IBM @server iSeries
2001 Announce Overview

Freedom to Succeed

ITSO Technical Overview

May 2001

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IBM ^ iSeries in 2001

iSeries
Model 820/830/840

Scalable, mixed transaction workloads

OS/400 V5R1 and SStar
Availability 5/25/2001

iSeries
Model 270

Application and Web server

Innovative technology that simply works

New tools for e-business

Application flexibility: Your business, your choice

Notes: IBM ^ iSeries in 2001

IBM eserver iSeries was announced in 2000, featuring new and innovative technology that separates it from predecessor AS/400 servers. iSeries is the first server in the industry to have deployed Silicon-On-Insulator, a breakthrough processor technology that improves a processor's performance, while reducing its heat output. iSeries also introduced High Speed Link, a new 1 Gigabyte bus technology that connects storage and I/O to the system, while being extensible for system-to-system clustering. Finally, a new crossbar memory switch added to iSeries balanced system performance.

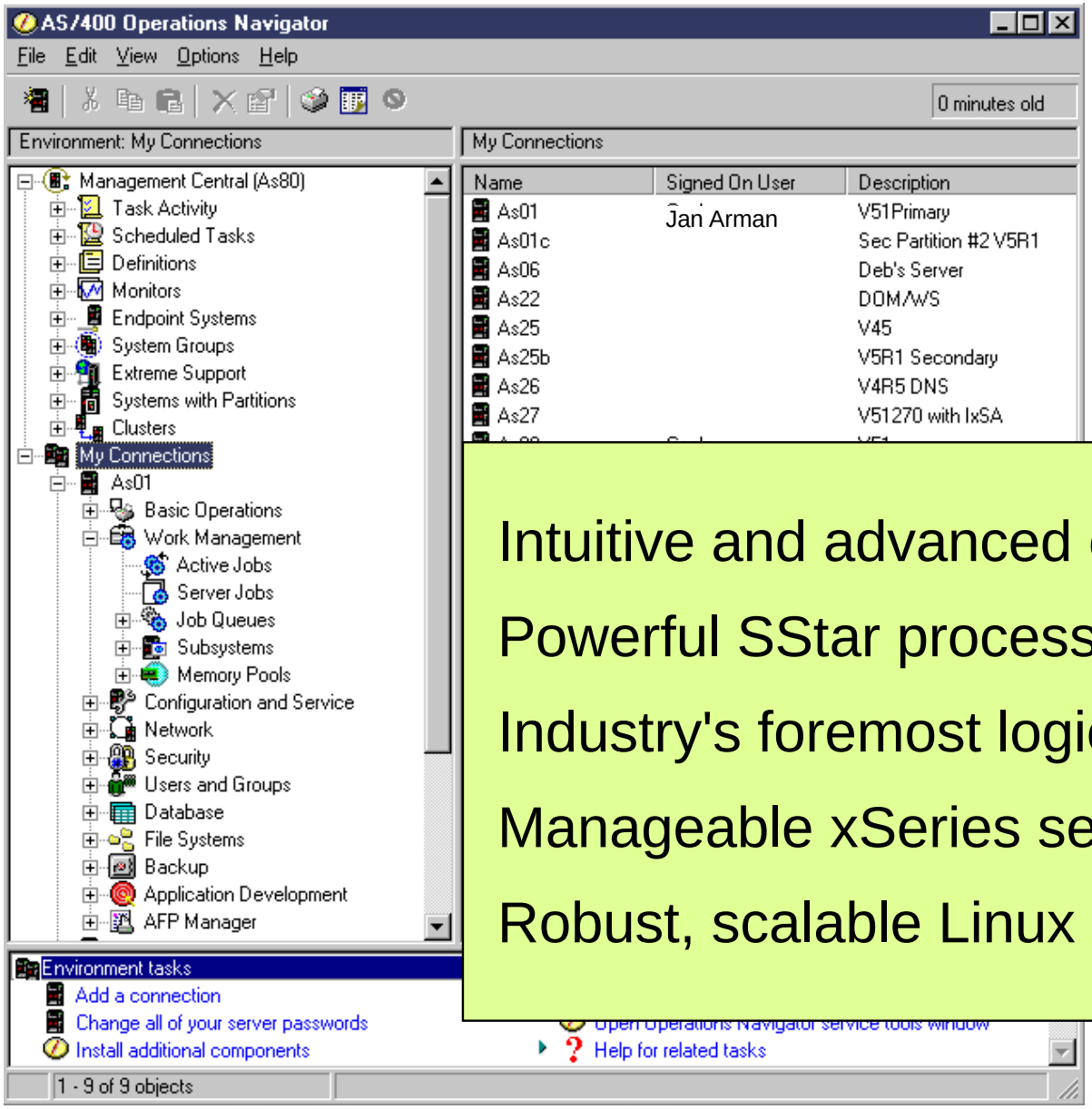
iSeries products are classified into four main groups:

- iSeries Models 820, 830 840 are scalable, enterprise class servers designed for mixed application and transaction workloads.
- iSeries 270 is a server for small to medium-sized businesses that incorporates options for application and Web serving and compute intensive workloads that typically do not use a relational database. In addition to non-database applications, the Model 270 has strong relational database support for applications such as Business Intelligence, Supply Chain and ERP.
- iSeries Dedicated Server for Domino is tuned specifically for the demands of Lotus Domino, providing balanced performance for multiple Domino server instances, concurrently in a single server.
- iSeries Models SB2 and SB3 are designed as application servers, requiring very scalable processor performance, but with few disk or database requirements. These servers are typically deployed in a three-tier implementation as a front-end application server to an iSeries 840 as a database server.

This presentation covers OS/400 Version 5 Release 1, new iSeries processor features and associated products that have a planned availability of May 25, 2001. Some enhancements will be available later in 2001.

Together these products extend the iSeries reputation for innovative technology, application flexibility, and as a server that provides new tools for e-business.

2001 iSeries Announcement Highlights



OS/400 V5R1 and SStar
Availability 5/25/2001

Intuitive and advanced operations

Powerful SStar processors

Industry's foremost logical partitioning

Manageable xSeries servers for Windows 2000

Robust, scalable Linux servers

Notes: 2001 iSeries Announcement Highlights

OS/400 V5R1 provides the industry's foremost application flexibility with support for Linux, Windows 2000, Java, UNIX and iSeries applications, combining high availability with superior workload management and logical partitioning.

OS/400 V5R1 and iSeries provide robust reliability and scalability for the fast growing open source Linux environment. Now the next generation of Web-enabled Linux applications can be quickly deployed and managed in a single, partitioned server alongside current business applications.

With OS/400 V5R1, a business can simply and rapidly deploy e-business applications with seamless integration of existing applications and data. With extensions to its robust security and networking options, OS/400 V5R1 enables a secure framework for business-to-business connectivity through the supply chain and to customers.

The face of OS/400 is forever changed with extensive Operations Navigator-based graphical interface enhancements providing intuitive visualization, wizards and integration for simplicity of advanced operations from both PCs and pervasive or mobile devices. Operating your server has never been this simple!

In this Operations Navigator window example you can see some of the new V5R1 capabilities, including:

- New Management Central support for Extreme Support, Configuring and Managing Logical Partitioning resources, Configuring and Managing Clustering support
- New specific system support for Work Management
- New "Task Pad" support at the bottom of the window. For each major Operations Navigator function there is a set of predefined "quick paths" to specific functions. These quick paths minimize the number of point and click operations required to get to a specific function. In later releases you will be able to customize this area.

With dynamic and granular Logical Partitioning, OS/400 V5R1 makes it easier then ever to manage multiple applications in a single server. Also, iSeries can now provide a storage area network for directly attached Windows 2000 Servers.

Notes: 2001 iSeries Announcement Highlights-2

New high availability options include faster, less expensive system-to-system clustering options and the ability to switch applications, data, and resources between two iSeries servers.

In addition, V5R1 includes a broad range of enhancements for e-business and application enablement, security, networking, directory services, database, Java, OS/400 Portable Applications Solutions Environment (OS/400 PASE), Internet printing and much more.

Innovative technology that simply works

Innovative Technology That Simply Works

iSeries processor roadmap

New iSeries processor features

Clustering over High Speed Link

Simple Clustering with Switchable disks

Fibre Channel

IBM eserver iSeries

Java J

Linux

OS/400 PASE

Windows 2000

IBM eserver iSeries

April 2001
20,200 CPW
128 GB
18.9 TB

over x 1000

64-bit

AS/400

June 21, 1988
15 CPW
96 MB
27.3 GB

x 10

S/36

S/38

October 24, 1978
1.7 CPW
1.5 MB
387 MB

The eserver iSeries is the current generation of servers derived from the architecture that formed the foundation for both AS/400 and System/3x products. Of course, the iSeries today is fundamentally different from its predecessor products, not only in its performance but also in its underlying hardware technology and its ability to run applications from a wide variety of open application environments. Its architecture, however, has remained the key to adapting to new application models and incorporating new hardware technologies without affecting the ability to run existing applications. Of course, to be successful, an architecture must be durable enough to be relevant through multiple generations of technology and products. iSeries architecture has demonstrated that durability since its inception in 1978.

In 1978, the System/38 was the first server to use the advanced architecture that is exploited today in iSeries. With the announcement of the AS/400 in 1988, the first major architectural challenge was overcome by incorporating System/36 and System/38 applications together in a single server. The second major test of the architecture came in 1995, when the AS/400 moved to a 64-bit RISC processor base. It became the only server in the industry to make that transition with applications being automatically translated to run in full 64-bit mode, with no recompilation or application rewrites.

The introduction of 64-bit processing and symmetric multiprocessing enabled the transformation of the AS/400 from a midrange and distributed server, to the scalable enterprise server that we see today with the iSeries.

By exploiting 64-bit PowerPC processor technology, it became possible to open to new application environments, to provide a highly scalable Java server, to run UNIX applications and even to run Linux natively. Integrating an Intel processor-based server opened the platform to running Windows NT and Windows 2000.

Now shipping its seventh, successful generation of 64-bit processors, the iSeries has grown to become one of the largest enterprise class servers in the industry, rivaling even the largest UNIX servers. Whereas the AS/400 at its announcement was 10 times larger than the first System/38, when the iSeries was announced in 2000, it was a massive 1000 times more powerful than the original AS/400.

Notes: IBM @server iSeries-2

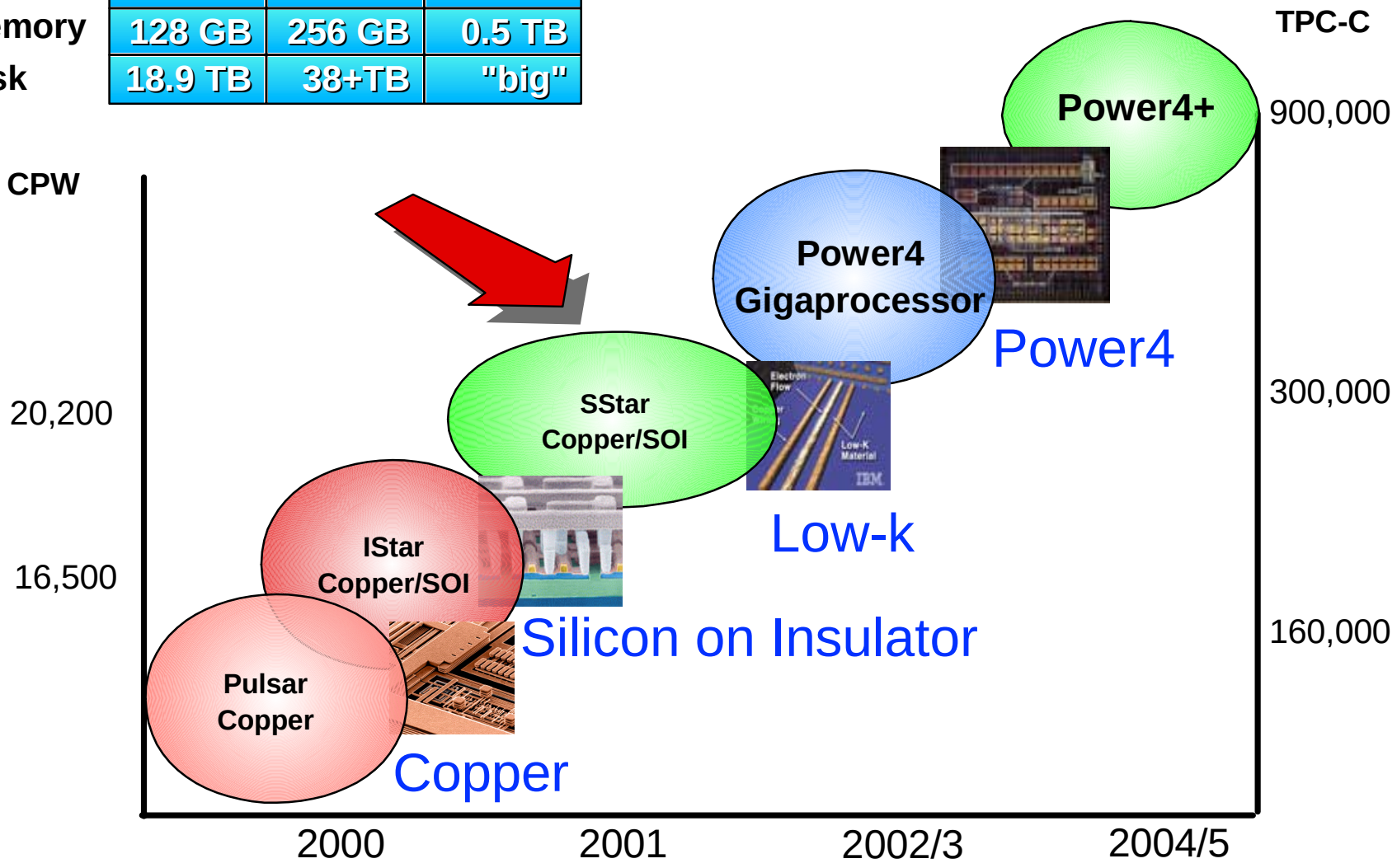
Note: During 2000 iSeries top rated 840 had a CPW rating of 16500. With the April 2001 announcement the top rated 840 is now 20200 CPW.

Remember also that Processor Commercial Processor Workload (CPW) values are used. CPW is a relative measure of performance of AS/400 family of processors. Performance in customer environments may vary. The value is measured on maximum configurations and can be used only for comparison among iSeries and AS/400e servers.

All performance statements made in this presentation are based upon measurements and predictions using standard IBM benchmarks in a controlled environment. For example, CPW (Commercial Processing Workload) is an internal IBM AS/400 performance benchmark used to compare among iSeries and AS/400 systems. Regardless of the benchmark used, the actual throughput or performance that any user will experience will vary depending upon considerations such as the amount of multiprogramming in the user's job stream, the I/O configuration, the storage configuration, and the specific workload processed. Therefore, no assurance can be given that an individual user will achieve throughput or performance improvement equivalent to the ratios stated here.

iSeries Processor Roadmap

	2000/1	2002/3	2004/5
SMP	24	32	64
Memory	128 GB	256 GB	0.5 TB
Disk	18.9 TB	38+TB	"big"



Notes: iSeries Processor Roadmap

With SStar processors and V5R1, iSeries now delivers its seventh generation of 64-bit processors.

The roadmap shown here is the roadmap for IBM eserver. Both iSeries and pSeries customers benefit from IBM's ability to deliver innovative technologies that provide industry leading performance, based on exploiting scalable 64-bit symmetric multiprocessing. With support for Linux on PowerPC, the IBM eserver advantage extends to give customers robust and scalable alternatives for implementing the next generation of e-business applications.

iSeries was the first server in the industry to deliver Silicon-On-Insulator and, combined with Copper chip technology, has forged a new role as an enterprise server.

IBM has now announced another milestone in semiconductor manufacturing: a new method for building microchips that can deliver up to a 30 percent boost in computing speed and performance. This new manufacturing technique uses a material technologists refer to as a "low-k dielectric" to meticulously shield millions of individual copper circuits on a chip. IBM is the first to use the low-k dielectric technique with copper wiring. For more information on IBM's chip technology including Copper, SOI, Low-k and Power4, see http://www.chips.ibm.com/bluelogic/showcase/

While iSeries, with its 24-way SMP, sets impressive performance benchmarks at the high end, it is also able to scale down, bringing the same processor and robust operating system advantages to small businesses. With SStar, iSeries is again able to bring the latest Copper and SOI technology down to smaller servers and, in doing so, reaffirms its strategy for entry products designed for small business.

The iSeries roadmap includes future exploitation of Power4 and Power4+ processors, with over 1 GigaHertz clock speed. Of course, iSeries is designed with business applications requirements for balanced system performance in mind. Therefore, along with new 64-way processor technologies, our system roadmap includes designs for supporting up to .5 TB of memory and massive disk storage capabilities to match the growth expectations of large corporations.

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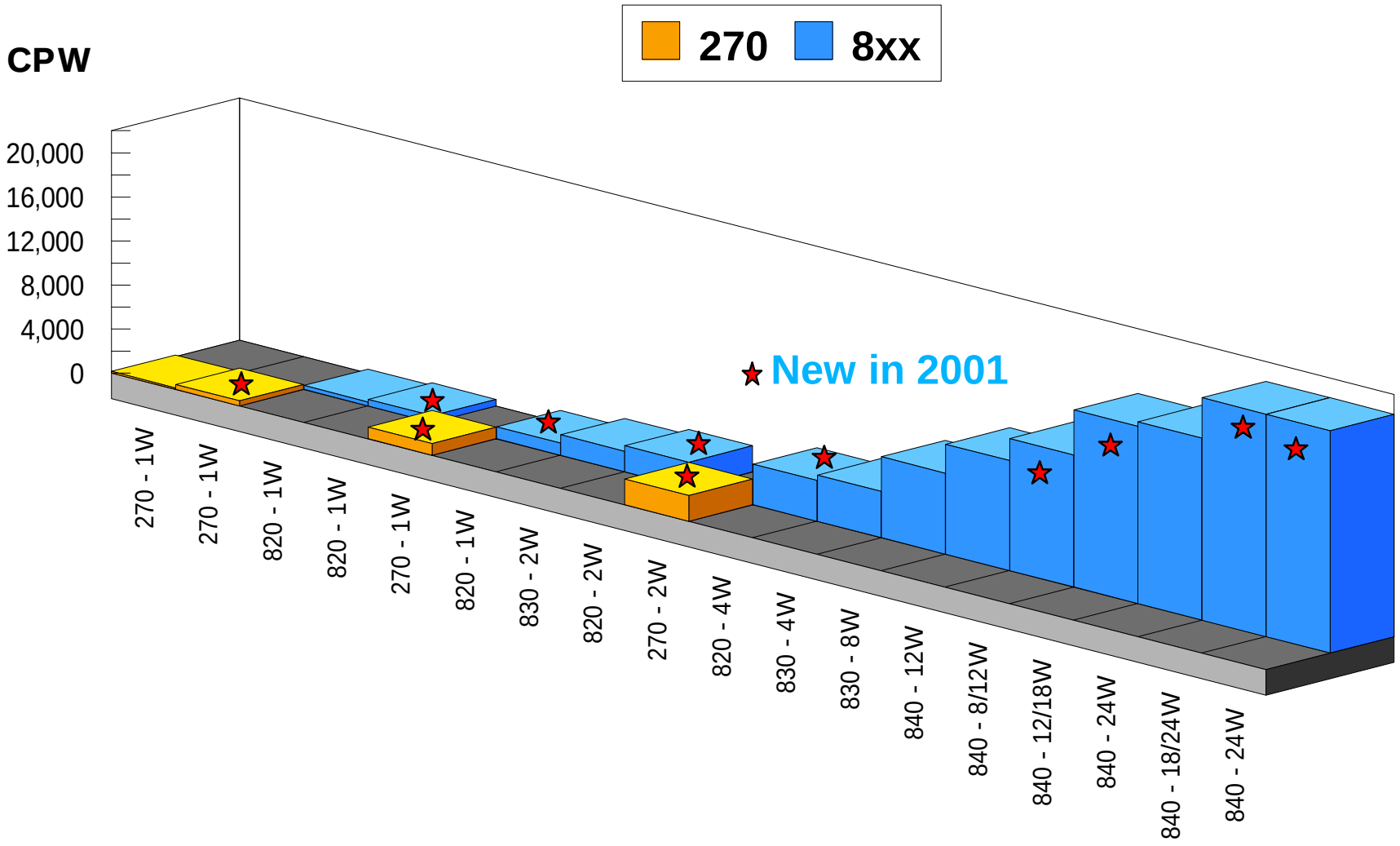
Notes: iSeries Processor Roadmap-2

Of course, while any roadmap is subject to change, AS/400 and iSeries has an impressive track record of delivering on past roadmaps. Unlike some technology competitors, AS/400 and iSeries has delivered on its promise of exploiting 64-bit processors and has done so without forcing customers to rewrite their applications. Note that Intel announced Merced in 1995, the same year AS/400 provided customers a seamless transition to its first generation of 64-bit computing.

Completing the Transition to iSeries



Processor Commercial Processor Workload (CPW) values are used. CPW is a relative measure of performance of iSeries processors. Performance in customer environments may vary. The value is measured on maximum configurations.

Notes: Completing the Transition to iSeries

In 2000, IBM announced the iSeries, complete with innovative technology from the ground up including new processors with Copper and Silicon-On-Insulator, a new crossbar memory switch and 1 Gigabyte High Speed Link interconnect. To help customers implement the transition to the new iSeries servers at a pace that matched their business requirements, IBM continued to sell AS/400e 7xx servers and combined a single product line with comparable price performance. As a result many customers were better able to upgrade within the 7xx products, while planning longer term to move to iSeries.

Now in 2001, the transition between AS/400e servers and iSeries is complete. The iSeries product line covers requirements from small businesses to the enterprise server requirements of large corporations.

The AS/400e Model 250 is available to meet the requirements of small business customers. Of course, as announced last year, the AS/400e 7xx servers remain available through 2001.

Benchmarks Update

V5R1 840-2461 and top 10 SpecjBB

System	# CPUs	JAVA JDK Level	Trans/second	Max Trans Time (SEC)
IBM iSeries 840-2461 (600 Mhz)	24	1.3.0	132,322	0.18
IBM iSeries 840-2461 (600 Mhz)	24	1.2.2	130,791	0.20
IBM iSeries 840-2461 (600 Mhz)	24	1.1.8	131,479	0.15
Sun Fire 6800 (750 Mhz)	24	1.3.1	109,146	2.80
IBM iSeries 840-2420 (500 Mhz)	24	1.2.2	80,348	0.46
IBM iSeries 840-2420 (500 Mhz)	24	1.3.0	79,316	0.35
IBM iSeries 840-2420 (500Mhz)	24	1.1.8	79,250	0.35
Sun Fire 6800 (750 Mhz)	12	1.3.1	62,463	1.77
IBM pSeries 680 (600Mhz)	12	1.2.2	56,834	1.11
Sun Fire 6800 (750 Mhz)	8	1.3.1	43,353	1.17
HP N4000	8	1.2.2	40,192	1.66

http://www.ideasinternational.com, or http://www.spec.org
SPECJBB2000 as of April 25, 2001

No other platform has published response times less than 0.5 seconds

V5R1 NotesBench Update

R5 Mail and Calendaring Results

Rank	Vendor	Server	# of CPUs	Test Date	Price per User	R5 Mail, Calendar Users
1	**IBM**	**iSeries 840 (600 MHz)**	**24**	**04/26/01**	**$31.86**	**100,500 (.067sec. RT)**
2	IBM	iSeries 840 (500 MHz)	24	12/01/00	$30.11	75,000
3	IBM	iSeries 840 (500 MHz)	24	06/01/00	$31.78	75,000
4	IBM	RS/6000 S80	24	01/18/00	$27.51	57,600
5	IBM	RS/6000 M80	8	05/01/00	$23.91	28,032
6	Compaq	Proliant 8500	8	01/15/01	$21.59	16,000

As of April 26, 2001

Source: http://www.notesbench.org and http://www.ideasinternational.com/benchmark/lotus/mailonly.html

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Hardware Overview

Scalable, Linux-ready iSeries Enterprise Servers

iSeries Model 820

- **SStar & Pulsar Copper / SOI**
- **up to 3,700 CPW**
- **up to 32 GB memory**
- **up to 4 TB disk, 237 arms**
- ***Replaces*** **top 4 features with new SStar processors**
- ***Adds*** **3 new base processor features**

iSeries Model 830

- **IStar Copper / SOI**
- **up to 7,350 CPW**
- **up to 64 GB memory**
- **up to 11 TB disk, 630 arms**
- ***Extends*** **existing options**

iSeries Model 840

- **SStar & IStar Copper / SOI**
- **up to 20,200 CPW**
- **up to 128 GB memory**
- **up to 18.9 TB disk, 1080 arms**
- ***Adds*** **new 24-way processor feature**

Notes: Scalable, Linux-ready iSeries Enterprise Servers

In 2001, iSeries 8xx servers provide a full range of enterprise server options featuring Pulsar SStar and existing IStar processors, both incorporating breakthrough Copper and Silicon-On-Insulator technologies. Four of the 820 processor features are replaced with new standard features (4 SStar processors), delivering an approximately 20% performance boost versus current servers. The 820 is also extended with 3 highly competitive new *base* servers, tuned for the high demands of new workloads, and designed for companies who do not need any 5250 interactive application performance.

The new SStar-based 820s are enabled for High Speed Link clustering and those with SStar processors are Linux-ready. New SStar 820s feature shared processor support for both OS/400 partitions and for Linux, allowing companies to run LPAR on a uni-processor for the first time. Note shared processor support for OS/400 partitions is available on Pulsar and IStar based 820 servers, but Linux shared processor support is not available on these processors. Existing n-way 820s can support Linux with dedicated processors. Additionally, existing 820s can be upgraded to SStar-based processor features to take advantage of High Speed Link clustering.

The iSeries Model 830 is extended with new support for up to an impressive 64 GB of memory. Shared processor support is enabled for OS/400 partitions, but not for Linux partitions. The iSeries Model 830 is Linux-ready and enabled for clustering over High Speed Link. For existing 830 servers, a simple feature upgrade is required to add the clustering support. The feature numbers are discussed later in this presentation.

A new high end 840 processor feature is added, giving exceptional scalability of up to 20,200 CPW with the new SStar-based 24-way. Both IStar and SStar processors will continue to be available in the 840, delivering a more granular high end product line. In addition, the iSeries Model 840 now supports up to a massive 128 GB of memory. The iSeries 840 also features Capacity Upgrade on Demand options, with new upgrades available from AS/400 Models 730 and 740 as well as existing standard iSeries Model 840 servers. Shared processor support is enabled for both OS/400 partitions and, on SStar processors, for Linux. All iSeries Model 840s are Linux-ready and enabled for clustering over High Speed Link. For existing 840 servers, a simple feature upgrade is required to add the clustering support. The feature numbers are discussed later in this presentation.

Notes: Scalable, Linux-ready iSeries Enterprise Servers -2

This chart shows technology level and range of CPW ratings of all 830 and 840 servers available as of May 2001.

Model	Standard Proc	N-Way	Proc Speed / L2 Cache	CPW	Int CPW	
840	2461	24W SStar	600 MHz/16 Mb	20200	120-20200	Requires V5R1
840	2420	24W IStar	500 MHz/8 Mb	16500	120-16500	Runs V4R5 and V5R1
840	2418	12W IStar	500 MHz/8 Mb	10000	120-10000	
830	2403	8W IStar	540 MHz/4 Mb	7350	70-4550	
830	2402	4W IStar	540 MHz/4 Mb	4200	70-2000	
830	2400	2W IStar	400 MHz/2 Mb	1850	70-1050	

iSeries 820: Extending Options for New Solutions

Linux-ready

Introducing base 820 processor options for compute intensive applications

- Flexible options for customers with no 5250-based applications
- For new iSeries portfolio of e-business, Supply Chain and CRM applications

Industry's foremost server for logical partitioning

- Up to 16 LPARs, up to 4 on a uni-processor

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iSeries 820: Extending Options for New Solutions

New options for the iSeries 820 extend its flexibility to run new solutions that demand compute intensive performance, but do not use any 5250 interactive application performance. Three new base processors are available with no 5250 performance, except that required by the system console.

New solutions supported by the base 820 processors include Web serving and many new applications like i2, Logility, QAD, EXE, Synquest, Prelude, Ariba, WebSphere Commerce Suite, Xtricity, Siebel, Engage, Youcentric, Onyx, SAP, JD Edwards OneWorld, Intentia, Baan, etc.

The iSeries 820 was already the only midrange server in the industry to offer logical partitioning. Now, V5R1 shared processor support extends LPAR capability to uni-processor 820 servers. Supported on Pulsar, IStar and SStar processors, up to four OS/400 partitions can be run on a single processor.

820s: 2001 Marketing

Pulsar 820-2395 for 820 entry

- V4R5
- V5R1, LPAR
- No HSL Clustering, Linux

SSTAR 820 Base Processors

- 0150. 0151, 0152: 0 Interactive CPW
- V5R1, LPAR (shared processors), Linux
- HSL Clustering

SSTAR 820 Standard Processors

- 35 - 2000 Interactive CPW
- V5R1, LPAR (shared processors), Linux
- HSL Clustering

Pulsar, iStar 820 Processors

- Not actively marketed
- V4R5, LPAR (2397, 2398)
- V5R1, LPAR (2396, 2397, 2398)
- V5R1, Linux (2397, 2398)
- No HSL Clustering

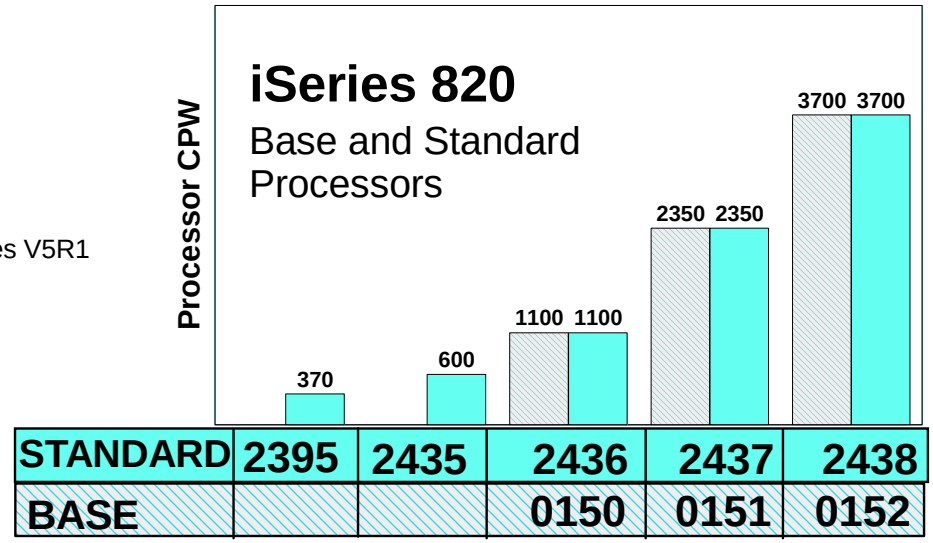
Base Proc	N-Way	Proc Speed / L2 Cache	Proc CPW	Int CPW
0152	4W SStar	600 MHz/4 Mb	3700	0
0151	2W SStar	600 MHz/4 Mb	2350	0
0150	1W SStar	600 MHz/2 Mb	1100	0

Standard Proc	N-Way	Proc Speed / L2 Cache	Proc CPW	Int CPW
2438	4W SStar	600 MHz/4 Mb	3700	35-2000
2437	2W SStar	600 MHz/4 Mb	2350	35-1050
2436	1W SStar	600 MHz/2 Mb	1100	35-560
2435	1W SStar	600 MHz/2 Mb	600	35-240

Requires V5R1

Standard Proc	N-Way	Proc Speed / L2 Cache	Proc CPW	Int CPW
2395	1W Pulsar	400 MHz/0 Mb	370	35-240

Runs V4R5 and V5R1



Notes: 820s: 2001 Marketing

This foil is a good summary of the new "April 2001 processors" and the "Year 2000" 820 entry processor (2395) that will be actively marketed during 2001. It shows summaries of their processor power and LPAR, Linux, Clustering capabilities.

Note that the "other Year 2000 820's" are still available, but the newer 820s are emphasized because of the newer technology, especially being able to take advantage of HSL Clustering.

iSeries 270: Innovative Technology for Small Business

Extending logical partitioning to the new SStar Model 270 processors

SStar processors - Linux-ready

Base servers tuned for Web, e-commerce, Supply Chain and CRM applications

ARIBA®
Making the net work for B2B℠

IBM WebSphere

iSeries Model 270

- **Pulsar and SStar Copper / SOI**
- **up to 2,350 CPW**
- **up to 16 GB memory**
- **up to 421 GB disk**

- ***Replaces*** **top 3 features with new SStar processors**

The iSeries Model 270 provides small businesses the opportunity to share the best and most innovative technology from IBM enterprise class servers.

With the iSeries announcement in 2000, the iSeries Model 270 already covered the majority of small business requirements.

With V5R1, logical partitioning is extended to the iSeries 270 SStar processors. This is quite an achievement as the majority of enterprise servers do not have partitioning features to rival those now on the iSeries Model 270. Partitioning on 270s will be used extensively by companies and Business Partners who want a small test server to try a new application release and to support Linux.

The SStar-based iSeries Model 270 processor features are Linux-ready with flexible (shared) partitioning capabilities to balance the demands of existing applications on the same server as new Linux applications.

270s: 2001 Marketing

Pulsar 270-2248 for 270 entry

- V4R5
- V5R1
- No HSL Clustering, LPAR, Linux

SSTAR 270 Base Processors

- 2432, 2434,: 0 Interactive CPW
- V5R1, LPAR (shared processors), Linux
- HSL Clustering

SSTAR 270 Standard Processors

- 2431, 2432, 2434
- 30, 50, 70 Interactive CPW
- V5R1, LPAR (shared processors), Linux
- HSL Clustering

Pulsar 270, Processors

- Not actively marketed
- V4R5, (2250, 2252, 2253)
- V5R1
- No HSL Clustering, LPAR, Linux

Base Proc	N-Way	Proc Speed / L2 Cache	Proc CPW	Int CPW
2434	2W SStar	600 MHz/4 Mb	2350	0
2432	1W SStar	540 MHz/2 Mb	1070	0

Requires V5R1

Standard Proc	N-Way	Proc Speed / L2 Cache	Proc CPW	Int CPW
2434	2W SStar	600 MHz/4 Mb	2350	70
2432	1W SStar	540 MHz/2 Mb	1070	50
2431	1W SStar	540 MHz/0 Mb	465	30

Requires V5R1

Standard Proc	N-Way	Proc Speed / L2 Cache	Proc CPW	Int CPW
2248	1W Pulsar	400 MHz/0 Mb	150	25

Runs V4R5 and V5R1

Innovative Technology for Collaborative Commerce

Dedicated Server for Domino
Model 820

Dedicated Server for Domino
Model 270

Lotus .domino for iSeries™

iSeries Dedicated Server for Domino

- Powerful new SStar processors, up to 4 TB of disk
- Up to 22% more performance
- Tuned for Domino mail, groupware applications and Web serving
- Extended support for WebSphere and Java applications

Flexible logical partitioning on both iSeries 270 and 820

 2001 IBM Corporation

Innovative Technology for Collaborative Commerce

iSeries has the industry's most scalable Domino server, with benchmark results of 75,000 users in a certified single server.

iSeries also features the industry's first server -- the Dedicated Server for Domino -- tuned for the unique demands of running collaborative commerce workloads with Lotus Domino, from mail serving to Web serving and CRM applications. The iSeries Dedicated Server for Domino has both 270 and 820 processor feature options.

With V5R1, new Dedicated Server for Domino 270 and 820 processor features are available featuring SStar Copper and Silicon-On-Insulator technology, delivering up to a 22% increase in performance with 11,810 Domino R5 Mail and Calendar Users (MCU).

iSeries flexibility for managing multiple Domino servers on a single system with balanced performance and robust reliability is well known. Now with V5R1, uni-processor logical partitioning support is extended across the SStar 270 processor features and all 820 uni-processor options. Partitioning allows a separate operating system image within which to test a new Domino version, in a isolated and flexible environment. Resources can be dynamically moved between partitions, so new Domino versions could be tested with spare resources that can be immediately returned to production partitions as required.

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2001 DSDs

Note: Internal IBM Domino Performance Estimates at 70% CPU Utilization

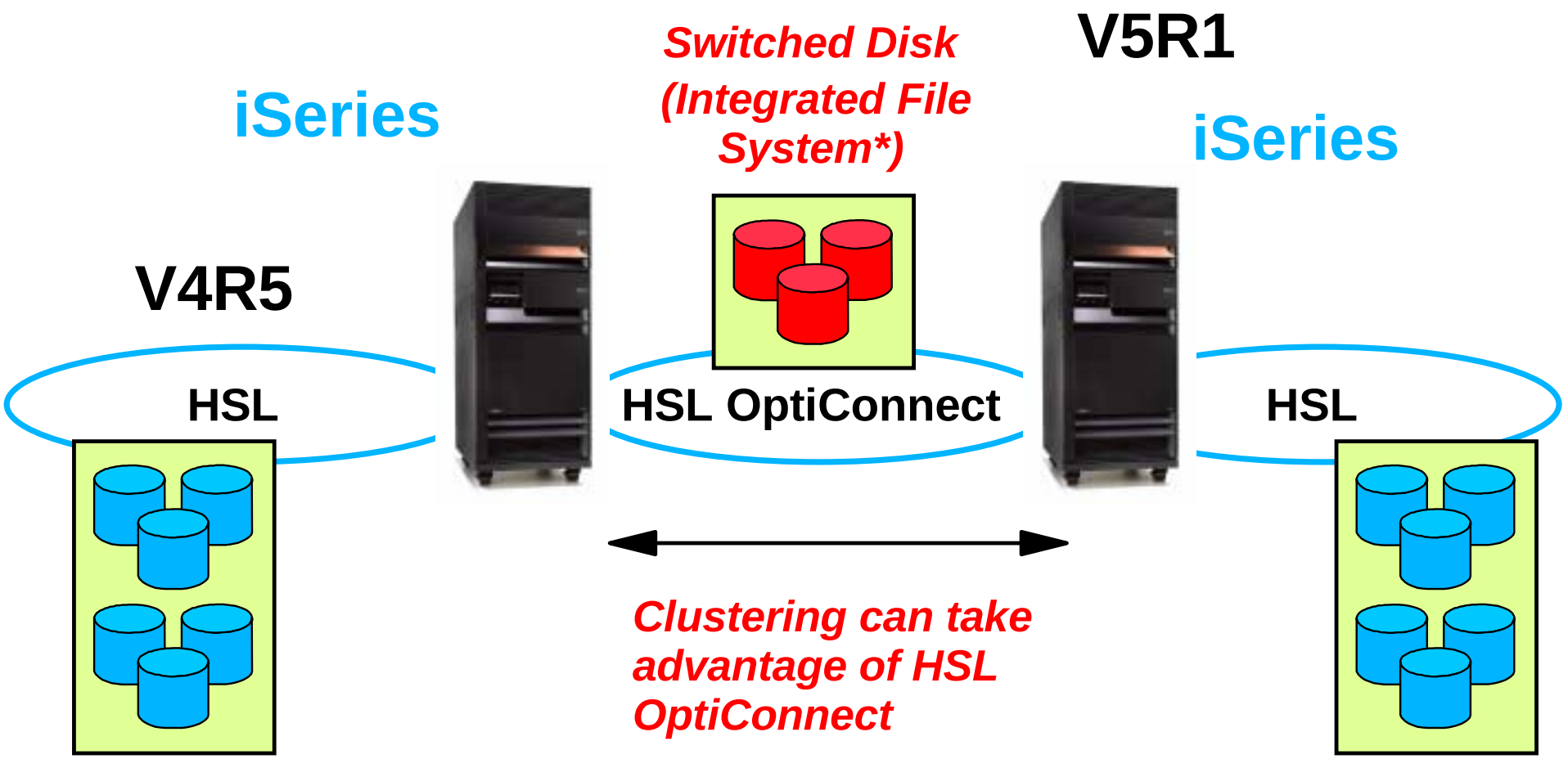
SSTAR DSD Technology

	270-2452	270-2454	820-2456	820-2457	820-2458
Number of SStar processors	1	2	1	2	4
Mail & Calendar Users	3,070	6,660	3,110	6,660	11,810
Maximum Memory (GB)	16 GB	16 GB	32 GB	32 GB	32 GB
Maximum Disk Capacity	421GB	421 GB	4 TB	4 TB	4 TB
Disk Drives (arms)	24	24	237	237	237
Software Tier	P10	P10	P05	P10	P10
LPAR	Y	Y	Y	Y	Y
Linux Ready	Y	Y	Y	Y	Y
Requires V5R1	Y	Y	Y	Y	Y

Pulsar, iStar Technology (not actively marketed)

	270-2422	270-2423	270-2424	820-2425	820-2426	820-2427
Number of processors	1	1	2	1	2	4
Mail & Calendar Users	1,600	2,570	5,050	2,570	5,610	9,890
Maximum Memory (GB)	4GB	8 GB	8GB	8 GB	16 GB	16 GB
Maximum Disk Capacity	421 GB	421 GB	421 GB	4 TB	4 TB	4 TB
Disk Drives (arms)	24	24	24	237	237	237
Software Tier	P05	P05	P10	P05	P10	P10
LPAR	N	N	N	**Y**	Y	Y
Linux Ready	N	N	N	N	**Y**	**Y**
V4R5, V5R1	Y	Y	Y	Y	Y	Y

HSL OptiConnect and Clustering



*All IFS objects except those in QSYS.LIB (such as database objects)

Notes: HSL OptiConnect and Clustering

AS/400 and iSeries are already known for leading single system availability, plus strong clustering capability, within OS/400 itself, plus through High Availability Business Partners such as Lakeview Technologies, Vision Solutions and DataMirror which provide data replication services and cluster management utilities. In addition, a growing number of ISVs offer ClusterProven applications on iSeries, solutions that have failover services that adhere to OS/400 cluster services and APIs.

OS/400 Clustering support includes the connectivity ("cluster fabric") of SPD OptiConnect software and hardware, communications lines (including ATM or 1 Gbps Ethernet) and now, with V5R1 the new OptiConnect over HSL support. OptiConnect is the most elaborate cluster fabric, supporting special application services and exceptional performance.

Also new with V5R1 is the option for switchable disk clusters. This option allows I/O towers (and the disk and other I/O they contain) to be switched between a primary server (node) and backup server (node). An IOP and attached disks can also be switched within partitions on an LPAR configured system In this release, switched disk clustering is supported for Integrated File System (IFS) objects except for QSYS.LIB objects, such as database objects and other system objects. There is a general statement of direction that database objects will be supported in the future.

Lotus Domino is a good example of an application that stores its files in the Integrated File System (IFS) and thus can take advantage of the new switched disk support. In addition, Domino (5.0.7 and above) is now a ClusterProven J application allowing automatic failover between a primary and secondary server in the event of a failure. Unlike the clustering support that is built into Lotus Domino that requires two servers and two sets of disks, iSeries switched disk clustering provides for failover between two servers, but maintaining a single disk copy of the server's data directory that can be switched between the two servers.

The next foil gives a good overview comparison of the various cluster fabric options. The Availability presentation gives more details on configuration and management of clustering support.

Notes: HSL OptiConnect and Clustering-2

The capability to switch I/O towers extends the availability options for iSeries servers that are managing Windows 2000 Servers. Integrated xSeries Servers, contained in an I/O tower, plus their disks defined in a new for V5R1 Independent Auxiliary Storage Pool (IASP) can be switched between two systems. In the event of an iSeries failure, the Windows configuration and disks can be simply switched to the backup iSeries server and then the Windows servers restarted after the appropriate linking of network storage objects.

OptiConnect is the most elaborate cluster fabric, supporting special application services and exceptional performance.

The next foil gives a good overview comparison of the various cluster fabric options. The Availability presentation gives more details on configuration and management of clustering support.

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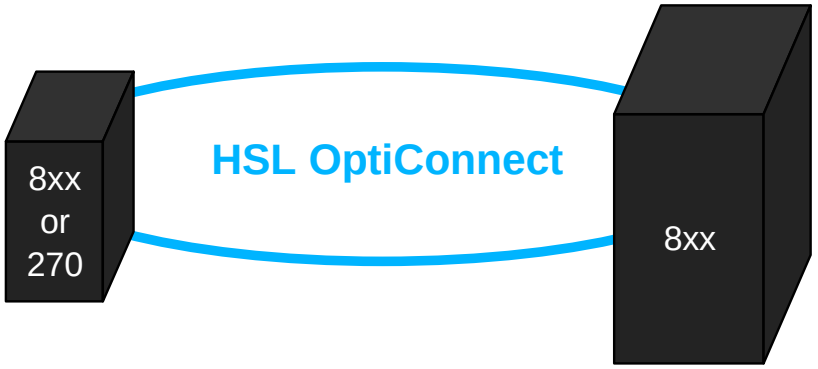
Clustering with HSL OptiConnect Loops

iSeries to iSeries connection

- Faster (1 gigaBYTE)
  - **Top performance for any environment where two or more nearby iSeries need to connect**
  - 16x SPD OptiConnect
  - 5x PCI 1 Gbits/second Ethernet
- Simpler
  - All new 8xx and 270 processors have HSL OptiConnect capability.
  - Existing 830/840 can be upgraded to HSL OptiConnect
  - Standard HSL cables
- Lower Cost
  - Less than 1/10 the expense of SPD OptiConnect hardware, the previous most common high speed system-to-system linkage



- Named HSL OptiConnect
  - (Optimal not Optical)
  - V5R1 OS/400 option 23
- Coexists with SPD OptiConnect in a Migration Tower
- Configuration rules and maximums in System Builder

Notes: Clustering with HSL OptiConnect Loops

Prior to this announcement, either SPD OptiConnect or the PCI 1 Gbps Ethernet were the fastest options to connect two iSeries. Each HSL OptiConnect loop is far faster with a capacity of about 1 Gbyte per second per loop and can take advantage of the shortened code path for database and communications under OptiConnect.

HSL OptiConnect is simple. All you have to do from a hardware perspective is plug them together. HSL OptiConnect ports are standard (no-charge) on the new processors features. Existing 830/840 HSL ports can be upgraded to OptiConnect HSL ports. Standard HSL cables are used.

Contrast that to the specialized, costly hardware required for SPD OptiConnect, and it's easily less than 1/10 of the hardware cost. HSL OptiConnect is far cheaper than other options.

Remember, this is called HSL OptiConnect. But it is "Optimal", not "Optical". HSL cables today are copper based and a maximum of 15 meters per cable segment.

And for those who need to connect into existing 6xx/Sxx/7xx SPD OptiConnect clusters, HSL OptiConnect can coexist in this AS/400-to-iSeries environment.

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Notes: Clustering with HSL OptiConnect Loops-2

Notes::

- HSL cable length maximum of 15 meters is why "nearby iSeries" is used.
- The 16x and 5x capacity differences are a little of an apples vs. oranges comparison. It's probable that from an effectiveness perspective, SPD is more effective and Ethernet is less effective than these numbers indicate. It would be workload dependent. Don't focus on the specific numbers as "your mileage will vary."
- The current "year 2000" 830 and /840 have new features to do HSL OptiConnect: 2-Way 830 is FC#2777; 4/8-Way 830 is FC#2754; all 840 is FC#2755. New 830/840 orders when shipped with V5R1 will default to these features. They are called Bus Exp - 8/16 HSL Ports.
- For 270s and 820s, the HSL capabilities are built into the back plane of the server. The processor features announced in 2000 only have HSL but no OptiConnect capability. To use OptiConnect, they must be upgraded to processor features announced in 2001 to have HSL OptiConnect capability.
- To coexist with SPD OptiConnect, at least one 8xx must have a migration tower with SPD OptiConnect hardware attached.
- There are a number of configuration rules and maximums which are not on this foil. See the *System Builde*r book, SG24-2155-06, for more information.

High Speed Link OptiConnect

Server to Server connectivity over HSL

- 1 GBytes per second connectivity

All iSeries Models with V5R1 hardware are enabled with new adapters

- Year 2000 iSeries Models 830 and 840 require new orderable features

If implementing switchable IASP:

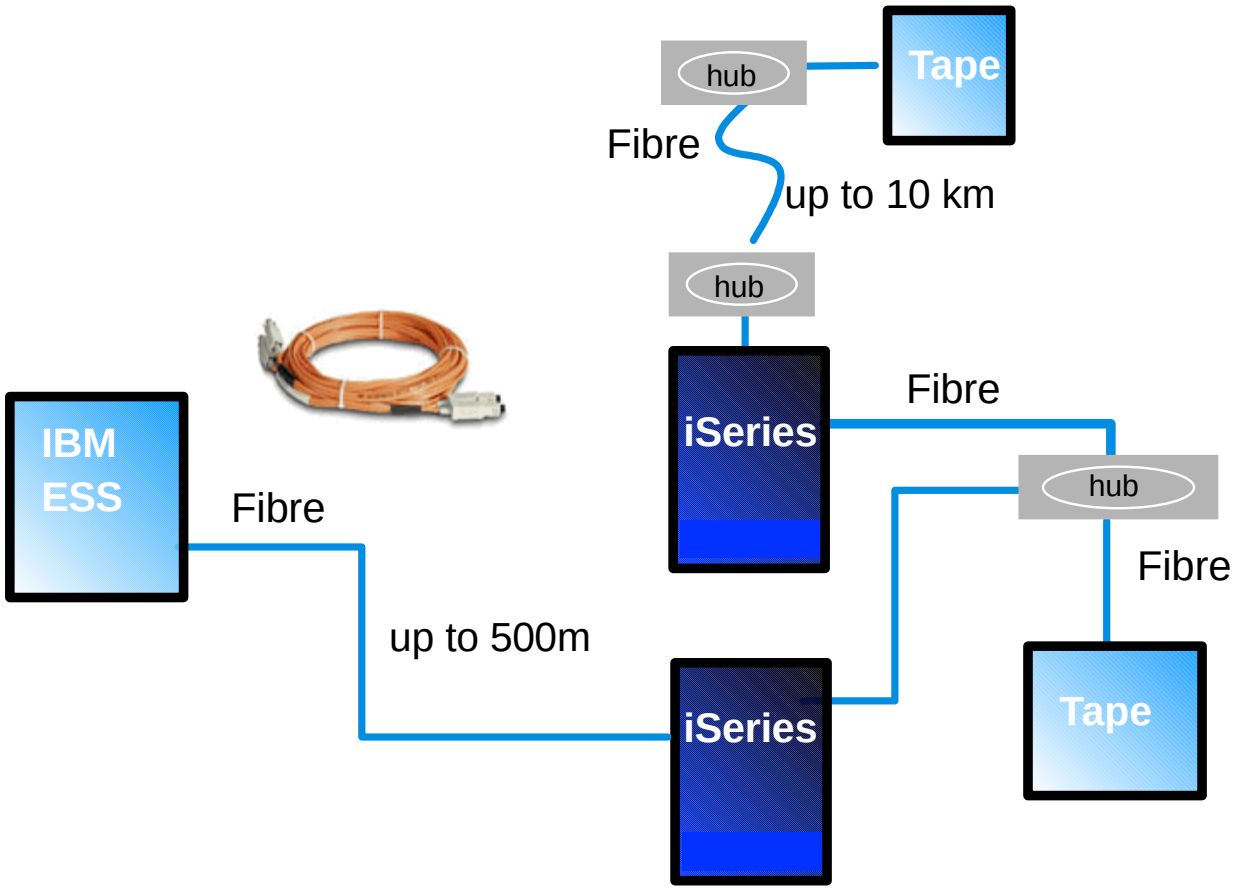
- HSL OptiConnect hardware required*
- OS/400 option 41 (HA Switchable Resources, extra cost) required
- OS/400 option 23 (OptiConnect intersystem communications) not required

If implementing OptiConnect intersystem communications:

- Can use: HSL OptiConnect hardware, 1 Gbits/second Ethernet, SPD Optical via Migration Tower, ...
- OS/400 option 23 (OptiConnect intersystem communications) required
- OS/400 option 41 (HA Switchable Resources) not required

*Not required for IOPs in LPAR partitions

Fibre Channel Attachment Options



New PCI Fibre Channel Disk and Tape Controllers

- Tape Controller extends tape distance and sharing options
- Disk Controller simplifies IBM ESS storage attachment

Notes: Fibre Channel Attachment Options

iSeries with V5R1 now supports options to participate in Storage Area Networks (SANs), with new Fibre Channel Controllers for tape and disk attachment.

Note that dedicated storage, whether internal or network connected, continues to provide the best and most consistent performance to iSeries applications, especially high volume transaction workloads typical of banking, ERP and telecommunications customer care and billing applications. In benchmarks, these application types have not performed consistently when mixed on the same external storage device with high I/O demanding workloads such as a sequential batch processing or file serving.

For tape devices, fibre channel presents new opportunities for resource sharing and distance of up to 10 KM with hubs.

For those customers that are attaching IBM Enterprise Storage Server via an SPD tower and #6501 I/O controllers, the new fibre channel storage controller provides for simpler connectivity. Note switching from #6501 to fibre channel controllers will only improve performance if the #6501 was a performance bottleneck. Typically, the #6501 has not been the performance bottleneck and so existing customers may choose to migrate to fibre only as they transition from SPD to PCI towers.

Fibre attachment offers several advantages. However, careful planning must be made based upon understanding the connection options external to the iSeries and possible sharing of disk or tape configurations with multiple systems to ensure advantages can be taken advantage of in specific customer environments.

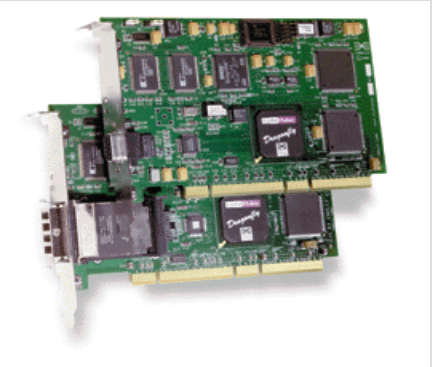
Detail planning considerations are beyond the scope of this presentation. The following foils give some details on iSeries fibre channel attachments.

SAN Hardware Components

iSeries Fibre Channel Tape Controller #2765

iSeries

- 3590 E11 an E1A
- 3584
- Up to 23% more capacity than the Ultra Magnetic controller, Feat code # 2749, announced in 2000



iSeries Fibre Channel Disk Controller #2766

- Supports 2105 Models F10 and F20

Fibre Channel Cables

- Multi-mode 62.5 and 50 micron
- Single-mode 9 micron

IBM Managed Hub (3534 Model 1RU)

- 8 ports; 1 Gigabit Interface Converter, 7 short wave optical ports
- Supports zoning (by port)
- Serial, Ethernet/Browser Interfaces

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Notes: SAN Hardware Components

iSeries #2765

The #2765 PCI Fibre Channel Tape Controller provides fibre channel attachment capability for external tape devices. The #2765 supports point-to-point and arbitrated loop topologies. Each #2765 is shipped with a wrap connector (PN#05N6767). The following options are available to attach SC-type fibre cables :

- #0371 is a two meter LC-SC Adapter kit that can be used to connect the #2765 to a 50µm (50 micron) cable.
- #0372 is a two meter LC-SC Adapter kit that can be used to connect the #2765 to a 62.5µm (62.5 micron) cable.

Fibre channel attachment for tape drives offers tremendous performance capabilities and long distance options. It is also easier for you to share these valuable resources with multiple systems.

The following Tape subsystems with FC capability that are supported by the #2765 PCI Fibre Channel Tape Controller are the 3590 Models E11 or E1A with feature #9510 (on new orders) or feature #3510 (SCSI to FC conversion on installed models) and the 3584 with drive feature #1456.

For the Magstar 3590 Model C12 frame, or the Magstar 3494 Tape Library Model L12 or D12 frame, one feature number #3511 (Install Fibre Channel Drive) must be added for each Magstar 3590 Model E1A Tape Drive with Fibre Channel Attachment feature installed in those frames.

Notes: SAN Hardware Components-2

iSeries #2766

The #2766 PCI Fibre Channel DASD Controller provides fibre channel attachment capability for external disk devices. The #2766 supports point-to-point and arbitrated loop topologies. Each #2766 is shipped with a wrap connector (PN#05N6767). Just as for the #2765, the following options are available to attach SC-type fibre cables :

- #0371 is a two meter LC-SC Adapter kit that can be used to connect the #2765 to a 50µm (50 micron) cable.
- #0372 is a two meter LC-SC Adapter kit that can be used to connect the #2765 to a 62.5µm (62.5 micron) cable.

Some iSeries customers may find SAN-attached DASD devices to be appealing for their environment. If consolidating large amounts of DASD from different platforms is important, you should consider SAN. Note, however, a complex commercial business environment usually requires good, predictable response time to maintain user productivity and satisfaction. Carefully consider the performance implications of sharing resources in this environment, as the sharing may introduce more variable performance. For these critical workloads, dedicated direct attach DASD resource can ensure more predictable performance. Feature #2766, PCI Fibre Channel Disk Controller, for attachment into Storage Area Networks for DASD is offered as an optional feature, when ordered with ***RPQ 847126.***

Fibre Channel Adapters require OS/400 V5R1

IMPORTANT NOTE: IBM will withdraw #6501 from marketing on July 31, 2001. Attachment to IBM ESS will be through #2766 Fibre Channel Adapter on iSeries and OS/400 V5R1.

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Notes: SAN Hardware Components-3

3584

The Gigabit Interface Converter (GBIC) 3534 Managed Hub is used to attach network devices to fiber-based transmission systems such as fibre channel and gigabit ethernet. It converts the serial electrical signals to serial optical signals and vice versa. This is not an iSeries orderable feature.

The IBM SAN Fibre Channel Managed Hub offers:

- Industry standard Fibre Channel attachment
- High-speed performance utilizing nonblocking switch-based technology.
- Simultaneous 100 MB/second full duplex data transfers across all ports.
- Eight ports, one that is configurable with either a short wave or long wave optical GBIC. (see detail below)
- StorWatch FC Managed Hub Specialist, a Web browser interface for configuration, management, and service.
- Support of industry standard MIBs enabling standard SNMP management.
- IBM SystemXtra support services and financing.

The managed hub is designed for implementing multinode server clusters and storage systems for high-availability and disaster recovery solutions. Seven ports incorporate fixed short-wave laser optical media for device interconnection at a maximum distance of 500 meters. A single Gigabit Interface Converter (GBIC) slot accommodates an optional GBIC, which supports either short-wave or long-wave laser fibre optic cabling with a maximum distance of 10 kilometers.

SAN Hardware Components...

IBM SAN Fibre Channel Switch (2109 Model S08 and Model S16)

- 8 or 16 port switch, zoning supported
- up to 10km
- supported in V5R1 with Arbitrated Loop via QuickLoop

Notes: SAN Hardware Components...

The 2109 SAN FC Switch is offered in two models:

- Model S08, 8-port model for departmental SANs
- Model S16, 16-port model for enterprise SANs

Common features include four short-wave (SW) laser (500M) GBICs (Gigabit Interface Convertor), 10/100BaseT Ethernet port for StorWatch specialist console with Web Interface and either rack mount or desktop packing options. Optional features include one or more SW or long wave (LW, 10 KM) -laser GBICs, redundant power supply and SW, multi-mode 5M/25M FC cables. The eight port model provides for 1 or 4 additional GBICs, a serial port for telnet terminal attachment with a simple command line interface for setting configuration variables such as IP-address, and a 1U (1.75") form factor. The sixteen port model provides for 1 to 12 additional GBICs.

For use on the iSeries, the QuickLoop RPQ provides the firmware that enables devices connected to ports of the switch to be handled as private loop devices. QuickLoop creates a unique fibre channel topology that allows host bus adapters (such as the #2765 and #2766) that use fibre channel arbitrated loop (FC-AL) without knowledge of SAN fabric, commonly to communicate with fibre channel arbitrated loop storage devices through IBM 2109 Fibre Channel Switches. QuickLoop allows individual switch ports to be designated as arbitrated loop ports, allowing a private host initiator to communicate with arbitrated loop storage devices as though they were all contained in one logical loop. These QuickLoop switch ports can be located on one switch, or on two switches either directly connected to each other or connected within a SAN fabric. A SAN fabric can contain many independent QuickLoops but only one or two switches can be designated to build a single logical arbitrated loop in which private loop initiators can communicate.

This is not an iSeries orderable feature. The 2109 with Arbitrated Loop via QuickLoop is the only 2109 switch configuration supported in V5R1.

iSeries I/O Enhancements

Operations Console with LAN Connectivity (Specify Codes 5546, 5548)

- Flexible management of multiple servers and partitions from a single PC console

PCI RAID Disk Controller (#2778/4778)

- Improved performance via advanced caching (104 MB)

PCI Expansion Unit (#5078)

- Contains 14 I/O slots for expanding I/O requirements without requiring a disk tower (no disks or removable media devices): "top hat" on 840 base 9079 I/O Tower or 5074 PCI Expansion Tower

Rewriteable DVD-RAM (#4430/#4530) 4.7 GB per side uncompressed

- For Save/Restore, Alt IPL, Software Distribution: 7 x CD-ROM; 3.6 MB/sec (equal to 24 x CD-ROM); Read CD/DVD ROM, RAD

New Tape Options

- 3590 E11/E1A and 3584 UltraScalable Library with improved flexibility/performance via Fibre Channel
- 50 GB QIC SLR Tape with 2x the data rate of previous models #4487/#4587
  - External 7329 Model 308 SLR100 Tape Autoloader (8 cartridge magazine = 400 GB capacity):

New Communications Adapters

- 1 Gbps Ethernet Unshielded Twisted Pair (UTP) IOA (#-2760)
- Dual WAN / Modem IOA (#2772/#2773))
- 155 Mbps Multi-Mode Fiber (MMF) ATM IOA (#2817)

HSL OptiConnect adapters for 830 and 840

Notes: iSeries I/O Enhancements

Operations Console with LAN Connectivity offers Token-Ring and Ethernet options for additional flexibility in distributed and LPAR environments. It is designed for customers running LPAR or managing multiple systems from a single console. When ordering new, the LAN Console feature you specify 5546 if using a Token Ring connection or 5548 if using an Ethernet connection.

PCI RAID Disk Unit Controller (#2778/4778): In addition to providing RAID-5 protection for disks, this controller is also designed to work as a high performance controller for disks protected by system mirroring or disks with no protection. This controller is Ultra2 SCSI capable when installed in a #5065, Storage/PCI Expansion Tower or #5066 I/O Tower, and is Ultra SCSI capable when installed in the system unit or #5064/#9364 System Unit Expansion. It supports a maximum of 15 drives. It also supports the #4331/#6831 1.6 GB Read Cache Device. Larger read cache is supported only when it is not in compression mode. It has a maximum compressed cache size of 104 MB which provides RAID-5 protection and compression for internal disk units.

PCI Expansion Unit (#5078): The #5078 PCI Expansion Unit is a "top hat" that installs on top of the #9079 Base I/O Tower of the Model 840, and on top of the #5074 PCI Expansion Tower. The #5078 has 14 PCI slots, which allows up to 11 PCI IOAs to be added. Disk units and removable media devices are not supported in the #5078. The #5078 can be ordered with a #5074/#9079 on initial orders and the #5074/#9079 will ship with the #5078 installed. The #5078 may also be ordered as an field install on an existing #5074/#9079.

Rewriteable DVD-RAM: The #4430/#4530 is a 5.25-inch half-high device which installs in a removable media slot. It uses new optical technology that advances the capabilities that CD-ROM brought to the iSeries. It provides the software distribution capability of CD-ROM, but it is also a writable device. The 4.7 GB (uncompressed) capacity of the media is over seven times larger than CD-ROM. The drive will read CD-ROM, CD-R, CD-RW, DVD-ROM and DVD-RAM media. It can write only DVD-RAM media. The speed at which it transfers data from the media is roughly equivalent to a 24x speed CD-ROM, or about 3.6 MB/sec average sustained. #4430 is an optional feature that mounts in the system unit of Models 830, 840, SB2, and SB3, and in the #5074/#5079 PCI Expansion Towers. DVD-RAM may be selected in place of a CD-ROM drive in the minimum server configuration. #4530 is an optional feature that mounts in the system unit of Models 270 and 820.

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Notes: iSeries I/O Enhancements-2

The #4430/#4530 can be used for Alternate IPL, program distribution, and data interchange (using ISO 9660 and UDF formats). #4430/#4530 is not supported by "Boot Manager" with OS/400 V5R1. Prerequisites: Disk unit controller in CEC/tower where device is mounted. **OS/400 V4R5 with PTFs, or later, is required.**

The 3590 E1 and E1A and the 3584 Ultrascalable Library are enhanced by providing for improved flexibility/performance via Fibre Channel connectivity to an iSeries.

The 50 GB 1/4-inch cartridge tape features #4487 and #4587, provide up to 100 GB of storage capacity, per cartridge using Scalable Linear Recording (SLR), an extension of the Quarter Inch Cartridge (QIC) tape technology.

The following foils provide additional details on selected I/O enhancements listed on this foil.

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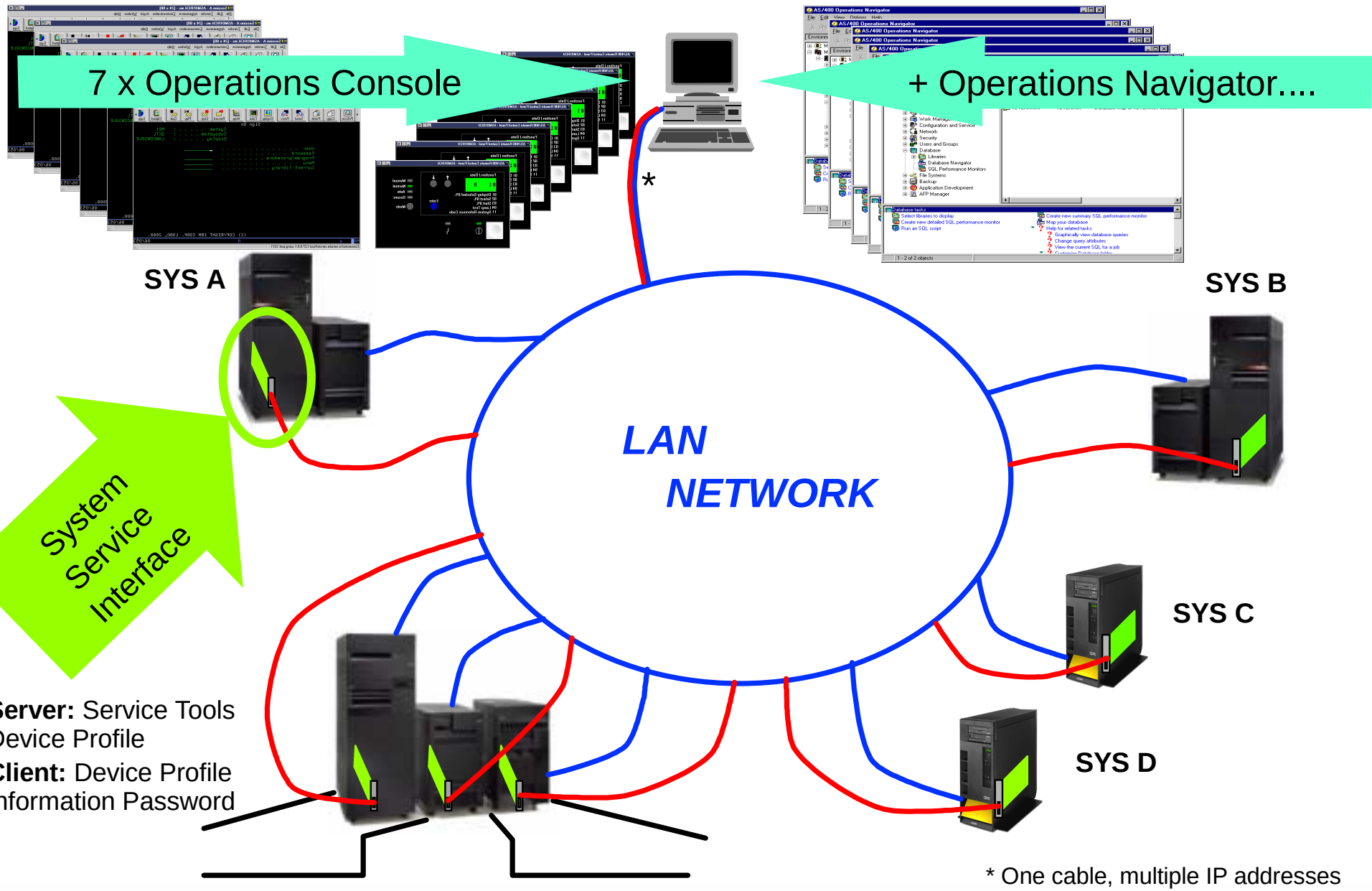
Operations Console on the LAN: The Concept



- **Server:** Service Tools Device Profile
- **Client:** Device Profile Information Password

* One cable, multiple IP addresses

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Notes: Operations Console on the LAN Concept

Operations Console - Direct attach or via a switched connection has been available for several releases as a console device alternative to twinax attached 5250 workstations. Now in V5R1 a 3rd console device attachment - over an existing LAN network, becomes available. The objective of the Operations Console on the LAN support is to enable a single workstation device to be the console to multiple AS/400 or iSeries systems and/or multiple partitions in a single iSeries or AS/400 system.

The Operations Console on the LAN console attachment is specified as one of the following:

- Specify 5546 for Operations Console on Token Ring LAN
  - Requires #2744 : 4 / 16 / 100 Mbps Token Ring Adapter
- Specify 5548 for Operations Console on Ethernet LAN
  - Requires #4838 : 10 / 100 Mbps Ethernet Adapter

V5R1 Client Access Express either under EZ-Setup wizards or on the client workstation at a later time under Operations Console are used to configure the client workstation side of Operations Console.

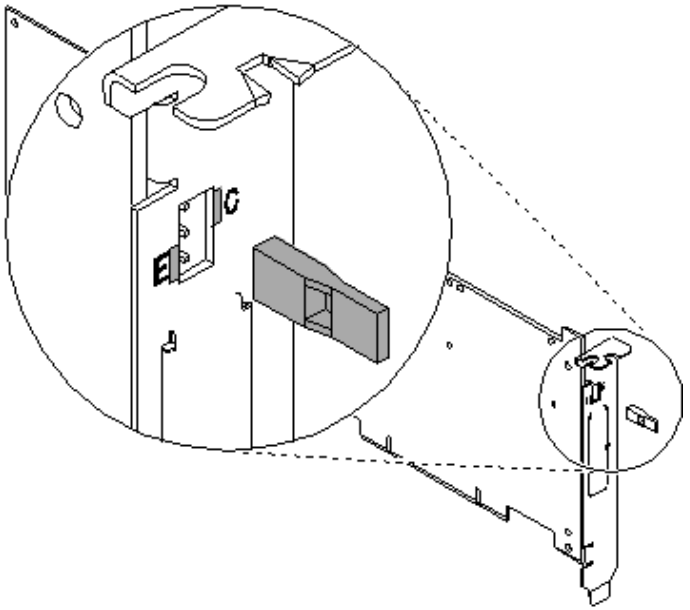
On the host/server side, new V5R1 Service Tools Security is used to secure Dedicated Service Tools (DST) functions as well as System Service Tools (SST) functions for Disk Unit and Logical Partition functions from either a console device or Operations Navigator Configuration and Services-Hardware interface. For Operations Console on the LAN there is additional Service Tools Device Profile security that must be configured to perform console functions. This device profile information is used to perform SSL encryption without requiring Digital Certificates.

As depicted in this foil, Operations Console for the LAN assumes complete control over a specific 270, 8xx LAN adapter per system or partition. **The system service interface requires a dedicated LAN adapter**. See the red line from a workstation to the green rectangle in each system/partition. If concurrent standard LAN activity, such as running Operations Navigator functions, is desired, a second LAN adapter must be configured and varied on. Separate IP addresses are required. The dark blue line from the PC to each system/partition represents the "normal function" IP address on each system.

Disk Controller and Disk Unit

PCI RAID Disk Controller #2778/#4778 or #9778 (base):

- Write cache of 104 MB
- Supports up to 15 disk units (18 on 270)
- Compression Mode Jumper
- Supports #4331 1.6 GB Read Cache device
- Supports CD-ROM, DVD and internal tape



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Notes: DASD IOA and DASD Unit

The #4778/#9778 is an Ultra2 SCSI adapter with a maximum compressed write cache size of 104MB that provides RAID-5 protection and compression for internal disk units and also supports up to two (any combination) of internal tape units, CD-ROM and DVD-RAM units.

The #4778/#9778 supports both disk compression and enhanced modes. The mode of operation is determined by a hardware jumper. The Ultra2 SCSI adapter #4778/#9778 is shipped in enhanced mode, which enables compression of the write cache while Extended Adaptive Cache (a Read Cache Device is needed for Extended Adaptive Cache, see below) and/or RAID-protection are also supported. By moving the hardware jumper the adapter will function in ***disk compression*** mode and you can start compression for selected drives under control of the adapter.

In addition to providing RAID-5 protection for disks, #4778/#9778 is also designed to work as a high performance controller for disks protected by system mirroring or disks with no protection.

#4778/#9778 also supports the #4331 1.6GB Read Cache Device, which is used by Extended Adaptive Cache to provide increased performance. The Read Cache Device (#4331) is supported only when #4778/#9778 is in enhanced mode.

The #4778/#9778 controller supports a maximum of 18 disk units. (NOTE: Due to system CEC and external tower disk unit cage SCSI bus designs, only the model 270 will have a suitable system configuration to allow 18 disk units to attach to a single #4778. All other CEC/tower disk unit configurations will restrict the number of attaching disk units to **15** or less.

Note: The #2778 and #4778 are the identical card. #4778 is installed by the customer ("CIF") and the 2778 is installed by a service technician.

Communication Adapters

#2817 155 Mbps MMF ATM

- Replaces #4816 155 Mbps ATM, when OS/400 V5R1 is ordered

#2760 1 Gbps / 100Mbps / 10Mbps UTP Ethernet UTP IOA

- Unshielded twisted pair (UTP) lower cost than current #2743 1 Gbps Ethernet IOA (multi-mode fibre optic cable)
- Negotiates to 1 Gbps, 100 Mbps, or 10 Mbps
- TCP/IP only, full or half duplex

#2772 and #2773 two line WAN adapters (RJ11) for V.90 support

- Integrated modem on both lines (similar to first line of #9771 shipped with every iSeries system)

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Notes: Communication Adapters

#2817 PCI 155 Mbps MMF ATM

#2817 is a 155Mbps Asynchronous Transfer Mode (ATM) PCI card that allows the server to be attached into an ATM network using the Multi-Mode Fiber (MMF) 62.5 micron interface. This interface is intended for connection to both local area switches and direct connection to service provider equipment. #2817 will typically be used where 155Mbps speeds are required over distances of less than 2Km. This card is a 64-bit card, but is allowed to plug into any 32-bit or 64-bit slot. This feature replaces #4816, on orders with V5R1 OS/400 in the configuration.

The #2817 ATM is a Non-Assist IOA. Functions that the card might handle are moved to the system level. Such things as fragmentation reassembly, address verification, IP filtering, and checksum generation verification are handled by the system. This allows the card to process data faster. Increased performance has also come from the more optimized transmit/receive path. This new adapter can potentially move 3 to 5 times more data than the previous PCI 155 Mbps MMF ATM #4816 could move.

#2760 PCI 1 Gbps / 100Mbps / 10Mbps UTP Ethernet Adapter

The #2760 PCI 1Gbps Ethernet IOA feature will allow to attach to IEEE standard 802.3Z high speed Ethernet LANs (1Gbps) to provide a significant performance improvement over other LAN solutions. The adapter supports a UTP CAT 5 media interface. The #2760 PCI Ethernet adapter only supports TCP/IP. This adapter can directly attach to 10Mbps or 100Mbps networks. A #2760 is supported under a #2790, #2791, #2890 or #2891 Integrated Netfinity Servers with V5R1. It is recommended that Enhanced Category 5 cable be used for the best results. The Enhanced Category 5 cable will be less likely to experience problems.

Notes: Communication Adapters-2

iSeries Ethernet support details

The Gigabit Ethernet Adapter Card (features 2743 (optical fibre) or 2760 (unshielded twisted pair) are one gigabit per second input/output adapters (IOAs) that support **only TCP/IP**. The #2760 supports half and full-duplex mode while the #2743 supports only full-duplex. The sending and receiving channels can transfer data at approximately one Gbps.

#2760 is lower cost than #2743, but runs at a slightly lower maximum throughput.

Both 1Gbps IOAs support the IEEE 802.3 and the Ethernet Version 2 standards. It also supports frame sizes that include 1496 to 8996 bytes. This card attaches to the 2842 PCI IOP (270), or 2843 PCI IOP (8xx).

#2743 requirement: You must ensure that all "devices" (switches, routers, bridges) within the communications path can handle the 1 Gbps speed . This card does not negotiate to a lower speed. Speed negotiation is performed only on the #2760 1 Gbps Ethernet adapter, #4838 100 Mbps/10 Mbps Ethernet adapter, or the #2744 100/16/4 Mbps Token Ring adapter.

The industry standard states that gigabit Ethernet frames are to be the same size as 10/100 Ethernet frames, which ranges from 64 to 1518 bytes. All known Ethernet vendors know and meet this requirement. Since the card technology used with #2743 and #2760 supports larger frame sizes you can realize maximum throughput over the 1Gbps communication link by using switches that support frame sizes in the 1518 through 8996 bytes range. At the time of publication there is only one known vendor switch that supports the larger frames. See the Notes that follow. If you are in doubt about the switch frame size capacity you must not specify a frame size greater than 1496 on the AS/400 Ethernet Line description MAXFRAME parameter.

Notes: Support for Gigabit Ethernet -2

1 Gbps Ethernet support continued

If the maximum frame size specified is greater than 1496 bytes, LINESPEED(1G) or LINESPEED(*AUTO) and DUPLEX(*FULL) or DUPLEX(*AUTO) must be specified for the #2743. For the 2760 DUPLEX(*FULL or *HALF or *AUTO) may be specified..

For the #2743:

- The technology used in the 2743 card does not negotiate to a lower speed than 1 Gbps. The #2743 1 Gbps Ethernet Adapter) requires a 1 Gbps-capable switch with at least one port that supports a 1000BASE-SX interface with IEEE 802.3z and 802.3u compliance. The 2743 supports only a multi-mode fiber optic cable connection from the AS/400 adapter to the switch.

- Depending on the switch capabilities, other devices on the network could use different cable types (UTP) and speeds (100 Mbps or 10 Mbps).

- A customer-supplied cable with the following specifications is used to attach the adapter to the switch: SC (fiber optic) connector, multi-mode fiber cable (62.5/125 micron fiber or 50/125 micron fiber).

Vendors that provide the required 1 Gbps switch hardware interface include the following. There are others.:

- Alteon Web Systems - http://alteonwebsystems.com
  This vendor provides 1 Gbps switches with the capability to process 8996 byte frames
- N Base Communications Giga Frame Switch - http://www.3com.com/util/contact.html
- 3COM Super Stack II Switch 9000 - http://www.nbase-xyplex.com/contactus/index.cfm

Notes: Communication Adapters...

#2772 and #2773 two line WAN adapters

#2772 and #2773 are basically the same interface, the #2772 is the non-CIM (Complex Impedance Matching) version of this card. Both are 2-line WAN adapters, with two ports (RJ11) supporting V.90 56K Async PPP and FAX applications at data rates up to 14.4K via internal modems. Connection to the V.90 ports is via telephone cable. Both these features do not support remote power on. The new cards can be used for the purpose of Multilink. These cards need country specific telephone cables (minimum one and maximum two per card). ***Feature #2773, the Complex Impedance Matching version is intended for Australia and New Zealand only.***

Compared with the existing #4761 with eight analog modem ports, the #2772/#2773 and #4761 both have fax capabilities, but the #4761 is more robust in this area. This is because the #4761 handles the fax process in the card whereas the #2772/#2773 passes it off to the system. The #2772/#2773 is a good option for those wanting to add some additional ports, but not wanting to add eight and if you do not need V.34 synchronous support that is provided by the #4761.

The feature code #9771 integrated V.90 modem will continue to be shipped with new systems. The two ports of the #2772 or #2773 are the same as the V.90 port of the #9771.

Minimum of one modem cable, maximum of two must be selected/ordered for each #2772 / #2773. Cable features that can be ordered:

#1010 Modem Cable - Austria	#1014 Modem Cable - Italy	#1018 Modem Cable - Iceland/Sweden	#1022 Modem Cable - Netherlands
#1011 Modem Cable - Belgium	#1015 Modem Cable - France	***#1019 Modem Cable - Australia (note)***	#1023 Modem Cable - Swiss
#1012 Modem Cable - Africa	#1016 Modem Cable - Germany	***#1020 Modem Cable - HK/NZ (note)***	#1024 Modem Cable - Denmark
#1013 Modem Cable - Israel	#1017 Modem Cable - UK	#1021 Modem Cable - Fin/Nor	#1025 Modem Cable - US/Canada

Note : Only cable #1019 and cable #1020 can be ordered with #2773; all cables except #1019 can be ordered for #2772. All modem cables for #2772 / #2773 that are ordered/present on one iSeries server must have the same feature number.

New HSL Adapters

#2754 Bus Expansion with 8 HSL ports

- Enables Clustering over HSL on iSeries Models 830 and SB2 (all processor features except #2400)

#2777 Bus Expansion with 8 HSL ports

- Enables Clustering over HSL on iSeries Model 830 processor #2400

#2755 Bus Expansion with 16 HSL ports

- Enables Clustering over HSL on iSeries Models 840 and SB3

Enable clustering over HSL on the Model 270 or Model 820?

- Upgrade to an SStar (Year 2001) 270, 820

Notes: New HSL Adapters

The HSL adapters mentioned in the previous foil can be purchased to replace the existing HSL adapters in the iSeries models 830, 840, SB2 and SB3 announced in 2000. The installed adapters in these models do not support HSL OptiConnect. If you want to use these models in a cluster using HSL OptiConnect with physical HSL connections between the clustered servers, you must order and install the appropriate HSL adapter for your server. These new adapters also support switching of HSL towers with Independent Auxiliary Storage Pools between HSL connected iSeries servers.

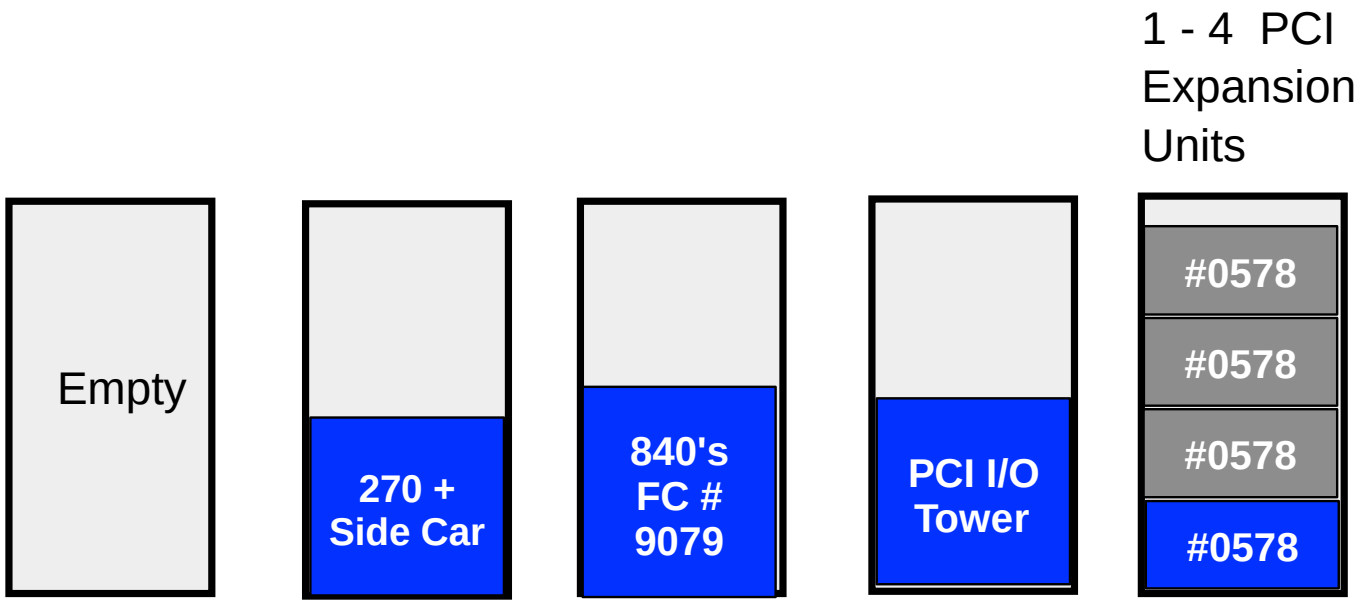
To enable clustering over HSL on a model 270 or a model 820 you must upgrade your existing server to one of the V5R1 processor features. The upgrade contains the parts enabling the HSL ports for clustering. There is no support for clustering over HSL on the V4R5 iSeries hardware of the models 270 and 820.

New iSeries Rack Options

Flexible rack mounting options for iSeries servers and I/O expansion towers

Up to 4 New Power Distribution Unit (PDU) in iSeries racks

- 6 power sockets per PDU



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Notes: New iSeries Rack Options

Announced in October 2000 with December 2000 availability are 3 initial offerings of iSeries rack mounted configurations:

- A rack with two Model 270 servers, each with a System Unit Expansion
- A rack with one Model 830 server
- A 1.8 meter tower with the Model 840 Base I/O Tower and a PCI Expansion Tower

Starting in April 2001, additional iSeries rack configurations can now be ordered as follows:

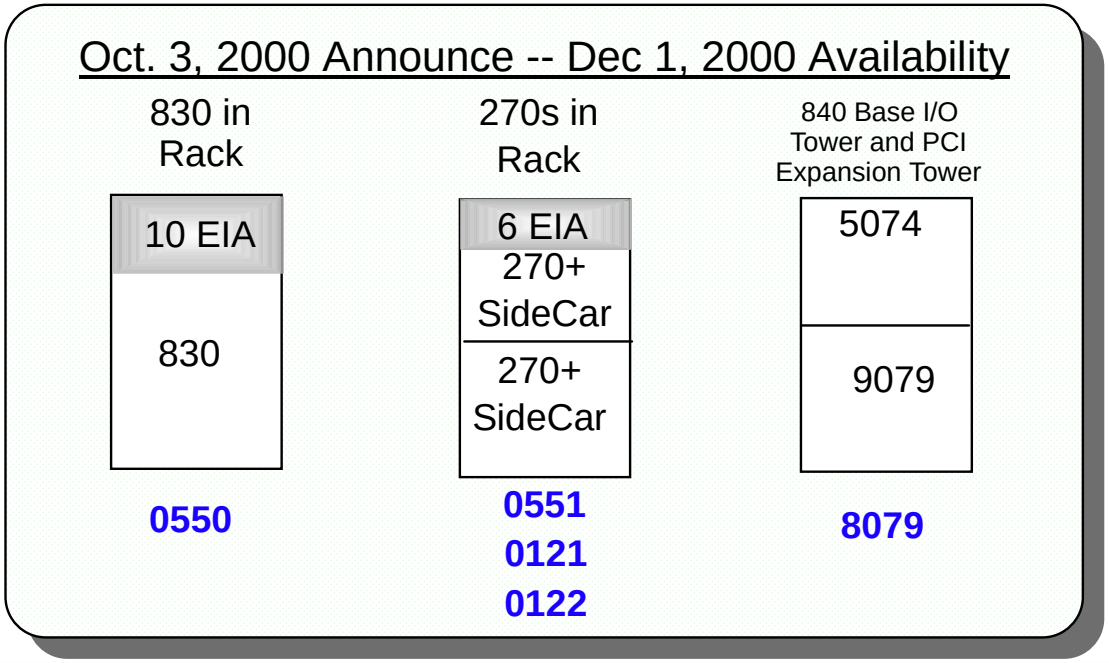
- An empty iSeries rack (new)
- An iSeries rack with one Model 270 server (new)
- An iSeries rack with two Model 270 servers
- An iSeries rack with one Model 830 server
- An iSeries rack with a Base 1.8m I/O Tower for a Model 840 Server (new)
- An iSeries rack with a Base 1.8m I/O Tower and a PCI Expansion Tower for a Model 840 server
- An iSeries rack with one or two PCI Expansion Towers (new)
- An iSeries rack with one to four PCI Expansion Units (new)

The iSeries racks are 1.8 meters high (36 EIA units) with EIA standard 19-inch width. Configurator support is not available for management of unused space available within any of the rack offerings. Empty space will have filler panels installed when shipped from the plant. One to four Power Distribution Units (PDU) may be specified with the iSeries rack (#0551). The PDUs may be ordered on initial order of the #0551 or on field upgrades. Each PDU has six power sockets.

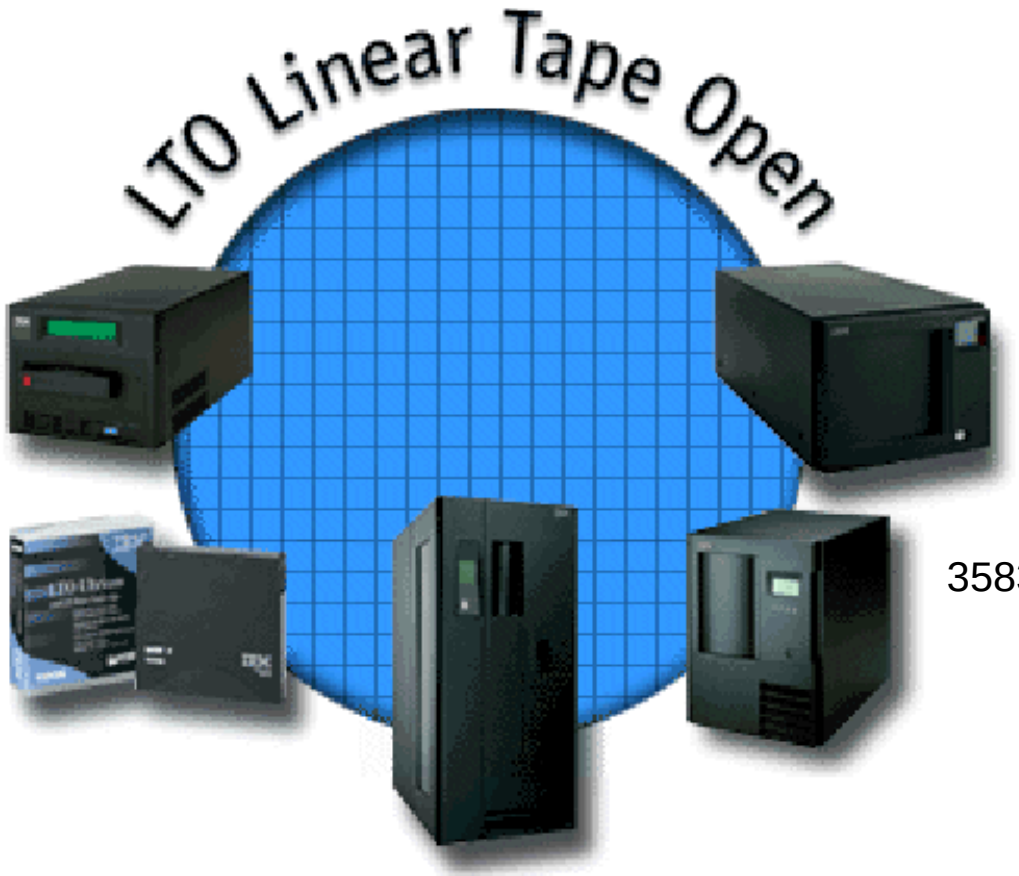
Original iSeries Rack Mount Offerings

iSeries Rack Solutions

- Designed for industry standard EIA mounting
  - Two iSeries Model 270's with #7104 System Unit Expansions (Sidecars) (Mix and Match with DSDs)
  - iSeries Model 830
  - iSeries Model 840 Base I/O Tower and PCI Expansion Tower
- Provide solutions for Application Service Providers, large customers, multiples, ...



3580 LTO Tape Support Update



3580 Ultrium Tape Drive

3581 Ultrium Tape Autoloader

Ultrium 100 GB Data Cartridge

3583 Ultrium Scalable Tape Library

3584 UltraScalable Tape Library

OS/400 3580 LTO Tape Support via SCSI

OS/400 V4R4 or later via #6501, #6534, #2729, #2749 adapters

Single Tape device High Voltage Differential (HVD) models via these I/O adapters:

- #2729 maximum speed: 13 MBs
- #6501 or #6534 maximum speed: 17 MBs
- #2748 maximum speed: 38 MBs

For 3584 library support:

- 3584 media changer can be shared
- OS/400 supports device pooling: same tape device can "appear" on multiple I/O adapters
  - Pooling requires 3584 library partitioning: 3580 devices assigned to a partition:
  - OS/400 supports maximum of 32 drives per library/partition

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Notes: OS/400 3580 LTO Tape Support via SCSI

This is an update to the November 2001 V4R5 support for SCSI attachment of the 3580 taped device family Linear Tape Open (LTO) technology support and applies to systems running OS/400 V4R5 or V5R1 with SCSI attachment.

The top 2 bullets on this foil show the I/O attachment features that support 358x on the iSeries (and AS/400).

Note that only one tape device can be "actively reading or writing data" through each iSeries adapter.

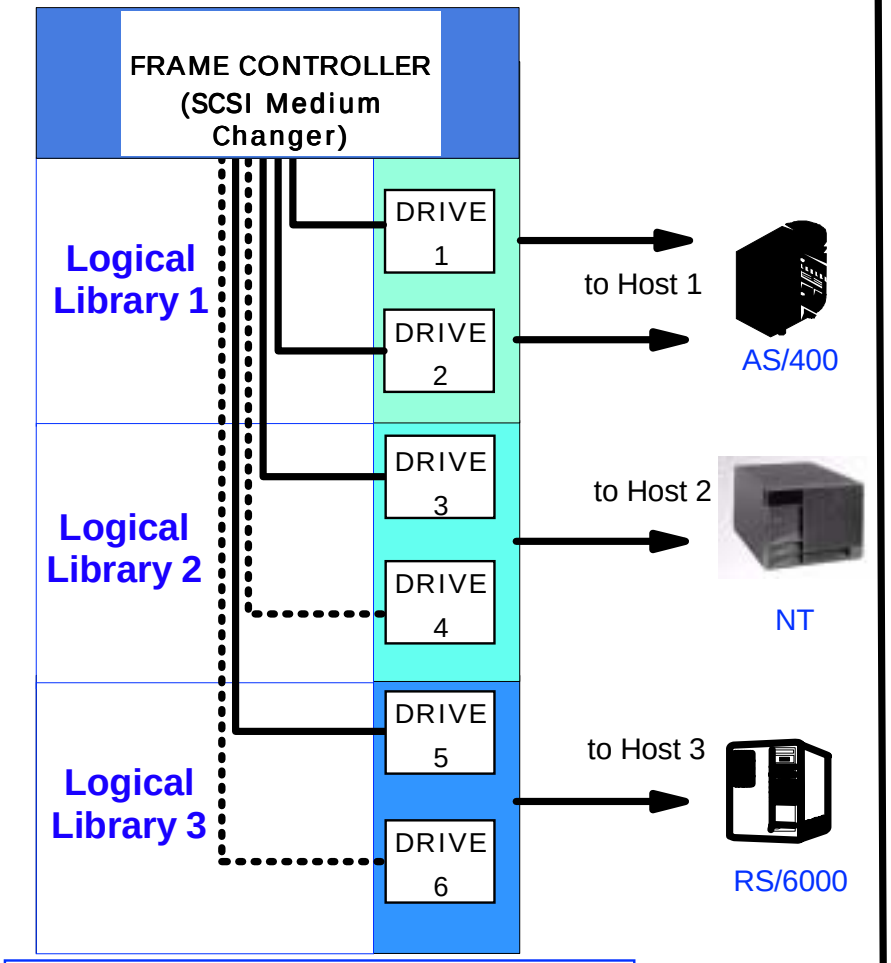
The 3584 UltraScalable Tape Library supports partitioning (up to 72) through a media changer that can be shared by multiple AS/400 or iSeries systems as well as systems running an NT or AIX operating system. Each 3584 partition is considered a logical library that contains one or more tape drives. If an iSeries is connected to the I/O devices in a library, each active tape device must attach to a separate adapter - #6501, #6534, #2729, #2749 and a "library control path" defined that interfaces to the SCSI media changer.

There is no sharing of a drive across iSeries servers - just the media changer can be shared.

Tape device pooling is supported under OS/400. Each tape device that is pooled must be in a tape library and in the same partition of the library, if partitioning has been configured. With device pooling, the tape drives can be connected to multiple adapters and the iSeries will detect all drives are in the same library and have equivalent capabilities. These devices are supported under one library device description.

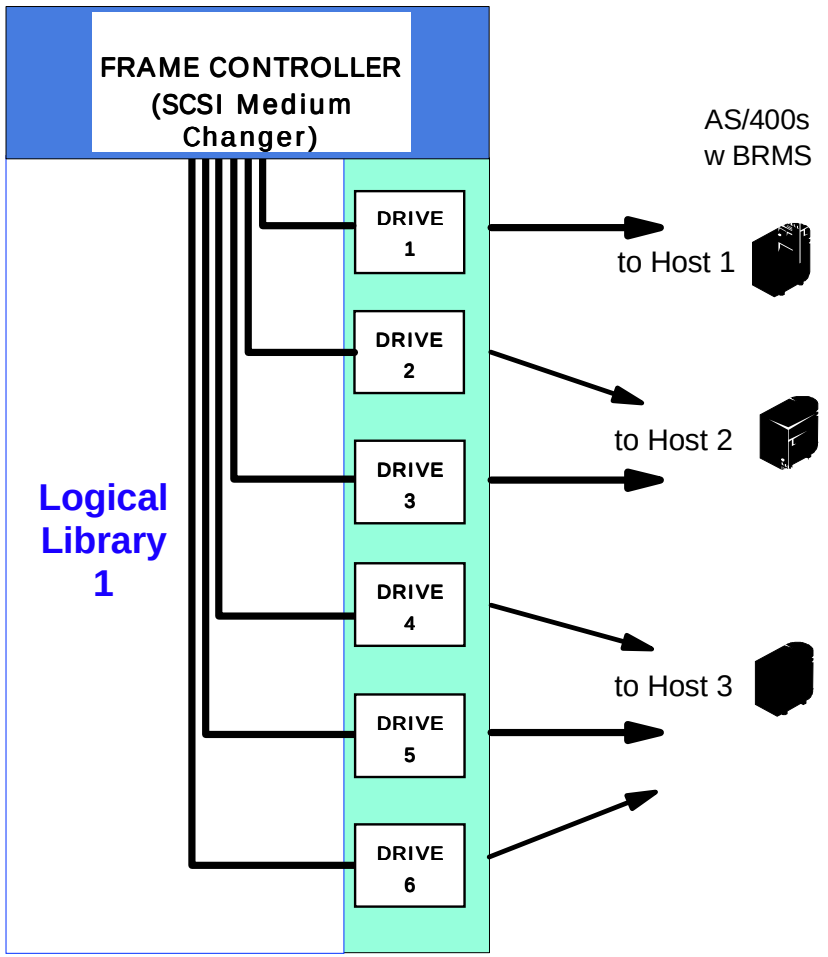
OS/400 supports a maximum of 32 drives in a library.

iSeries and 3584 Example



Multiple hosts 'owning' separate logical library inventories & drives

Up to 12 Hosts per Frame



Multiple hosts sharing one logical library inventory

Up to 72 Hosts Per Library

Notes: iSeries and 3584 Example

Every 3584 drive can have a path defined to the SCSI Medium Changer (SMC).

The library configuration on the left has been partitioned into three logical libraries. In the AIX and NT partitions, only the first drive has a library control path defined. These platforms are designed to use one library control path, and would not function correctly if more than one library control path were defined.

The iSeries (AS/400) is unique in that every SCSI bus (I/O adapter) has to have a library control path defined. The iSeries attached to the left hand library has two SCSI buses and therefore, two library control paths defined.

These three servers are sharing the 3584 Ultrium library.

The library configuration on the right has not been partitioned, and has only one logical library. Every iSeries SCSI bus has a library control path defined. The November 2000 V4R5 support for iSeries attached to LTO tape drives support one drive per SCSI adapter

New Tools for e-business

IBM @server Capacity Advantage

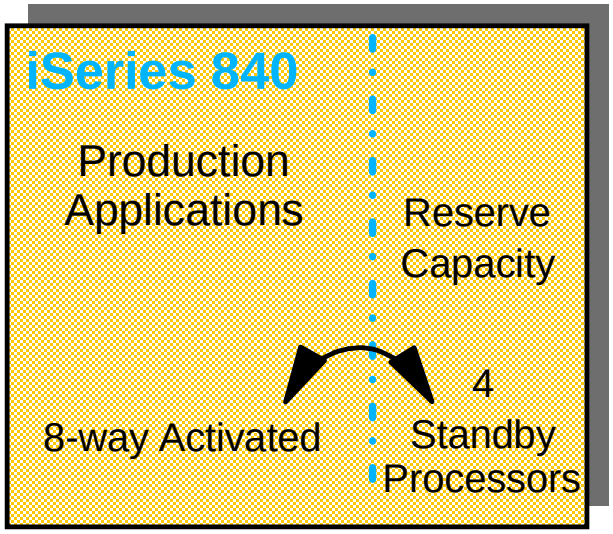
Flexible capacity management without interrupting business

For ASPs and high growth companies

New Capacity Upgrade on Demand features for SStar iSeries 840

Immediate activation of reserve processor capacity

- Temporary activation for 14 days



New upgrade paths from AS/400e servers 730/740 and iSeries 840

iSeries 840 Processor Feature	Processor	Base Processors	On Demand Processors	Installed Processors	Maximum CPW
2352	SStar	8	4	12	12000
2353	SStar	12	6	18	16500
2354	SStar	18	6	24	20200

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Notes: IBM @server Capacity Advantage

During October 2000 we announced new 840 Capacity Upgrade on Demand models. Capacity Upgrade on Demand provides flexible upgrade options with pre-installed processors that can be activated immediately, without restarting the server. It provides flexibility for fast growing companies, like ASPs and mobile telecommunications providers, who have difficulty anticipating future capacity requirements. Also, it provides strong advantages for banks and other companies that need to add capacity quickly, but want to avoid system downtime for processor upgrades.

With Capacity Upgrade on Demand, additional, reserve capacity processors are pre-installed in the system. The reserve processors can be immediately activated without an IPL of the system, all processors are activated together.

During April 2001 we announce three new Capacity Upgrade on Demand processor features have been added to the iSeries Model 840. Upgrades are now available from AS/400 Model 730 and 740, and iSeries Model 840 into iSeries Model 840 Capacity Upgrade on Demand features.

A 14-day temporary activation period allows a company to determine its exact processor requirements and purchase processor activation features, one per processor to be permanently activated.

Processors can be permanently activated one at a time, or together as required. Once the permanent activation feature key has been entered into the system, the 14-day period is reset.

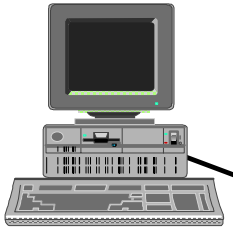
For more information about Capacity Upgrade on Demand for iSeries servers, see http://www.ibm.com/eserver/iseries/ondemand

iSeries 840 Processor Feature	Processor	Base Processors	On Demand Processors	Installed Processors	Maximum CPW
2352	SStar	8	4	12	12000
2353	SStar	12	6	18	16500
2354	SStar	18	6	24	20200

IBM eserver Customer Care Advantage

General & Personalized Web Transactions
- Problem Determination
- Performance Management
- Fix Management
- Software Upgrades
- Etc.

Customers, Partners, & IBM Reps

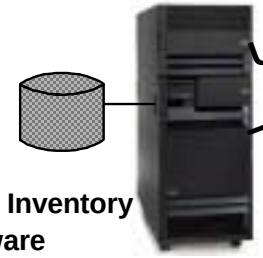


IBM Service & Support

Machine Inventory
Business Agreements
Performance Data
Available Fixes, Services, ...

Universal Connection

Customers Machine



Machine Inventory
- Hardware
- Software
- PTFs
- Performance

Extreme Support Personalized

V5R1:
- Management Central Configuration
- ECS, PM/400e, HW/SW consolidation
- Simplified ordering of software (SUA)
- Ease of use
- Internet, including VPN

Notes: IBM @server Customer Care Advantage

The iSeries Extreme Support Personalized (ESP) initiative helps you easily manage your system, streamline your support, and reduce risk for your business. ESP is total solutions support, personalized for you in the form you need it. ESP involves support over the Internet, voice, and on-site support, along with support integrated into the product.

New capabilities available at V5R1 announcement include:

- Set up integrated into Operations Navigator - Management Central
- Internet connection utilizing Virtual Private Network
- ECS, PM/400e, and consolidated HW/SW inventory over the Internet
- Multisystem data collection consolidation
- Simplified ordering of release upgrades with Software Upgrade Assistant (SUA)
- Direct input of performance data into workload estimation
- Simplified PTF Notification and Delivery
  - Electronically download Group PTFs from service
  - New commands to manage cover letters
  - Progress indicators during PTF load and apply
  - Preconditions to preview PTF apply/remove when preconditions present

The next foil summarizes the IBM-provided service offerings that have been updated for V5R1.

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ITS eserver iSeries Services Update

ITS Global Services enhancements for 2001 include:

- iSeries Planning and Migration Services
- LPAR Planning and Implementation Services
- High Availability Server Assessment for Small and Medium Businesses (SMB)
- Data Migration Services
- System Transition Services - CISC-to-RISC
- Server Consolidation Services

Notes: ITS eserver iSeries Services Update

The following ITS global services are being enhanced in 2001

- iSeries Planning and Migration Services - assists an existing customer in planning and migrating to the latest iSeries 8xx Server line.
- LPAR Planning and Implementation Services - provides assistance in planning and installing Logical Partitioning on the customers new or existing n-way server
- High Availability Server Assessment for SMB - provides a 2-day workshop at the customer's location to assess current systems management practices and recommending further availability enhancements to minimize planned and unplanned outages.
- Data Migration Services - provides assistance to migrate data and applications from one disk drive to another
- System Transition Services (CISC-RISC) - provides assistance in transitioning from a customer's CISC system to the Power-PC based iSeries system
- Server Consolidation Services - provides assistance with the consolidation of multiple AS/400 systems into a single iSeries System

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Application flexibility:
Your business, your choice

Application flexibility: Your business, your choice

Logical Partitioning

Linux

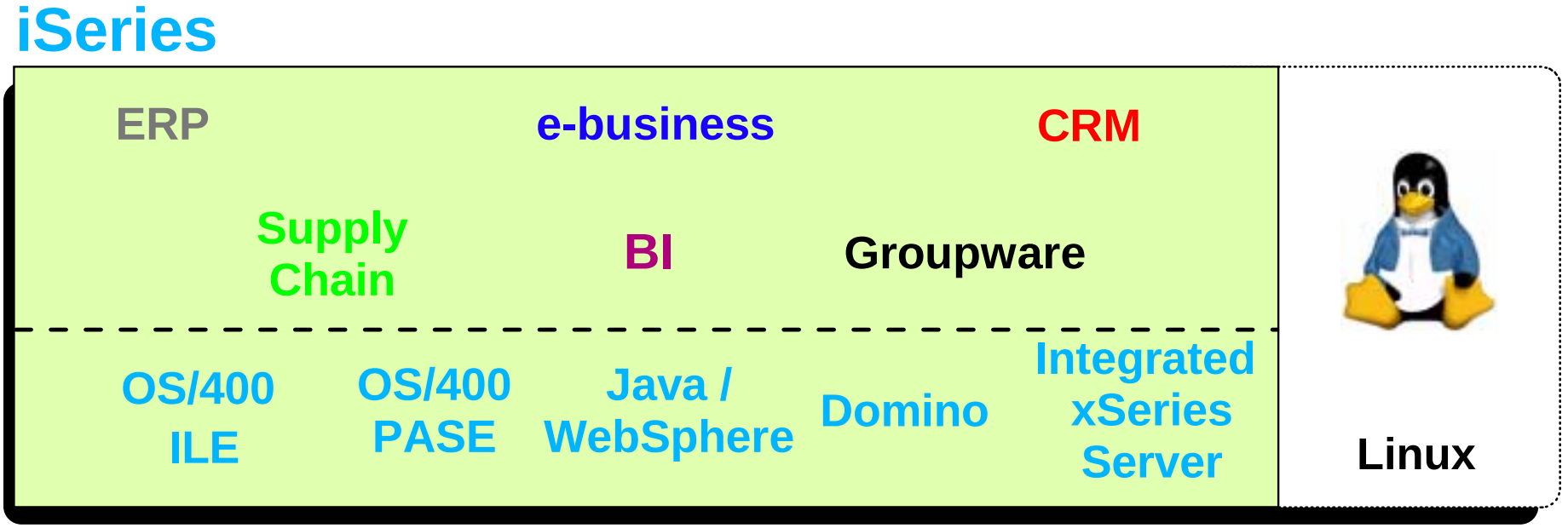
Windows

Domino

Application Development

OS/400 PASE

Application Flexibility = Solutions Vitality



SAP	i2	Intentia	Lawson	JDE
JDE	SPSS	Kingland	Binary Tree	Siebel
Logility	Serena	QAD	Synergistics	Logility
Siebel	Uniserv	Ariba	ParaResearch	Clear Technologies

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Notes: Application Flexibility = Solutions Vitality

Why do you buy an application server? To run the applications you need to support your business. No application servers do that better than iSeries.

OS/400 V5R1 provides the industry's foremost application flexibility with support for Linux, Lotus Domino, Java, Microsoft Windows, UNIX and iSeries applications, combining high availability with superior workload management and logical partitioning.

The iSeries offers enterprise-class technology for all size companies that is simply not available on competing systems. So you can consolidate applications and tune them for performance, rather than trying to manage expanding server farms.

The result? A reliable, high-performance e-business infrastructure that also gives you the flexibility to choose the right applications for your business, no matter what popular operating environment they were written for--all on one, very manageable server platform.

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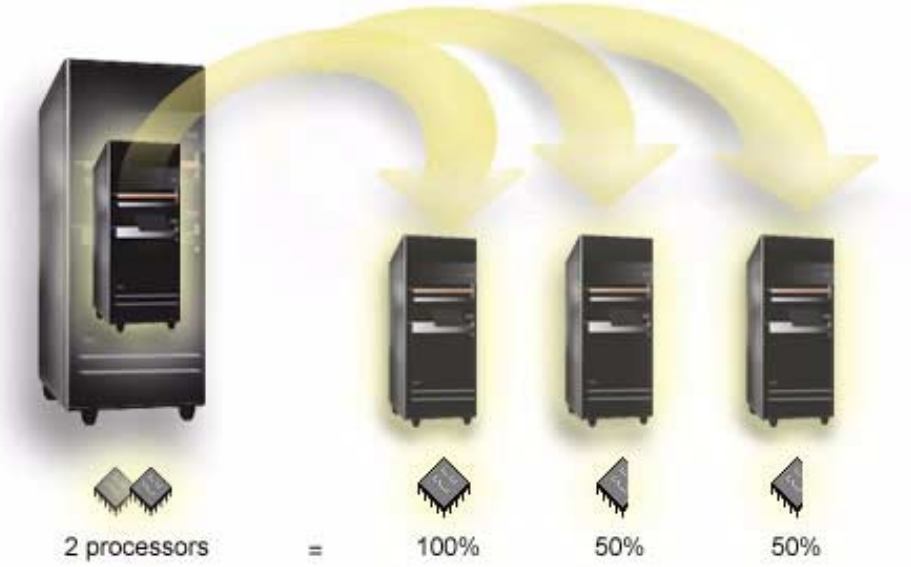
iSeries Logical Partitioning

At the forefront of partitioning technology

Enterprise class, flexible and scalable - V5R1:

- Dynamic resource movement
  - Processors, storage, bus
- Shared processor support (iSeries)
- Up to 32 partitions
- Virtual Ethernet
- Graphical management
- LPAR on iSeries 270*
- Linux in a partition
- Industry's first entry and midrange servers with partitioning



*Available on new 270 SStar processor features

Notes: Notes: iSeries Logical Partitioning

Logical partitioning (LPAR) has been available on iSeries and AS/400 servers since 1999, and is used by many companies worldwide to optimize I/T infrastructure and reduce operating costs. Often LPAR is used to consolidate multiple systems into a single server, while maintaining application independence. Benefits of using LPAR include cost savings from software, maintenance, data center operations costs such as heating, cooling, floor space etc.

Logical partitioning is enhanced with OS/400 V5R1 to provide dynamic resource movement on all iSeries Model 8xx systems, Model 270 features with SStar technology, and n-way AS/400 Models 6xx, Sx0, and 7xx.

Logical partitioning processor granularity is improved with the introduction of shared processors for the iSeries Model 8xx and Model 270 with SStar processor technology. Shared processors allow you to create a primary partition with partial processor allocation, thereby removing the requirement to allocate a full processor on iSeries system for partition management functions.

You can define a partition to use shared processors or dedicated processors with minimum, maximum and a "starting value." The OS/400 keeps track of any resource movement you perform to ensure the minimum and maximum value specifications are adhered to.

Note: Customers with AS/400 models will continue to require a minimum of 1 processor per partition regardless of whether they have OS/400 V5R1 or a previous release.

OS/400 V5R1 logical partitions will also benefit from the new Virtual Ethernet capability, used to establish multiple high speed TCP/IP connections between logical partitions without additional communication hardware.

iSeries systems will also be enhanced to support Linux running in a secondary logical partition on Model 270 and Model 820 with SStar processor technology - including uni-processor features. In addition, it will also support Linux in a secondary partition on n-way Models 820, 830, and 840.

Notes: Notes: iSeries Logical Partitioning-2

In addition to improving partitioning granularity, Operations Navigator (part of OS/400) provides new graphical interfaces to secure and authorize access to partition creation and management functions for multiple partitions from a single LAN-based console.

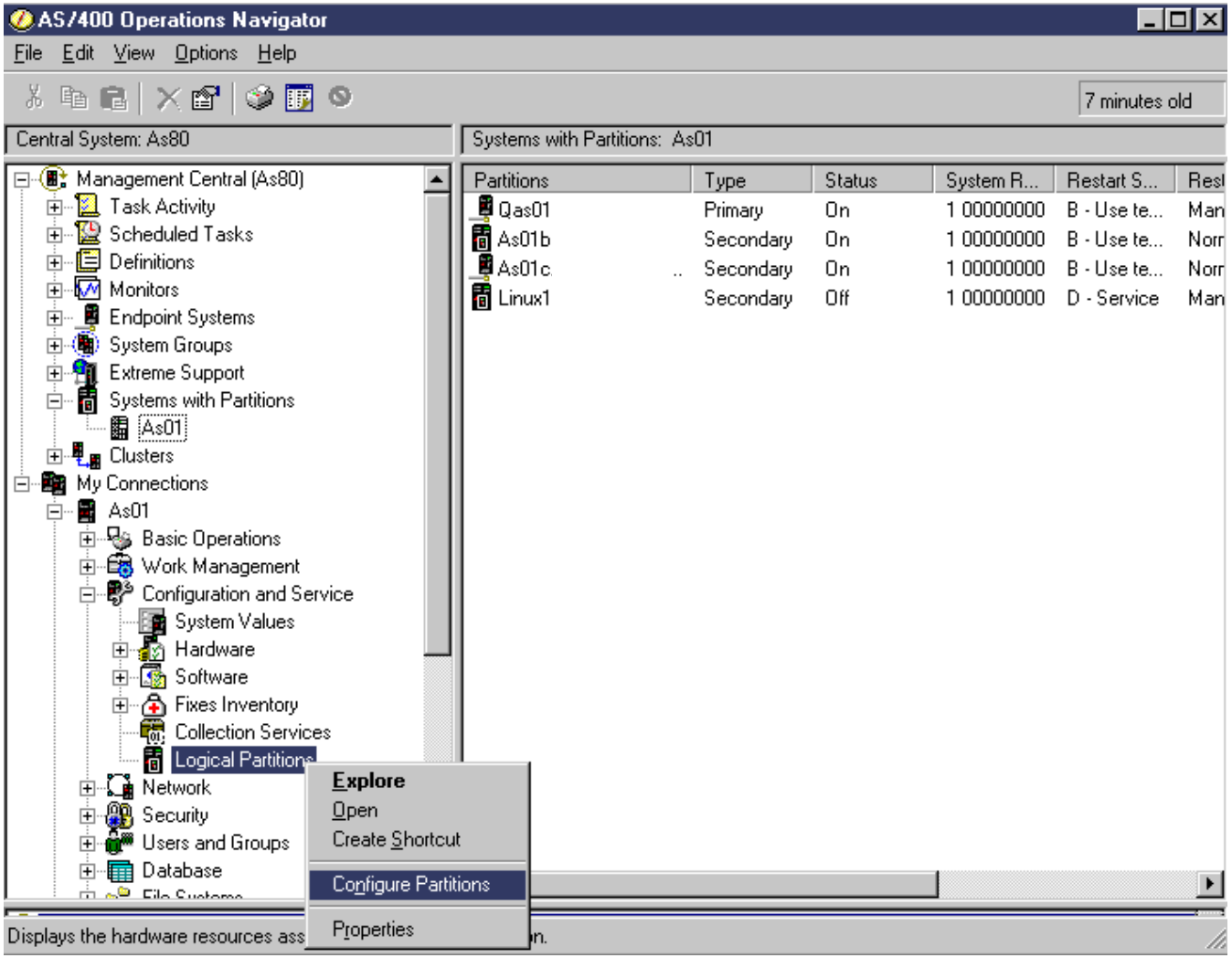
(Configuring and managing partitions through the 5250 workstation interface remain available.)

Enhancements are also provided to support LPAR APIs for software license management and system resource management . These APIs will be used by ISVs to extend the functions of systems management utilities to support LPAR, plus to allow applications to recognize the size of the underlying partition for software pricing purposes.

The next two foils give a flavor of the Operation Navigator interface.

Configuring a New Partition Example

Primary partition, 2 active secondary partitions



Notes: Configuring a New Partition

In this screen capture you can see on the left pane, the pull down actions list under AS01 Logical Partitions for Configure Partitions. This brings up a wizard to guide you through the configuration steps.

In the right pane you can see partitions we have already created on AS01:

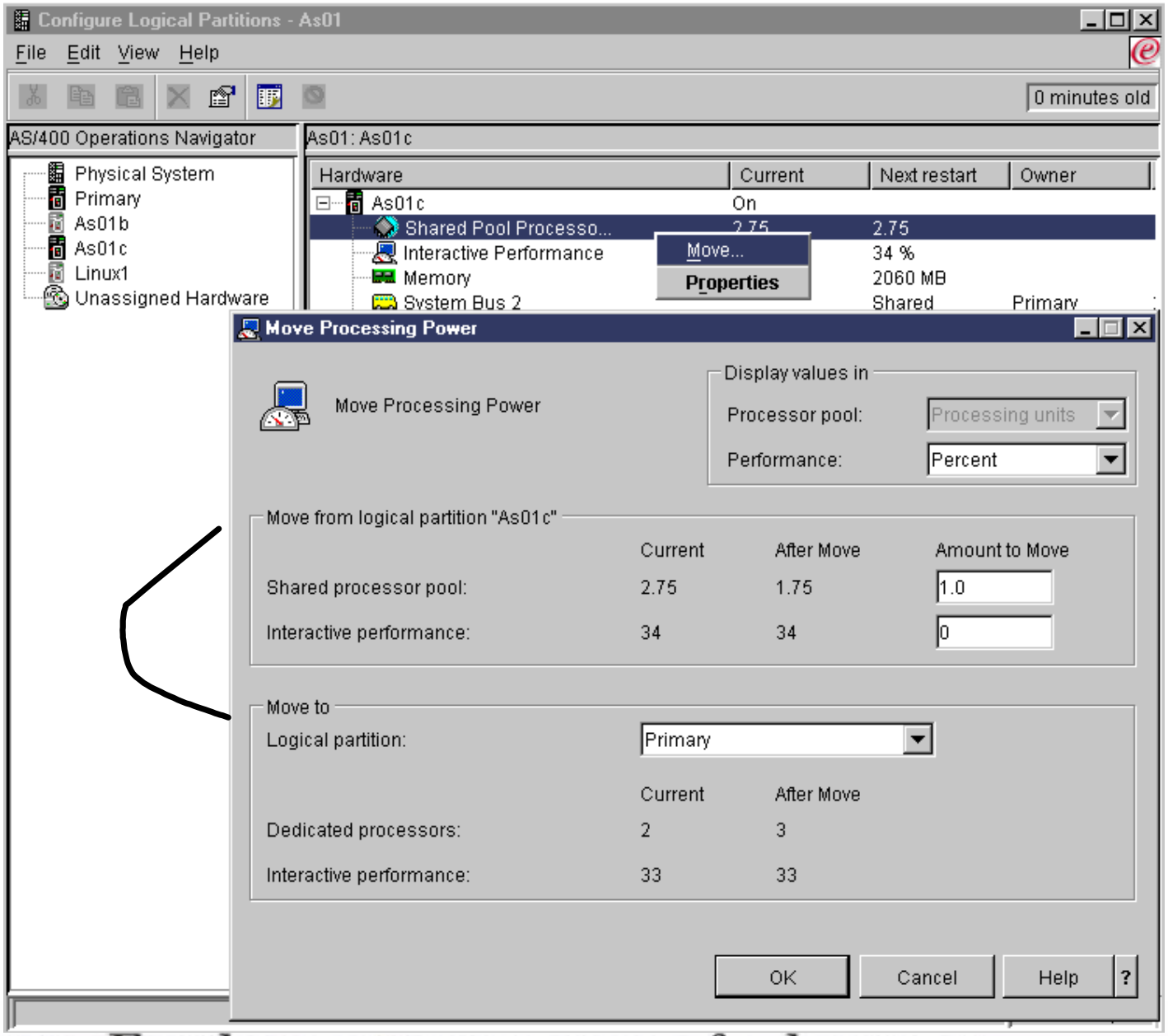
- Qas01 (active and in use - see Status "on")
- As01b (active and in use)
- Aso1c (active and in use)
- Linux (created for future use - see Status "off")

At the upper portion of the left pane you can see the Systems with Partitions branch under the Management Central server system As80.

Important note: To do these LPAR functions the Operations Navigator must successfully sign on with a user profile defined under the new for V5R1 Services Tools Security server functions. This helps ensure only the "right people" can configure and manage partitions over a LAN.

Moving Processing Resource Example

Secondary Partition
to
Primary Partition



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Notes: Moving Processing Resource Example

In this screen capture you we are moving some processor power from secondary partition As01c to the primary partition As01.

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Linux on iSeries

iSeries scalability and robust availability for Linux

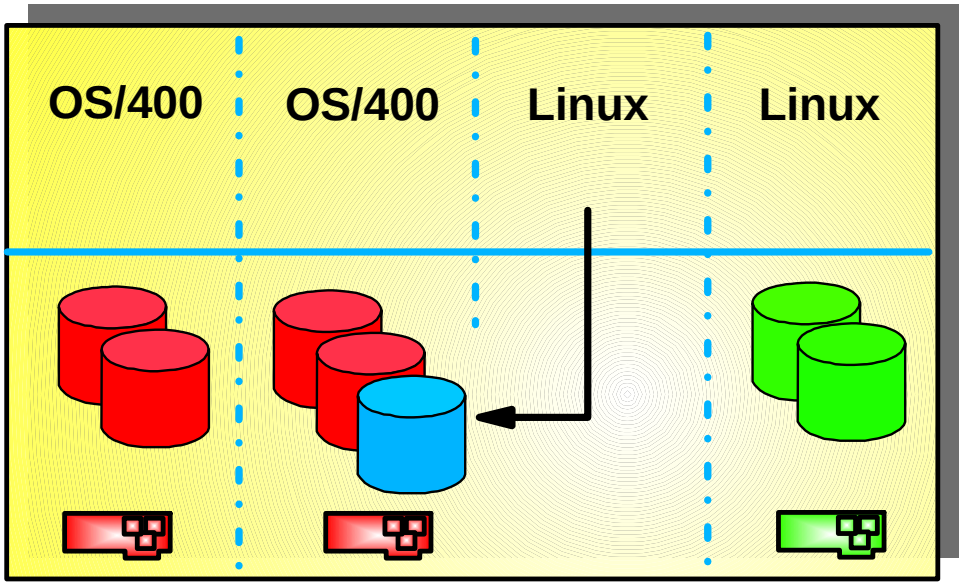
Linux kernel in a logical partition

Shared processor support*

- Uni-processor partitioning on SStar 270 and 820

Flexible resource allocation

- Dedicated and virtual I/O



*Available on Model 270, 820 and 840 SStar processor features

Notes: Notes: Linux on iSeries

IBM is committed to supporting Linux, across all its server platforms, including iSeries to foster the growth of the open source operating system as a source for new e-business applications. Companies running Linux on iSeries stand to gain from its robust reliability and scalability, plus take advantage of integrating with existing core business solutions.

With V5R1, OS/400 LPAR is enhanced to support Linux natively on PowerPC in a secondary partition. The new iSeries SStar processor features will support shared processors so that, for example, a uni-processor SStar can support up to 4 partitions - 1 OS/400 and 3 Linux. iSeries Models 820, 830, and 840 will support Linux on IStar processors, but require a minimum of 1 processor per Linux partition. Since one primary OS/400 partition is required for partition management, iSeries can support a maximum of 31 Linux partitions.

Logical partitioning provides the flexibility to move processor and memory resources between Linux partitions. This movement will require a restart of the affected Linux partitions.

iSeries provides outstanding I/O flexibility for Linux partitions, with options for both dedicated and virtual I/O. With dedicated I/O, the Linux partition owns and manages resources such as disks and LAN adapters. Using dedicated I/O is good for partitions where totally separate resource management is required, a firewall for example. Virtual I/O, on the other hand, provides a more cost effective and integrated I/O strategy, where storage and LAN adapters can be owned and managed by OS/400, but are made available 'virtually' to Linux. Virtual I/O provides storage management advantages to Linux such as being protected by OS/400 RAID-5 or mirroring and backup. Virtual I/O is also ideal for getting started with a small and flexible Linux partition, without the requirement to dedicate hardware resources. Also, it allows disk resources to simply be switched or allocated between Linux and OS/400 applications.

A Linux partition can utilize the new Virtual Ethernet capability to establish multiple high speed TCP/IP connections between logical partitions without additional communication hardware.

To enable Linux to run on the iSeries, IBM has contributed to the open source 32-bit kernel version 2.4 for PowerPC. IBM is currently working with the Linux community to create Linux distributions for iSeries. IBM plans to support selected Linux distributions running on iSeries in the second half of 2001.

What runs where ? Release Compatibility

LPAR with	6XX, 7XX, SXX N-way	6XX, 7XX, SXX N-way	6XX, 7XX, SXX N-way	iSeries (05/2000) 8XX	iSeries (05/2000) 8XX	iSeries (05/2001) 8XX / 270
Primary	V4R4	V4R5	V5R1	V4R5	V5R1	V5R1
Secondary	V4R4 V4R5 V5R1	V4R4 V4R5 V5R1	V4R4 V4R5 V5R1	V4R5 V5R1	V4R5 V5R1	V4R5 V5R1

What runs where ? Hardware and Functions

LPAR with	6XX, 7XX, SXX N-way	iSeries (05/2000) 8XX N-way	iSeries (05/2000) 8XX Mono	iSeries (05/2001) 8XX / 270 N-way	iSeries (05/2001) 8XX / 270 Mono
Dedicated Processors	V4R4 V4R5 V5R1	V4R5 V5R1	N/A	Y	N/A
Linux Partition	N	Y	N/A	Y	N/A
Shared Processors	N	Y	Y	Y	Y
Linux Partition	N	V5R1	N	Y	Y

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Notes: What runs where ?

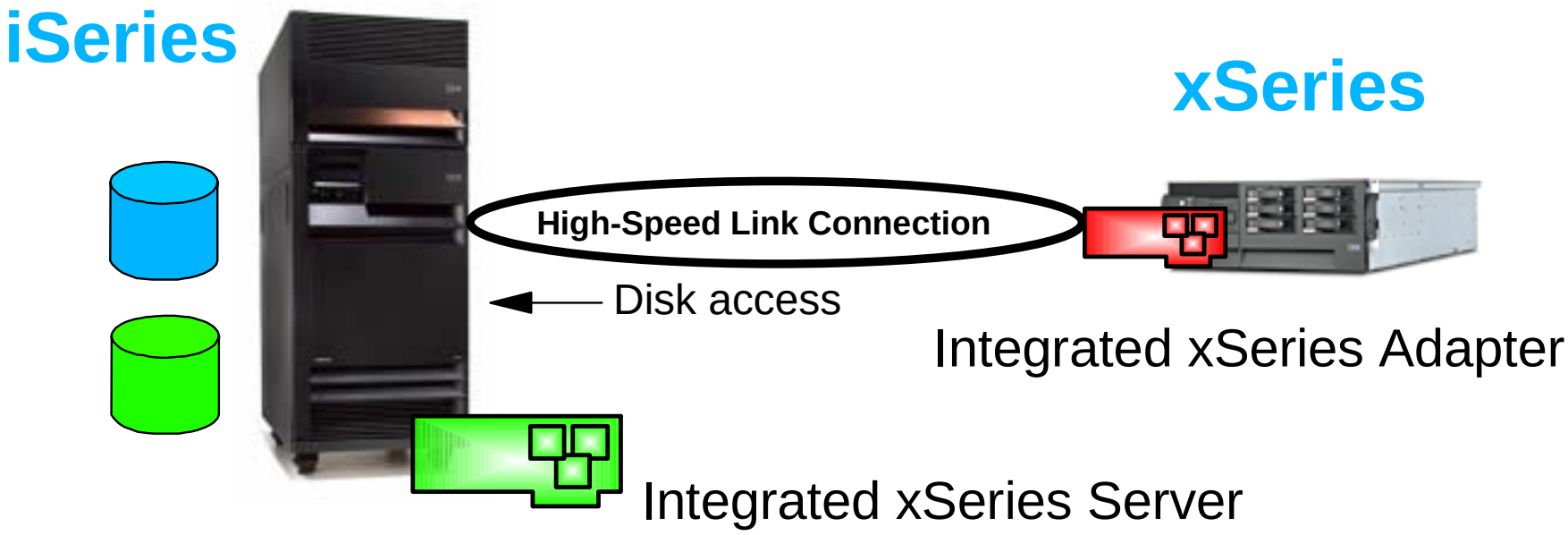
The best approach to identify what can run where is a step by step evaluation of the prerequisites for a particular partition to run on.

First step is to determine what capabilities are supported by the system hardware model. The general rule is that there is no support for a release in any of an iSeries or AS/400 server partition below the one required by this servers processor. This brings us to the first exception: iSeries models announced in 2001 do support V4R5 in a secondary partition. However, you must know the limitations: secondary partition running a certain version/release can only utilize capabilities for which it was initially designed. This implies that a secondary partition running V4R5 can not use enhancements of LPAR from V5R1 and will not support V5R1 exclusive hardware either. Once you know what can and will run in the primary partition, you are ready for step two.

In step two consider that the primary partition software version/release determines the capabilities available to all partitions. You may for example install V5R1 in a secondary partition of an iSeries model announced in 2000 with the primary partition at V4R5. This means that there is no support for V5R1 functions or hardware in any of the partitions.

In step three validate multiple release support based on primary partition version/release. The table on the first of the two previous foils can help you with step three. The table on the previous foil can help you determine easily what functions are supported and under what conditions. If you find shared processor pool support, than it also means that you can dynamically move processing resources and use other LPAR enhancements from the latest release. In the same table, you can find if Linux is supported in a secondary partition.

Windows 2000 Integration with iSeries



Manage Windows servers and applications from iSeries

- Integrated xSeries Server Intel 850 MHz Pentium III (#2791*/#2891*)
- Integrated xSeries Adapter to attach xSeries servers (MT 1519 Model 100)

iSeries Storage Area Network (SAN) for Windows servers

- Up to 2 TB per server

* Supported in V4R5

Notes: Windows 2000 Integration with iSeries

Since many iSeries customers also run Windows applications, IBM has provided a means to combine both applications in a single consolidated server. iSeries also takes advantage of IBM ^ innovative technology to provide a storage and systems management solution for Windows servers. Many Windows applications, such as Siebel, SAP APO, and BAAN FOS, are ServerProven to run on iSeries using the Integrated xSeries Server technology.

The Integrated xSeries Server is a PC server under the covers of the iSeries, logo'd by Microsoft to run standard Windows NT Server and Windows 2000 Server. The Integrated xSeries Server can also run Citrix MetaFrame which is used with Windows NT or 2000 to run Windows applications on IBM Network Stations. The #2791/#2891 can attach up to 2 TB of storage and is supported on iSeries Models 270, 820, 830 and 840. iSeries supports up to 32 Integrated xSeries Servers, depending on the model.

The #2791/#2891 PCI Integrated xSeries Server contains a 850MHz processor and 4 memory slots and is supported in V4R5 and V5R1, with increased maximums supported in V5R1: .

- The #2791 is supported in the CEC of models 820, 830, 840, SB2 and SB3, in the #5074 PCI Expansion Tower, in the #5079 1.8M I/O Tower, in the #5078 PCI Expansion Unit and in the #5075 PCI Expansion Tower when it is attached to the model 820.
- The #2891 is supported in the CEC of model 270 and in the #5075 PCI Expansion Tower when it is attached to the model 270. Each server memory slot can contain either a 128MB server memory card, a 256MB server memory card or a 1024MB server memory card providing a total server memory capacity ranging from 128MB to 4096MB (4GB). When the maximum memory is installed, only 3712MB will be addressable.

The following memory features are available on the #2791/#2891 PCI Integrated xSeries Server:

- #2795 - 128MB Server Memory
- #2796 - 256MB Server Memory
- #2797 - 1GB Server Memory

The following hot-plug (only valid on hot-plug capable iSeries) PCI network adapters can be installed under the Integrated xSeries for iSeries:

- PCI 100/10 Mbps Ethernet IOA (#4838)
- PCI 100 Mbps Token-Ring IOA (#2744)
- PCI 1 G bps Ethernet IOA #2743 (optical)
- PCI 1 G bps Ethernet IOA#2760 (UTP)

V5R1 supports the 1 Gbps adapters.

Integrated xSeries Adapter

With V5R1, a new Integrated xSeries Adapter (IXA) extends iSeries management of Windows servers to selected xSeries models. xSeries Servers connected to iSeries with the Integrated xSeries Adapter are supported with Windows 2000 Server. Currently, the Integrated xSeries Adapter provides support for the xSeries models 250 and 350 and the Netfinity models 7100 and 7600.

The iSeries HSL Adapter is Machine Type 1519 Model 100.

The IXA fits into two of the xSeries server's PCI slots and connects the Intel server to iSeries storage across its High Speed Link I/O infrastructure. The xSeries server's storage is all held in and managed by the iSeries, fully protected by RAID-5 or mirroring alongside other iSeries applications. The Integrated xSeries Adapter also provides power control to the xSeries server, allowing it to be booted automatically from iSeries. iSeries supports up to 16 Integrated xSeries Adapters, depending on the model.

The xSeries or Netfinity server used with the Integrated xSeries Adapter are standard models, containing processors, memory, and ServerProven adapters but no disks. All disks are housed in the iSeries, so that its operations and backup can be integrated with OS/400 applications.

The Integrated xSeries Adapter interfaces directly with IBM ^ xSeries' service processor. This IBM technology advantage is not available on OEM Intel servers.

Maximum I/O Towers and Integrated xSeries Adapter-attached xSeries servers and Performance

The maximum of Direct Attach xSeries Servers by model (these maximums are in addition to the maximum number of I/O towers that can attach to these models):

- Model 270 - system max is 2
- Model 820 - system max is 4
- Model 830 - system max is 8
- Model 840 - system max is 16

The maximum Direct Attach xSeries Servers per HSL loop by model (these maximums are in addition to the maximum number of I/O towers that can attach per HSL loop to these models):

- Model 270 - max per loop is 2
- Model 820 - max per loop is 5
- Model 830 - max per loop is 4 (limit on 1st loop is 1)
- Model 840 - max per loop is 4 (limit on 1st loop is 2)

For performance reasons, the Direct Attach xSeries Servers should be placed in the middle of an HSL loop (end of the HSL strings attached to each HSL port), that is, no I/O tower should communicate with the system by having it's data flow through an External xSeries Server. The 'end of loop' concept can be explained as follows: the iSeries server identifies the towers on a loop alternately form the loop ports. The user must make sure that the HSL attached xSeries servers are identified by the iSeries Server after that iSeries Server has identified the other (DASD or PCI) towers in the HSL loop. This topology will avoid problems that could arise when the iSeries CEC communicates with one of other towers through the HSL adapter in the attached xSeries Server.

iSeries SAN for Windows Servers

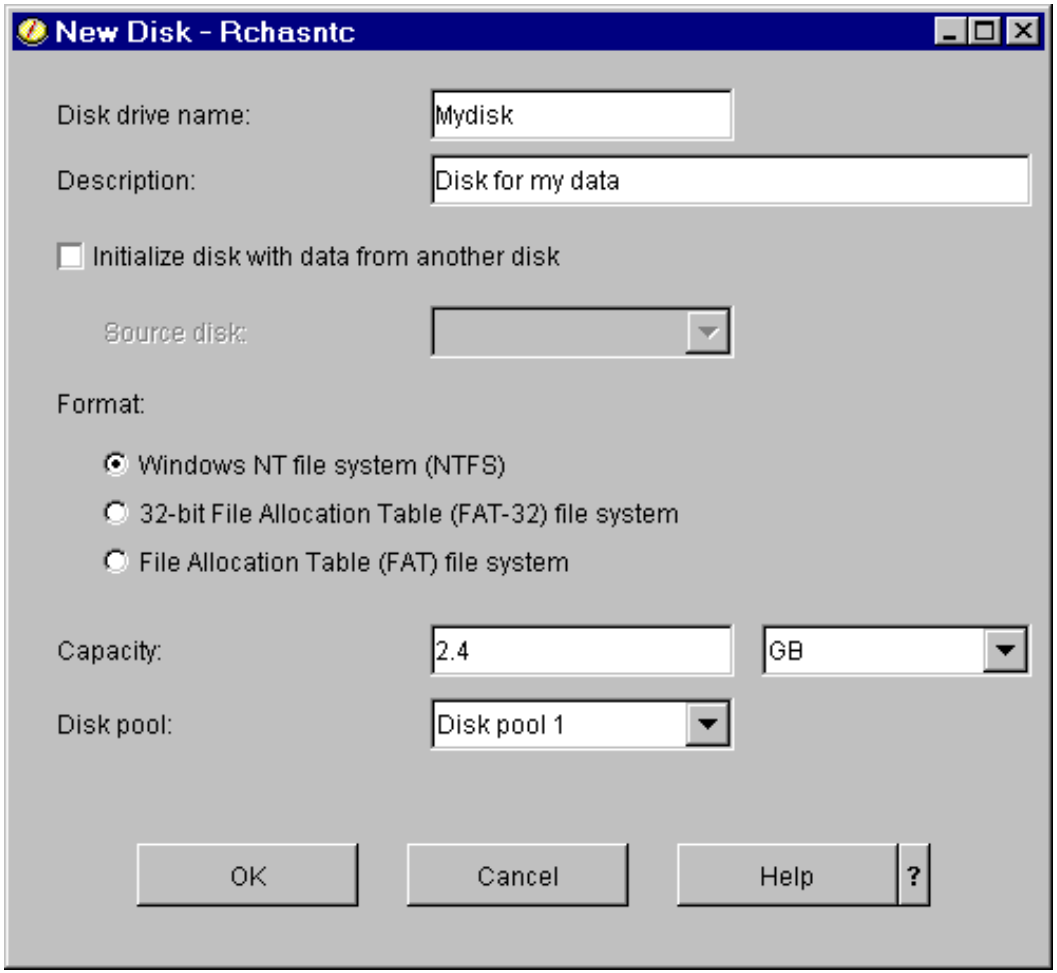
Flexible storage and systems management

Exploits OS/400 automated storage management

Dynamically add storage

Allows storage consolidation

- Up to 32 Integrated xSeries Servers
- Up to 16 Integrated xSeries Adapters
- Up to 2 TB storage per server
- Supports storage spaces in independent ASP



Notes: iSeries SAN for Windows Servers

The iSeries can be used to provide a flexible storage area network (SAN) to consolidate the disk requirements of multiple Windows NT and 2000 servers. While full Windows Server storage capability is maintained, the iSeries provides the value of its advanced storage management facilities and reliability.

iSeries disk storage is allocated to Windows NT or 2000 Servers by creating a storage space object or virtual disk space from the iSeries pool of disk resources. Up to 32 storage spaces can be created and linked to each Integrated xSeries Adapter, and up to 16 storage spaces can be created and assigned to each Integrated xSeries Server. The storage limit has also been increased from 1 TB to 2 TB. By using iSeries disks, Windows NT and 2000 Server files are protected by the iSeries RAID-5 and mirroring.

Windows NT/2000 storage spaces can either be located in the iSeries system disk pool, or separated from iSeries applications and data on specific drives in a user auxiliary storage pool (user ASP), or (with V5R1) in an Independent Auxiliary Storage Pool (IASP, also referred to as a Switchable IASP). Switchable IASPs allow an I/O tower containing Windows server storage spaces to be switched between two iSeries servers connected via High Speed Link (HSL). Switching storage allows a primary iSeries server to be taken down for scheduled maintenance without affecting users and disk storage of the Windows NT/2000 servers. The storage spaces can be switched between Windows servers via Operations Navigator Cluster configuration and Management.

OS/400 V5R1 also provides the ability to increase the storage limit from 1 TB to 2 TB, and dynamically add disk storage without having to shutdown Windows 2000 Server, thus utilizing the built-in functions offered by Windows 2000 server.

User administration integration through Operations Navigator enables OS/400 users and groups to be enrolled on an Windows NT/2000 server or a domain and for user passwords to be synchronized. This feature significantly reduces the overhead of maintaining two separate administration systems for OS/400 and Windows NT/2000.

Notes: iSeries SAN for Windows Servers-2

When you create an OS/400 user, you can add the user to a group that is predefined to propagate users to the Windows Server. The user is then created on Windows NT/2000 Servers using a predefined template, to allocate the correct security rights and user preferences. If the user leaves the company, deleting the OS/400 profile will also delete the Windows NT/2000 Server profile. Once OS/400 users are enrolled, their password changes are passed automatically to the Windows Server. If a password is changed through the Windows Server interface, however, the change is not synchronized back to the OS/400 side.

Operations Navigator with V5R1 is also enhanced to support restart or shutdown for multiple Windows NT or 2000 servers.

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iNotes and Domino for iSeries

Delivers power of iSeries and Domino mobility to Outlook users

Reliable, scalable messaging for Microsoft Outlook users

- Replace MS Exchange servers with Domino for iSeries
- Retain existing Outlook client software with iNotes J Web Access for Microsoft Outlook
  - Plus synchronization and off-line services

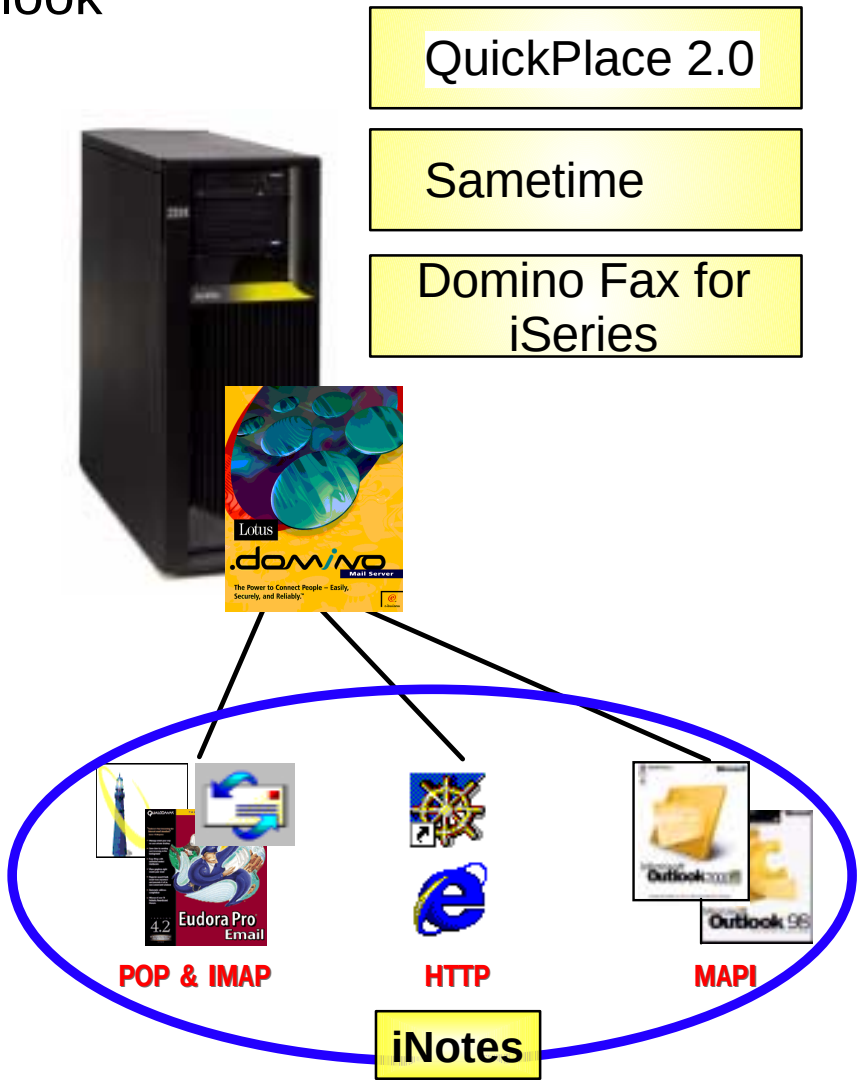
EZ Setup Wizard, TCP/IP autostart

B to B collaboration with Sametime and QuickPlace

IBM Integrated Domino Fax for iSeries

Domino for iSeries 5.0.7 ClusterProven J for robust availability

V5R1 NotesBench benchmark update



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Notes: iNotes and Domino for iSeries

A new Lotus client brand called iNotes is an umbrella that encompasses access to the Domino server with the user's choice of a variety of non-Notes clients. iNotes represents the extension of Domino messaging and collaboration, personal information management (PIM), and off-line services to current Web browsers and Microsoft Outlook clients. Support for Microsoft Outlook and off-line function for these clients are available beginning with Domino for iSeries 5.0.5. Components of the iNotes brand include WebMail, iNotes Access for Microsoft Outlook, Domino Off-line Services, and the newly announced iNotes Web Access. The iNotes licensing model also includes access to Domino mail from standards-based mail clients such as POP3 or IMAP4.

Domino supports online access by browsers and standards-based mail clients. Domino Off-line Services (DOLS) provides off-line functions for WebMail, iNotes Web Access, and iNotes Access for Microsoft Outlook clients via the Lotus iNotes Sync Manager. DOLS and support for Microsoft Outlook clients became available with Domino 5.0.5. iNotes includes the iNotes Sync Manager, which provides browser users with replication and other advanced functions that enable working with Domino e-business applications off-line. A Domino Off-Line Services design template allows application developers to offline-enable their Domino applications. Even with the new iNotes off-line capabilities, the full-function Notes client still offers advantages over a Web browser because it integrates so many disparate data types. For more information about Lotus iNotes, see http://www.lotus.com/inotes.

Notes: iNotes and Domino for iSeries-2

Besides iNotes, Domino for iSeries also supports Lotus QuickPlace, Sametime, Integrated Domino Fax for iSeries (5733-FXD), and Mobile Notes through the Integrated xSeries Server for access to Domino through PDAs and cellular phones. Lotus's fax solution will only be available on the iSeries.

- Lotus QuickPlace is the self-service Web tool for team collaboration. QuickPlace enables the creation of a team workspace on the Web instantly. Teams use QuickPlace to share and organize ideas, content and tasks around any project or ad-hoc initiative. QuickPlace provides a central on-line workspace structured for productivity.
- Lotus Sametime is a family of real-time collaboration products providing instant awareness, communication, and screen sharing capabilities. Sametime brings the flexibility and efficiency of real-time instant messaging and secure-Web meetings to the business world.
- IBM Integrated Domino Fax for iSeries (5733-FXD) enables Lotus Notes users to send and receive faxes, both text-based and graphics-based documents, directly from their Notes client. Use your current telephone system and Domino infrastructure. You can use a standalone NT workstation to perform format conversions or choose a single box solution by utilizing the iSeries Integrated xSeries Server (IXS). The Domino Fax solution for the iSeries uniquely offers native integration with the iSeries fax hardware and with Domino.

This rich e-collaborative application environment is further enhanced with OS/400 V5R1 by providing a graphical interface for server setup, automatic TCP/IP startup, and enabling Domino servers to take advantage of IBM's ClusterProven program demonstrating continuous application availability.

Domino for iSeries, release 5.0.7 or later has been certified by Rochester as a ClusterProven(TM) application.

For further information, refer to http://www.ibm.com/eserver/iseries/domino

OS/400 PASE

iSeries Management, UNIX Development

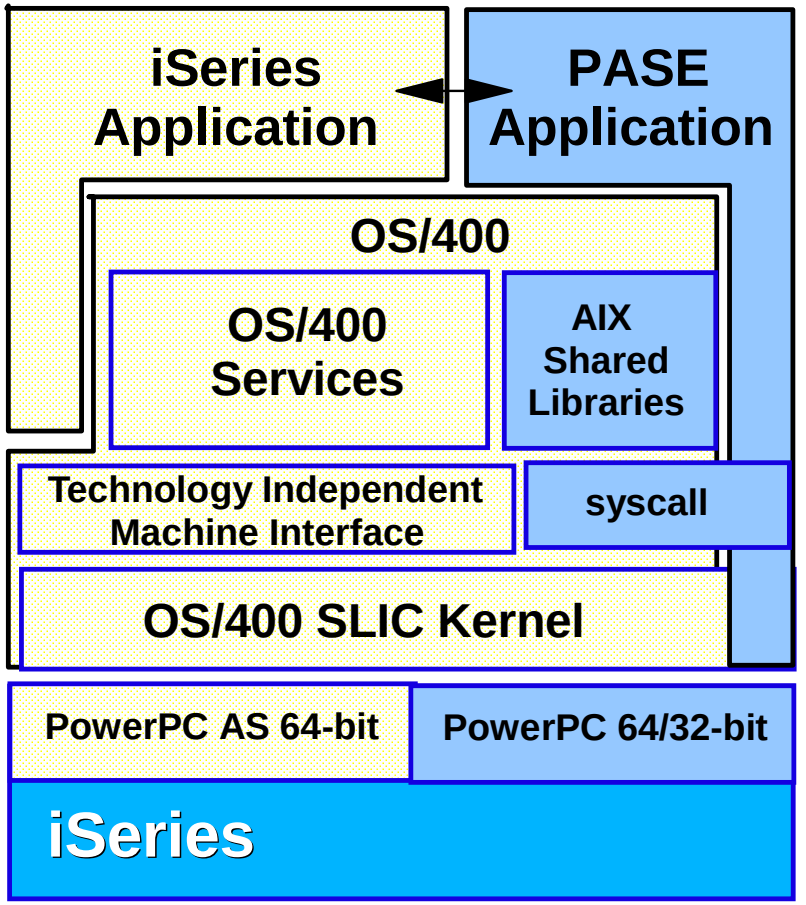
An integrated OS/400 runtime for porting selected UNIX applications

- Integrated with OS/400 file systems and work management

Exploits PowerPC's ability to switch runtime modes for applications

Enhanced to support AIX 4.3 64-bit application model

Enabled for National Language Versions



Notes: OS/400 PASE

The OS/400 Portable Application Solutions Environment (OS/400 PASE) is a technology designed to expand the solutions portfolio of iSeries. OS/400 PASE is an integrated runtime environment that simplifies UNIX* application porting.

The iSeries broad base of applications is continually enhanced by new applications coming to the platform from a variety of sources. Up to now, the Integrated Language Environment (ILE) accounted for the majority of C or C++ application ports, many originating on UNIX systems. While many applications continue to be ported to iSeries in this manner, other applications, specially those with highly compute-intensive demands now have the option to use OS/400 PASE.

OS/400 PASE provides a broad set of AIX interfaces, in a runtime that allows many AIX binaries to execute directly on the PowerPC processor of iSeries. The strategy for OS/400 PASE is to use the new technology to enhance and expand its solutions portfolio in specific industry and application segment targets.

OS/400 PASE is supported on all iSeries models, as well as any AS/400e servers 6xx or Sxx, or later. OS/400 PASE applications run directly on the hardware and take advantage of OS/400 services such as file systems, security and DB2 Universal Database. OS/400 PASE applications run in a normal OS/400 job and are managed using standard OS/400 operations and management facilities.

Notes: OS/400 PASE-2

Some of the significant enhancements to OS/400 PASE in V5R1 include:

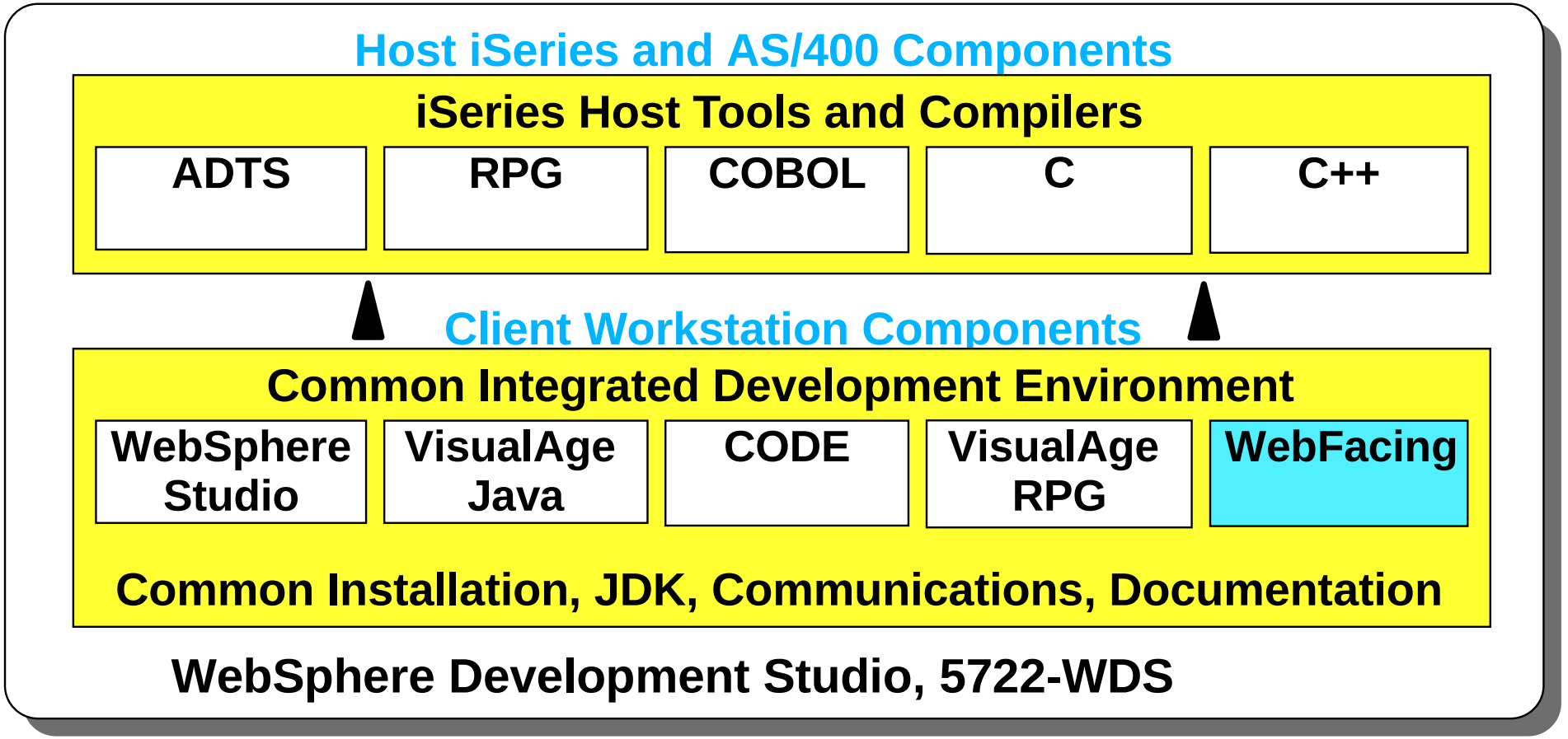
- Support of the AIX 4.3 64-bit application model
- National Language Version (NLV) enablement - including translated message catalogs for IBM supplied runtime libraries and utilities
- Documentation for OS/400 PASE runtime, shells, and utilities in the IBM iSeries Information Center
- Header and export files for OS/400 PASE extensions now packaged with OS/400 Portable Application Solutions Environment, option 33.
- SQL Call Level Interface (CLI) server mode support
- Additional locales, runtime APIs and utilities
- Updated versions of the AIX C++ and FORTRAN language runtime libraries

For more information, see:

- http://www.redbooks.ibm.com (search on PASE)
- http://www.iseries.ibm.com/developer/factory/pase
- the IBM iSeries Information Center at: http://www.ibm.com/eserver/iseries/infocenter

Note: The updated for V5R1 Domain Name Services (DNS) support requires V5R1 Portable Application Solutions Environment be installed.

WebSphere Development Studio for iSeries



A single toolset for *all* iSeries application developers

Common launch pad, project definition and maintenance

New WebFacing tool extends 5250 apps

Notes: WebSphere Development Studio

WebSphere Development Studio for iSeries is a fully integrated application development toolset, packaged to provide a full suite of visual development tools that encompass all phases of e-business applications. It incorporates both Web design (workstation- based tools) and deployment capabilities (iSeries-based tools and compilers) of WebSphere Studio, VisualAge Java and the new Web Facing Tool, and the development and integration of business logic using CODE or VisualAge RPG.

WebSphere Development Studio for iSeries is priced aggressively to encourage e-business development. Customers with Software Subscription will be able to upgrade to these tools at no additional charge. For example, a customer with RPG and ADTS (PDM, SEU, SDA, RPU, DFU, AFP, CGU) licensed program products will benefit from getting access to the complete suite of application development tools that are offered with the WebSphere Development Studio for iSeries.

A variety of language resources and compilers are provided to allow customers to accomplish the transformation to e-business easily, either by extending existing application investments already made in RPG or COBOL applications and skills, or by investing in new Java, XML, C or C++ applications.

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Notes: WebSphere Development Studio-2

Based on industry standards, companies can develop applications with procedural code, object-oriented constructs, architecting applications for browsers, thin clients, fat clients, or even for batch. When targeting their application development to new e-business needs, they can also take advantage of OS/400's built-in IBM HTTP Server powered by Apache and WebSphere Application Server (Standard Edition).

For ease of application integration in a heterogeneous environment, MQSeries can be added to provide a robust messaging infrastructure. Domino adds another dimension to e-business initiatives by providing a rich collaborative development environment.

On top of these e-business enabling technologies are a variety of frameworks from which to choose such as WebSphere Commerce Suite, and Connect for iSeries.

5722-WDS is packaged to include the iSeries host-based ADTS, RPG, COBOL, C, and C++ products and the client-based WebSphere Studio (with iSeries "affinity"), VisualAge for Java, CODE, VisualAge RPG and WebFacing-First Edition. There is a planned product, WebSphere Development Tools for iSeries V5R1, which supports only the client-based tools set.

In addition to the packaging of products, there are some enhancements to the various products for V5R1, the following summarizes them. We also have a foil on the new Webfacing-First Edition.

The Application Development presentation has more details on RPG, COBOL, C/C++ enhancements and the WebSphere Studio with iSeries "affinity."

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Notes: WebSphere Development Studio-3

The Application Development presentation has more details on RPG, COBOL, and C/C++ enhancements.

The following are installable options under 5722-WDS:

- 21: Tools - Application Development
- 31: Compiler - ILE RPG IV
- 34: Compiler - RPG/400
- 35: Compiler - ILE RPG IV *PRV
- 41: Compiler - ILE COBOL
- 44: Compiler - OPM COBOL
- 45: Compiler - ILE COBOL *PRV
- 51: Compiler - ILE C
- 52 Compiler - ILE C++
- 53: Compiler - ILE C *PRV
- 54: Compiler - ILE C++ *PRV
- 55: IBM Open Class - source and samples

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Notes: WebSphere Development Studio-4

V5R1 RPG IV:

- Java enablement to simplify coding of calls to Java classes and methods
- More granular exception monitoring (MONITOR opcode)
- New built-in functions: %ALLOC, %REALLOC, %CHECK, %CHECKR,
- %LOOKUPxx, %TLOOKUPxx, %OCCUR, %SHTDN, %SQRT, %XLATE.
- Date/time/timestamp operations in expressions
- Free-form calculation specifications
- Runtime control of file to be opened
- LICOPT support to pass options directly to translator
- Qualified names in data structures
- ELSEIF opcode
- New predefined /DEFINE names
- New compiler directive /INCLUDE
- and more

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Notes: WebSphere Development Studio-5

V5R1 COBOL:

- UCS-2 (Unicode) support:
  - National data, a new type of data item, has been added to provide support for the coded character set specified in ISO/IEC 10646-1 as UCS-2. The code set is the basic set defined in the Unicode standard.
  - NTLPADCHAR compiler option and PROCESS statement option
- JAVA interoperability support
  - QCBLLESRC.JNI file which provides the same definitions and prototypes that are provided in the JNI.h file, but written in COBOL rather than C.
- iSeries portability support
  - PROCESS statement option NOCOMPASBIN/COMPASBIN
  - PROCESS statement option NOLSPTRALIGN/LSPTRALIGN
  - Complex OCCURS DEPENDING ON (ODO) support
- The LICOPT parameter has been added to the CRTCBLMOD and CRTBNDCBL commands to allow advanced users to specify Licensed Internal Code options

5R1 ILE C:

- Updated to latest C Compiler on all IBM platforms, improving cross-platform portability
- Read source and includes from IFS or native QYS.LIB files systems
- Teraspace Phase 2 support
- Target release support for V4R4, V4R5, V5R1
- A Qshell command for compiling
- Asynchronous signals
- Improved compatibility with V5R1 C++

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Notes: WebSphere Development Studio-6

V5R1 C++

- Completely refreshed Compiler from the latest AIX compiler
- More ANSI support
- Compliant with the latest ANSI ISO/IEC 14882-1998 C++ standard
- Template Library, and namespace support
- Replaces VAC++ cross compiler and native PRPQ compiler
- New release (V5) of IBM Open Class class libraries
- book data type
- Read source and includes from IFS or native
- Produce native or IFS spool file listings
- 64-bit file indexing for stream classes
- Teraspace Addressing support (improves portability/perf)
- More explicit control on CCSID-translation for stream classes
- A third parameter for main() for current environment vars
- Target V4R4, V4R5 and V5R1
- Preprocessor output targeting specified file
- A Qshell command for compiling
- New LICOPT and CSOPT command keywords

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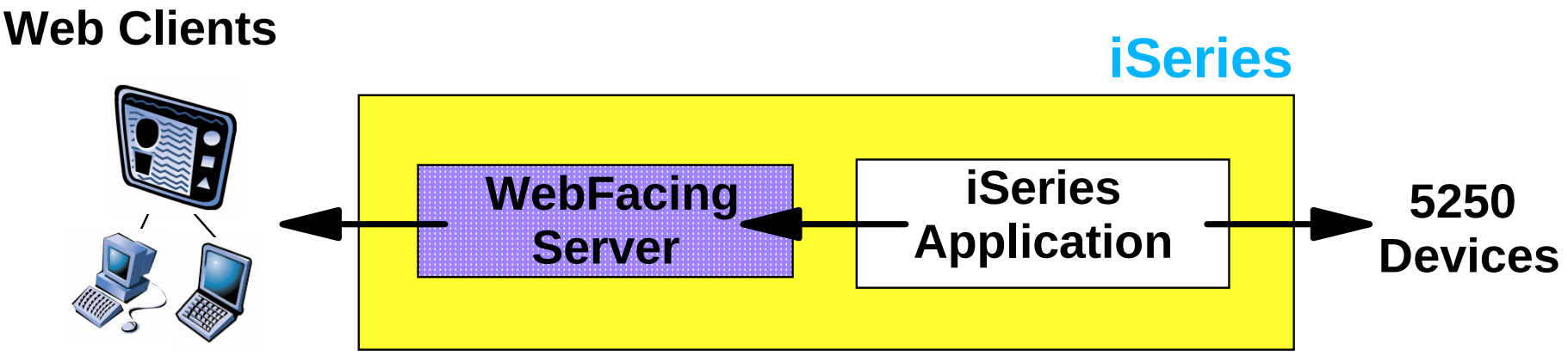
WDS: WebFacing Tool



Rapid Web conversion of 5250 applications

- Single code base supports both Web browser clients and 5250 devices
- Automatic conversion with good performance

Included with WebSphere Development Studio

- No separate development or runtime license

Notes: WDS: WebFacing Tool

The WebFacing tool was introduced during 4Q 2000 on a trial basis. With the April 2001 announcements an updated Webfacing-First Edition tool is shipped as part of the WebSphere Development Studio to provide rapid conversion of 5250 applications to support Web browser clients in addition to existing 5250 devices from a common code base.

No additional development or run-time charges are made for using the WebFacing tool.

The WebFacing tool designed for developers to simply convert display file DDS source to JSPs and Java Beans. Little change to program objects is required, since the majority of DDS keywords are supported.

Once converted, the application program can be used by either a 5250 device or through a Web browser. The runtime component converts between display files and JSPs automatically, with performance that is comparable to running on a standard 5250 device.

The WebFacing Tool is neither DBCS nor BIDI National Language enabled at GA. Plans are for it to be DBCS enabled in 3Q01 via a PTF.

Notes: WSD: WebFacing Tool-2

The major difference of the WebFacing Tool from the competition is that the WebFacing Tool is a development-time conversion tool while most of the other tools are run-time conversion tools.

5250 Intercept (run time) products are preferred when:

- The application is stabilized:
  - No change to application is desired
- Cannot change the application source
- Preference is to enhance runtime output versus development time source.

The WebFacing Tool (development time) is preferred when:

- The business is still actively evolving the application
- The developer is able to change the code to improve Web rendering
- Preference is to enhance source versus the. 5250 data stream
- The web application is performance sensitive
- The web application is cost sensitive

The WebFacing Tool (First Edition) supports display file DDS and does not support:

- UIM (User Interface Manager) help or panels
- Office product help
- OS/400 operating system screens or panels

WebFaced applications continue to run in interactive mode.

See the Appendix foil titled Host/Server Access Product Comparisons for comparison of WebFacing with other products of similar objective -getting 5250 applications into a web-based environment.

Innovative Technology: Software Enhancements

Innovative Technology: Software Enhancements

Connect for iSeries

Web Serving

Pervasive Computing

Networking and Security

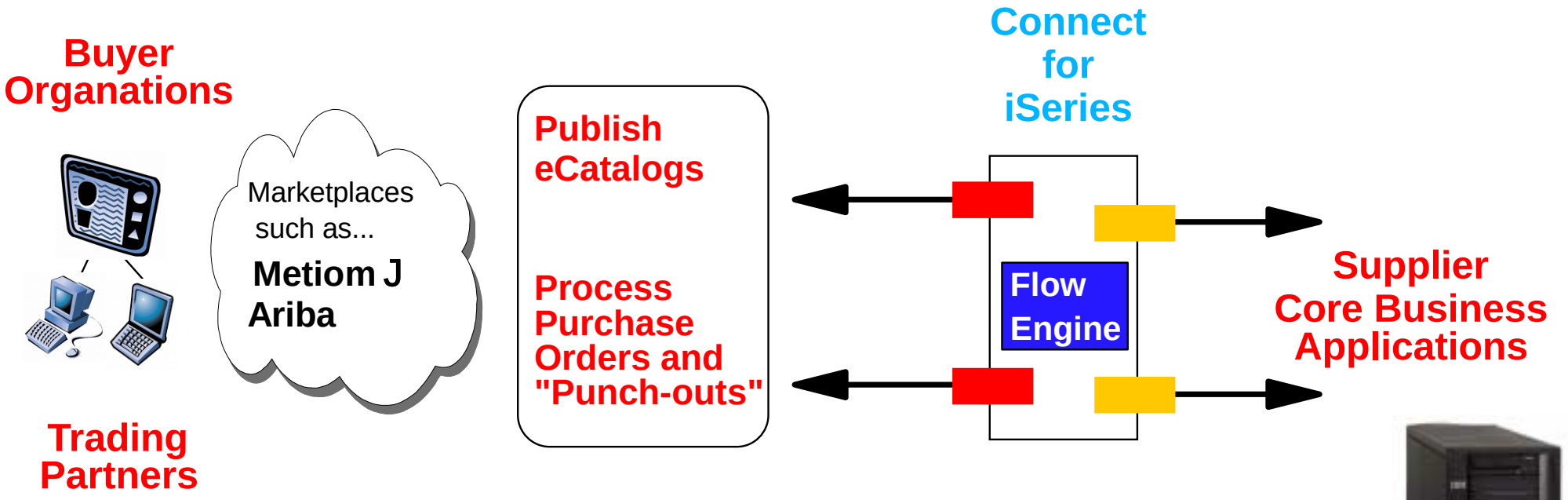
Database and File Systems

Client Access

Printing

Operations Navigator

Connect for iSeries



Business to Business integration framework

- Provides key enablement tools to securely connect supplier business applications to trading partnrers
- Integration with MQSeries and WebSphere Commerce Suite
- Low cost, high function
- Highly flexible and easy to extend

Notes: Connect for iSeries

Connect for iSeries is an integration framework for B2B that enables small and midsize suppliers to seamlessly and securely connect existing core business applications to trading partners and buyer organizations via the internet.

Connect for iSeries is built on industry standards and it works with Domino, WebSphere and MQSeries. It was announced on Oct. 3, 2000 and its initial delivery on Feb. 2001 was on V4R5.

Connect for iSeries is a Licensed Program Product, 5733-B2B, which includes pluggable connectors for connecting to e-marketplaces such as Ariba and MetiomJ and for integrating core business applications. Tools for configuring buyer and supplier information and for deploying and managing processes are included. Catalog management features and integration with WebSphere Commerce Suite for remote "punch-out" catalog processing are also included.

Version 1.1 of Connect for iSeries builds on a solid foundation, extending functional capability and flexibility. Some of the additions include:

- Support for new trading partner protocols
- Better application integration
- Enhanced flow processing
- Visual mapping tools
- Improved catalog management capabilities
- Support for the latest middleware from IBM

Connect for iSeries Version 1.1 is planned for availability on 8/31/2001.

For the latest information on Connect for iSeries, see http://www.ibm.com/eserver/iseries/btob/connect.

The following foils give some more information on Version 1.1 enhancements.

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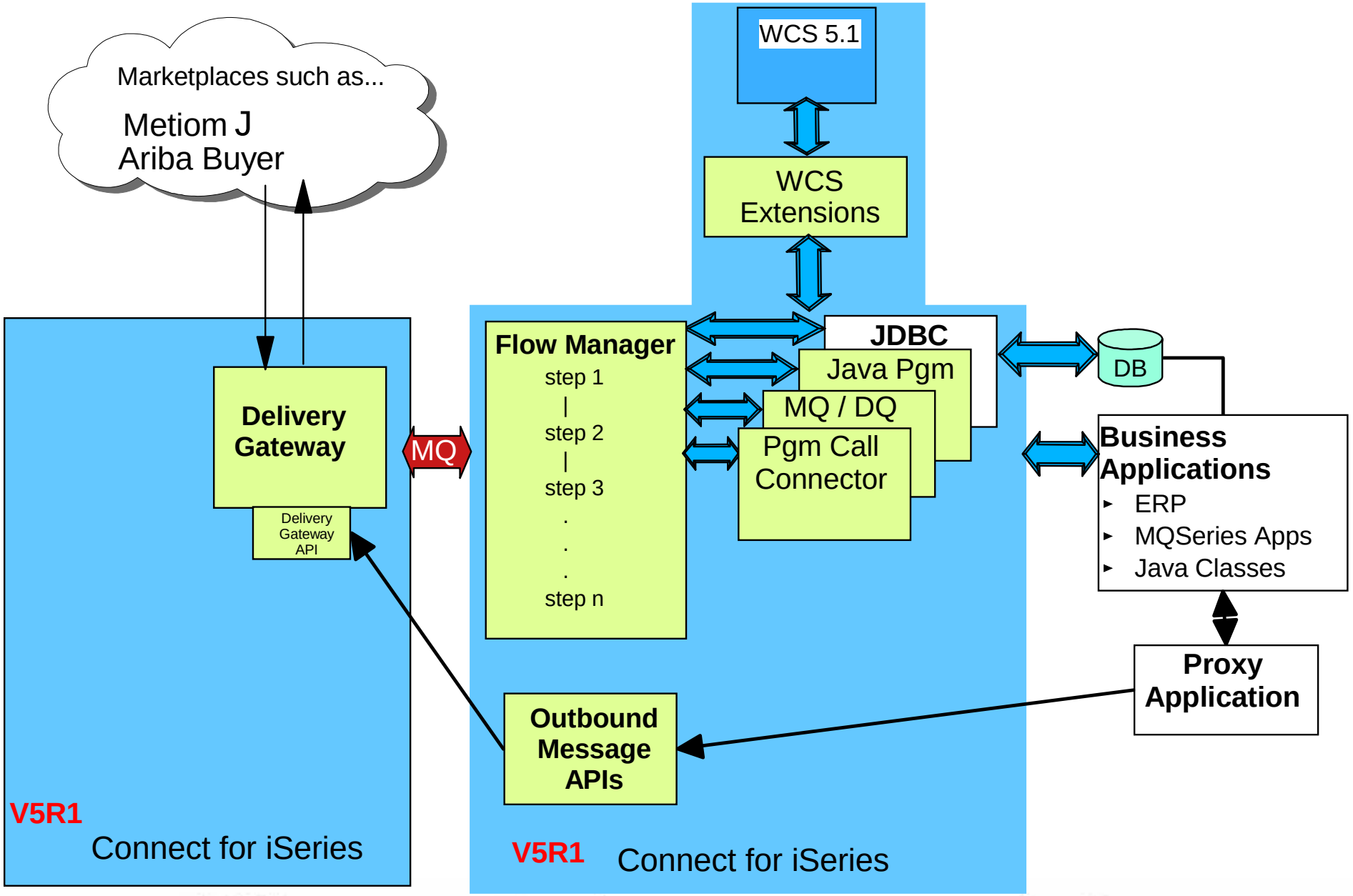
iSeries Connect V1.1 Application Interfaces



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Notes: V1.1 Application Interfaces

This foil is a pictorial representation of Version 1.1 enhancements including the Delivery Gateway and Flow Manager on separate systems, the updated marketplace protocols, the multistep Flow Manager, WebSphere CommerceSuite 5.1 and the new JDBC database connector.

Also shown is the usage of the new APIs for outbound messages. Here you can see that a Proxy Application would be written that, after interfacing with the business applications, routes market place responses back to the buyer.

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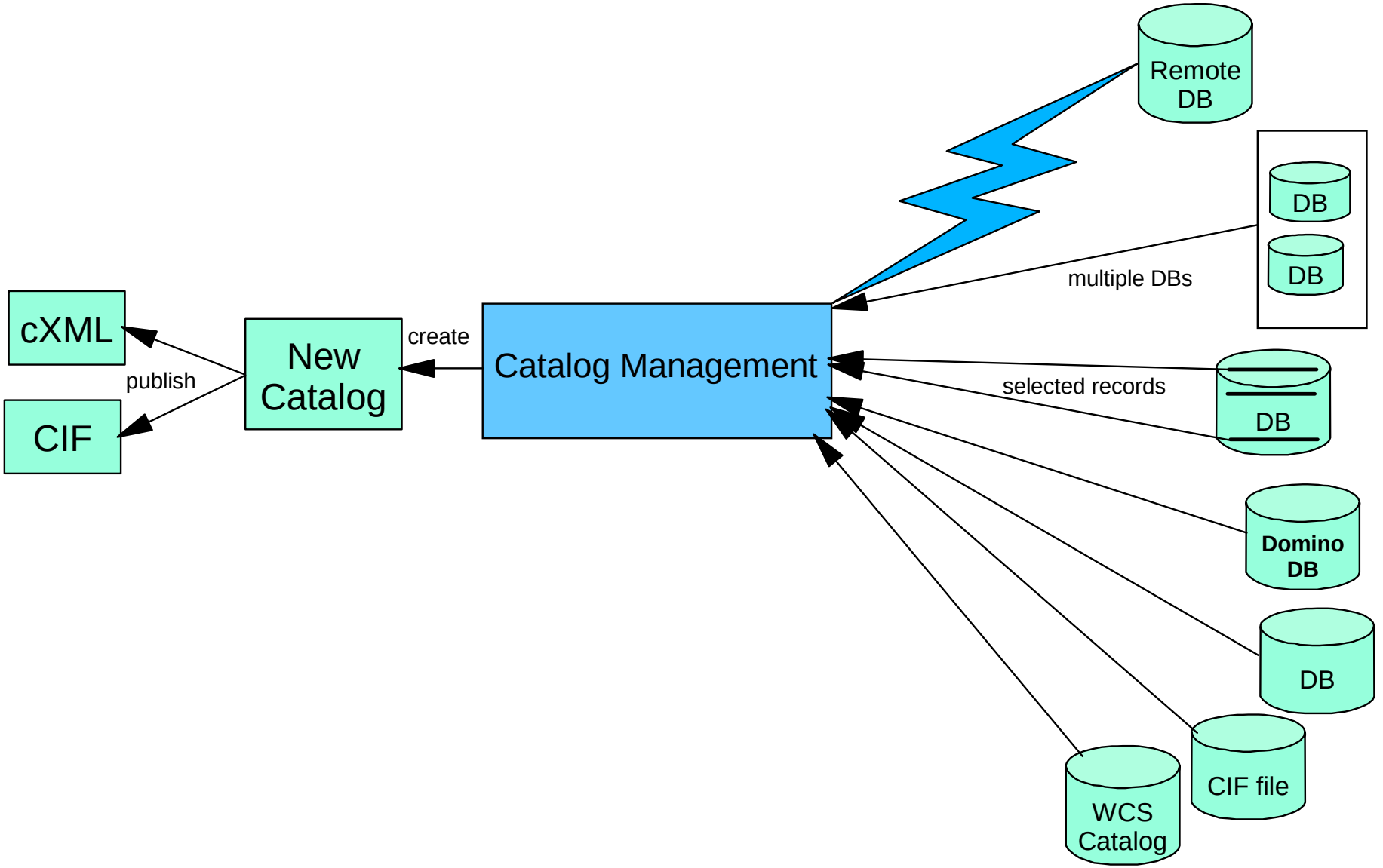
V1.1 New Catalog Features



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Notes: V1.1 New Catalog Features

This foil shows enhanced catalog management features which allow you to:

- Create and publish a subset of a catalog in order to provide product categorizations appropriate for particular buyer organizations
- Create a catalog with customer specific pricing
- Generate a catalog from multiple database tables, including a remote database, a Domino database, and other databases
- Generate catalog entries from selected table records

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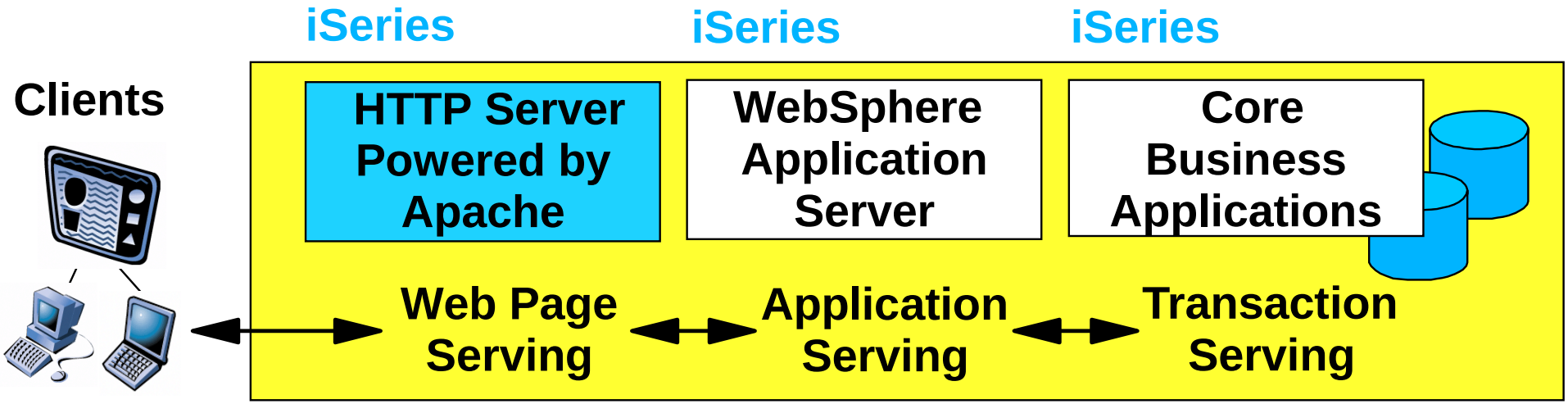
Web Serving

IBM HTTP Server for iSeries (powered by Apache)



- Support for switched disk (HTTP Server for iSeries only)
- Triggered Cache Manager -Improved caching performance
- DBCS search engine
- *ADMIN uses Apache

Notes: Web Serving

iSeries supports extending core business applications to the Web with options for HTTP Web serving and WebSphere Application Server. The HTTP Server for pSeries (5722-DG1 includes an option to configure and run either the HTTP Server for iSeries without the Apache environment or with the Apache environment - HTTP Server powered by Apache.

HTTP Server for iSeries enhancements include:

- Triggered Cache Manager (TCM) provides a mechanism to cache dynamically-generated Web pages. TCM allows a Web designer to build dynamic pages and will only update the cache when the underlying data changes, thereby improving the performance of a Web site.
- Highly Available Web server takes advantage of iSeries Clustering technology - simple clustering with switched IASPs, which makes it possible to build a highly available Web site, improving the availability of business-critical Web applications built with Common Gateway Interface (CGI) programs. This enhancement is only available on the original IBM HTTP Server (not under the "powered by Apache configuration").
- Updated Search enhancements including:
  - Support for Web crawling allows documents at remote web sites to be downloaded to a local directory to be used in creating a search index.
  - Thesaurus support allows search terms to be expanded with related terms for better search results.
  - Many search usability improvements added to allow search results to be sorted by rating, title, or document date. Also supported is the ability to do searches within search results.
- The ADMIN server is "powered by Apache" and as such uses unique configuration files. If you have made no changes to the prev V5R1 ADMIN configuration files these files are automatically converted for you when installing V5R1. If you have made changes you have to make similar changes to the new "Apache configuration files shipped with V5R1.
  Note: The HTTP Server for iSeries, 5722-DG! requires JDK level 1.2 be installed on your system. Unless a customer has taken specific steps to not have JDK level 1.2 installed, refer to the Memo to Users.

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Notes: Web Serving-2

HTTP Server for iSeries - Powered by Apache

As we have said, in V5R1, IBM HTTP Server for iSeries now includes both the original IBM HTTP Server and the IBM HTTP Server (powered by Apache). Apache under OS/400 was originally made available during 4Q 2000 running on V4R5. For V4R5 information, go to:

- http://www-1.ibm.com/servers/eserver/iseries/software/v4r5ptfs

HTTP Server for iSeries (5722-DG1)- Apache configuration option

Apache, a freeware HTTP server, is open-source software that implements the industry-standard HTTP/1.1 protocol with a focus on being highly configurable and easily extendible. It is built for several server platforms and distributed under the Apache Software License by the Apache Software Foundation. OS/400's HTTP Server includes a highly scalable multithreaded runtime as well as Apache Portable Runtime (APR) which allows Apache modules to be written independently of the target deployment platform with only a simple recompile required to run on iSeries.

Working from a common Apache Version 2 code base, iSeries has incorporated many features that differentiate its Web serving from other Apache-based servers in the following areas:

- Usability:
  - OS/400 provides the only Apache-based server with a complete, task-oriented, browser-based User Interface that is fully NLS-enabled and translatable utilizing a built-in, industry standard Java servlet engine .
  - LDAP used to store configuration information and share across multiple physical systems .
- Availability and Serviceability:
  - iSeries delivers greater serviceability for its Apache-based server with robust, configurable, trace points and on-the-fly tracing capability.
  - APIs for updating configuration information allowing Web applications to set up server instances with no manual intervention .
  - Idle backup server provides seamless failover within one server instance with improved server throughput and scalability.

Notes: Web Serving-3

HTTP Server for iSeries (5722-DG1)- Apache configuration option continued

- Security:
  - User credentials passed to CGI programs allowing true, secure, single sign-on for Web applications.
  - Persistent CGI and Net.Data to maintain process state across multiple browser requests as a single transaction.
  - Validation Lists to secure user lists with no inherent system authority.
  - Optional or required user sign-on using SSL Client Certificates (not userid/password) associated with either an OS/400 user profile or users in validation lists.
  - Configurable dynamic protection against denial of service attacks that try to tie up server TCP/IP connections.
- Performance:
  - Pre-started and reused CGI jobs, significantly improving performance and throughput.
  - Pre-cached static files at a directory level and dynamic caching of the most-accessed static files.
  - Asynchronous I/O to decouple browser requests from server threads, for high volume HTTP persistent connections.
  - Java level requirement:
  - reREqure

For more complete information on Apache servers, refer to:

- http://www.apache.org/

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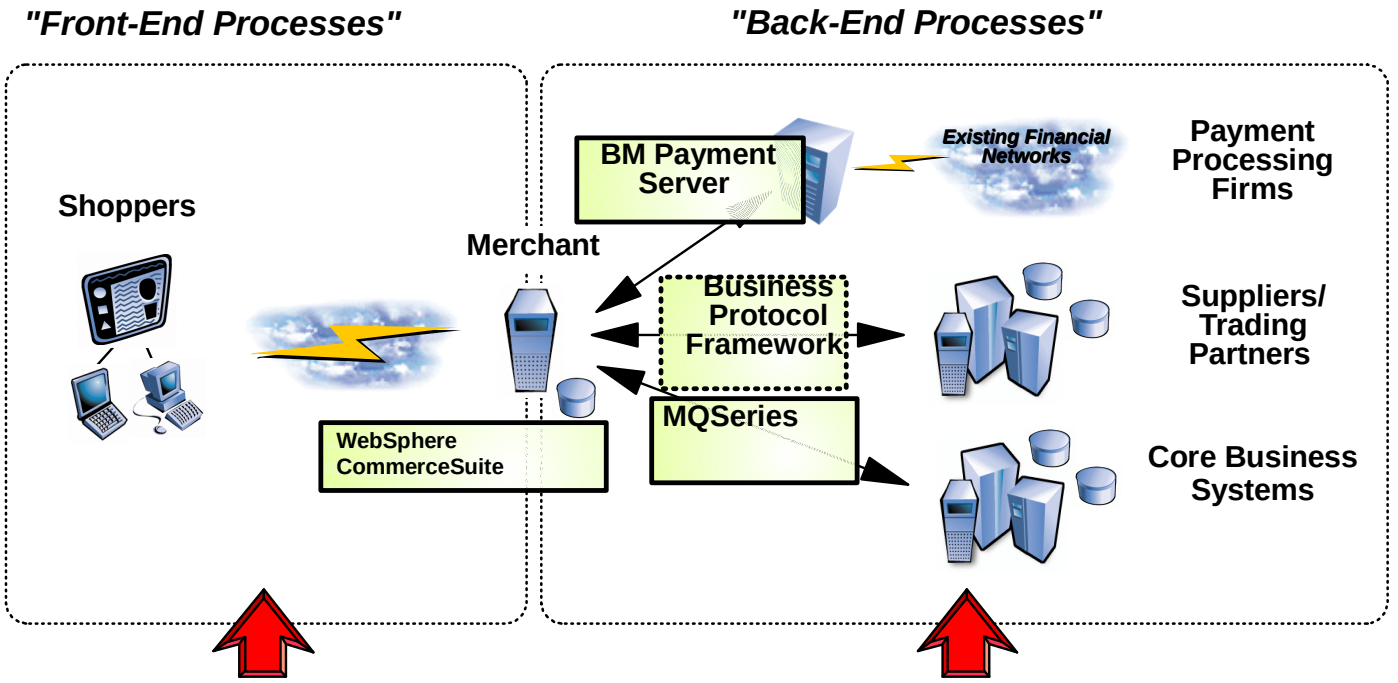
WebSphere Commerce Suite V5.1



Provides a framework for customers to establish effective, enterprise B2B and B2C e-commerce web sites

- Includes WebSphere Advanced Edition
- Includes WebSphere Payment Manager
- V5.1: More XML, Pervasive Computing, Subsystem Design (easier plug-in)

Notes: WebSphere Commerce Suite V5.1

WebSphere Commerce Server V5.1 is the follow-on to WebSphere Commerce Suite 4.1 and Net.Commerce.

WCS is a great starter kit for a modern e-commerce solution. It can be used as a very robust electronic catalogue component in a Private Valuenet B2B solution or in a B2C solution.

WebSphere Commerce Suite provides catalog function as well as many other important functions such as:

- Commerce Server for Online Store operations
- Database for product, store, and customer data
- Payment Server
- WebSphere App Server, providing foundation and basic services
- Catalog Subsystem for catalog navigation and merchandising
- User Subsystem for user registration, authentication, access control
- Negotiation Subsystem for Auctions with multiple bidding technology options
- Order Subsystem for shopping carts, order processing, taxation, etc.
- Messaging Subsystem for notification schemes.. e-mail, etc.
- WCS Accelerator for campaigns, merchandising, promotions
- Commerce Analyzer provides business intelligence.. analyze customer behavior
- Multicultural enablement for language, currency, taxation, shipping, price, etc.
- Mass Loader utility to populate the WCS database
- Commerce Studio development tools

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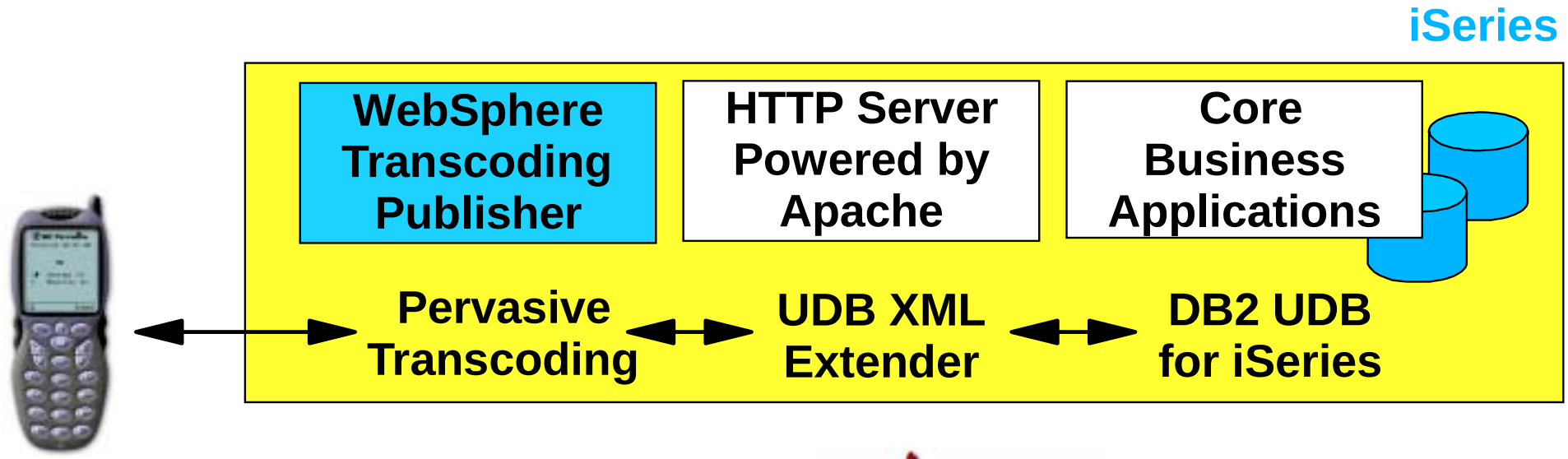
Pervasive Computing

iSeries application enablement for pervasive devices

- XML
- DB2 UDB XML Extender (5722-DE1)
- WebSphere Transcoding Publisher*
- Management Central Pervasive

*Supported on V4R5; Watch for V5R1 support later in 2001



Strategi by ADVANCED BusinessLink

LANSA Advanced Software Made Simple

Jacada

SEAGULL™

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Notes: Pervasive Computing

iSeries provides a wide range of application enablement options for extending business solutions to pervasive and wireless devices. In addition to solutions from IBM, such as Management Central Pervasive, a number of iSeries Business Partners provide wireless solutions. The Business Partners include LANSA, Seagull, Jacada and Advanced Business Link.

Extensible Markup Language (XML) is one of the key technologies fueling growth of e-business and mobile e-business solutions. XML is becoming the standard way to represent data in a portable, reusable format for use in a number of solutions, ranging from B2B solutions which link together trading partners, to pervasive computing applications which connect mobile devices such as cell phones to core business solutions. OS/400 includes a wide range of XML applications enablers, including with V5R1:

- XML parsers (common building blocks) used to work with data in new Java and C++ applications.
- XML parsing interfaces to extend enablement options to existing applications written in RPG, COBOL and C.

IBM DB2 UDB XML Extender is a new iSeries licensed program (5722-DE1) that provides two-way data interchange between XML and DB2 relational database formats. It provides new data types to allow XML documents to be stored in DB2 UDB databases plus utilities to work with the new database formats. See the Database topic of this presentation for more information.

Management Central Pervasive is shipped with OS/400 and based on the industry standard protocols WAP and WML. It allows iSeries operators to monitor their iSeries servers from a pervasive devices. Using an Internet capable cellular phone (mobile), a PDA with a wireless modem, or a Web browser, the administrator can monitor and manage iSeries operations. With V5R1, you can both monitor system messages and jobs and, now, manage jobs and run commands.

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Notes: Pervasive Computing-2

IBM WebSphere Transcoding Publisher is designed to extend existing Web pages to pervasive computing platforms (cell phones, PDAs) via on-the-fly data conversion. The publisher allows you to select the data in a Web page and omit graphics and images that are not practical to render to the smaller mobile device screens or with the available wireless bandwidth. It is supported on V4R5.

WebSphere Transcoding Publisher is a server-side, easy-to-use solution for bridging data across multiple formats, markup languages and devices. Transcoding Publisher adapts, reformats, and filters content to make it suited for pervasive computing, giving companies better access to customers, business partners and mobile employees on a variety of devices:

- Leverage existing investments in HTML and XML-based content to reach wireless Internet users.
  - HTML to simplified HTML
  - HTML to WML (Wireless Markup Language)
  - HTML to i-mode (a variant of compact HTML)
  - HTML to HDML (Handheld Device Markup Language)
  - XML to XML variants using XSL (Extensible Stylesheet Language) stylesheets
  - JPEG images to GIF and WBMP (Wireless Bit Map) formats
  - GIF images to JPEG and WBMP (Wireless Bit Map) formats
- Avoid the expense of creating multiple versions of your Web sites by dynamically adapting content for a wide range of devices including Personal Digital Assistants (PDAs), WAP-enabled phones, and now HDML-based and i-mode phones.
- Respond quickly to emerging trends with easy deployment of new transcoders
- Respond to the limited storage capacity of phones. Fragmentation, which allows Web pages to be dynamically broken into smaller pieces, is available for HDML, i-mode and WML

Notes: Pervasive Computing-3

- Customize content presentation for the end user
  - Choose content to be delivered through two techniques.
    - ✓ Annotation makes it possible to tailor source content without programming through an XML-compliant annotation language.
    - ✓ Text clipping allows for content to be tailored for devices with some Java programming.
- Apply XSL stylesheets dynamically to XML content to customize the format and layout.
- Use a wide variety of device profiles to allow for more detailed personalization of content.

Watch this space for plans to support it on V5R1.

For more information on WebSphere Transcoding Publisher, refer to:

- http://www-4.ibm.com/software/webservers/transcoding/

eOutput

Infoprint Server for iSeries V5R1

- e-business output management with new PDF output support
- supports managing and transforming PCL, PDF Postscript into AFP

Infoprint Designer for iSeries V5R1

- Integrated, fully graphical design system for iSeries output
- Supports new DDS and Java input into new support

Print Services Facility (PSF) for iSeries

- Integrated OS/400 features for AFP and IPDS printing management
- Integrated e-mail of iSeries output PDF files

iSeries as Internet Print Protocol server

Java AFP print architecture for Java server printing

Unicode

Notes: eOutput

With V5R1, iSeries strong core print architecture is expanded both with new composition features, plus with new output delivery options. V5R1 provides significant changes to iSeries-AS/400 printing and 'e-output' capabilities. Although the changes are wide-ranging, the primary focus is 'e-output'. e-output refers to the ability to create information output and deliver it to the required destination in the format desired. Where business processes typically printed then distributed information in hard copy, e-business processes quite frequently require information to be delivered electronically.

Infoprint Server is focused on enterprise and e-business driven output management. On the e-output side, Infoprint Server provides PDF and portable AFP support for the iSeries. Any standard iSeries-AS/400 output format can be transformed into PDF. The PDF is text-based, fully navigable, and provides high-performance. In addition, you can segment an output file, triggering the PDF server to create multiple PDF files - this is an "electronic burst and bind" function. In addition, e-mail options are fully integrated and automated so that output files can be transformed to PDF and automatically sent to any destination .

Infoprint Server is also focused on allowing the iSeries to manage network output. Infoprint Server provides transforms for PCL, Postscript, and PDF into AFP so output generated in those formats can be brought into the iSeries and effectively managed to the printer.

Infoprint Designer for iSeries provides a fully-graphical document composition interface to the iSeries-AS/400 printing and e-output system. It supports the requirements of today's complex documents and reports, producing fully electronic documents combining data, text, electronic forms, graphics, image, bar coding, and typographic fonts. Infoprint Designer for iSeries can be used for the design of new output applications or the reengineering of existing applications. V5R1 is also enhanced to provide new interfaces from DDS and Java to the output formatting architecture (page definitions) that Infoprint Designer addresses.

Notes: eOutput-2

PSF/400 is a feature of OS/400 and provides AFP system management and IPDS print management. PSF/400 addresses two key elements in e-business driven transformations. First, printers have moved to the network and PSF/400 (via IPDS) means that the assured delivery and printer management characteristic of twinax printers is extended to network-attached printers (assuming they are IPDS). For V5R1, PSF/400 is enhanced on many fronts including the support for automatic e-mail of output (PDF).

With V5R1, the iSeries becomes an IPP (Internet Print Protocol) server. IPP is the emerging standard for Internet printing, allowing you to submit print jobs direct to a URL anywhere in the network. Over time it will replace the traditional LPD/LPR TCP/IP print support.

Two new print architectures for Java server printing are announced, one that is XML-based for simple reports and one that is AFP-based for complex documents. iSeries now supports Unicode-encoded data for worldwide applications that are National Language-independent.

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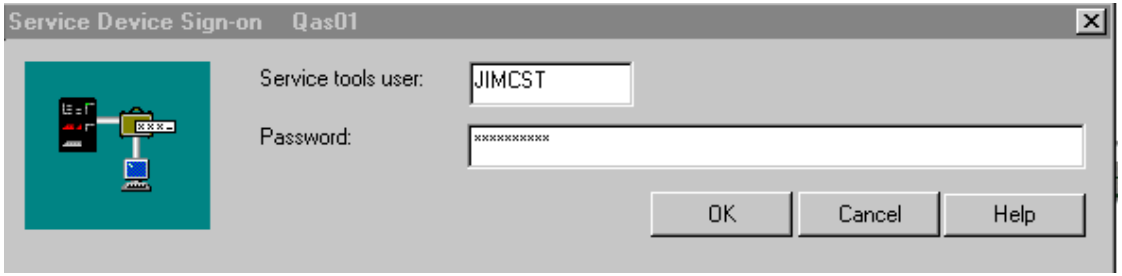
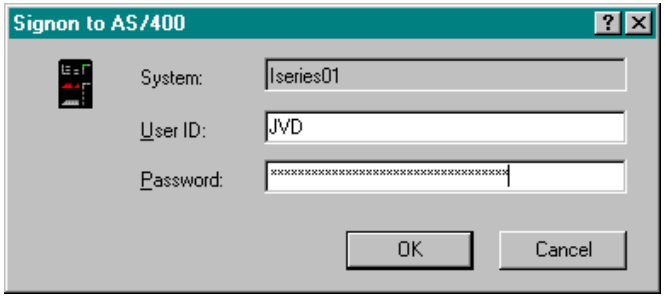
OS/400 Security

Enhanced security with 128 character passwords

Service Tools Security





Digital signature and object signing

IBM SecureWay Directory V3.2

- Supports Kerberos V5 APIs for Windows interoperability

Cryptographic processor can optionally perform SSL handshake

- Offloads iSeries processor for improved session throughput

Digital certificate manager private key can be stored in cryptographic processor

Notes: OS/400 Security

Robust security is one of the major reasons many companies, including many of the world's largest banks, trust iSeries for their mission critical applications. OS/400 V5R1 provides further enhancements to iSeries system security, including increased support for security interoperability via digital certificates and, with Windows applications, via Kerberos.

Password support is enhanced with new case sensitive user profile passwords, with up to 128 characters in length and broader character set options.

Both the Dedicated Service Tools and Service Tools functions now require Service Tools user profiles to perform specific functions. This new security is more important to Operations Console over the LAN and Operations Navigator functions for Disk Management and LPAR Management.

New support for digital signatures on several OS/400 object types provides an even greater degree of integrity. Software providers, or system administrators, can add digital signatures to software, and use those signatures both to verify the source of the software and to ensure that the software has not been changed since it was signed. This added layer of protection against altered software, both unintentional and malicious, is also being used by the operating system to protect itself from unauthorized changes.

OS/400 Directory Services in V5R1 now supports IBM SecureWay Directory Version 3.2 which provides Network Authentication Services via Kerberos V5 protocol APIs (server and client), used for interoperability with Windows 2000. This function was originally announced as a PTF in 10/2000.

Notes: OS/400 Security-2

The operations interface for the Digital Certificate improves ease-of-use plus adds the following enhancements:

- Storing the certificate private keys using the IBM #4758 Cryptographic Coprocessor
- Digitally signing objects and verifying the signature
- Creating certificates using a Public Key Infrastructure for X.509 (PKIX) Certificate Authority (CA)
- The 4801/4802 is the IBM 4758-023 Cryptographic CoProcessor. The 4758-023 card is FIPS 140-1 Level 3 certified. The card has not been ZKA certified.
- Within the Rochester lab, the 4758-023 card on iSeries has been driven to slightly more that 100 1024-bit RSA signatures per second.

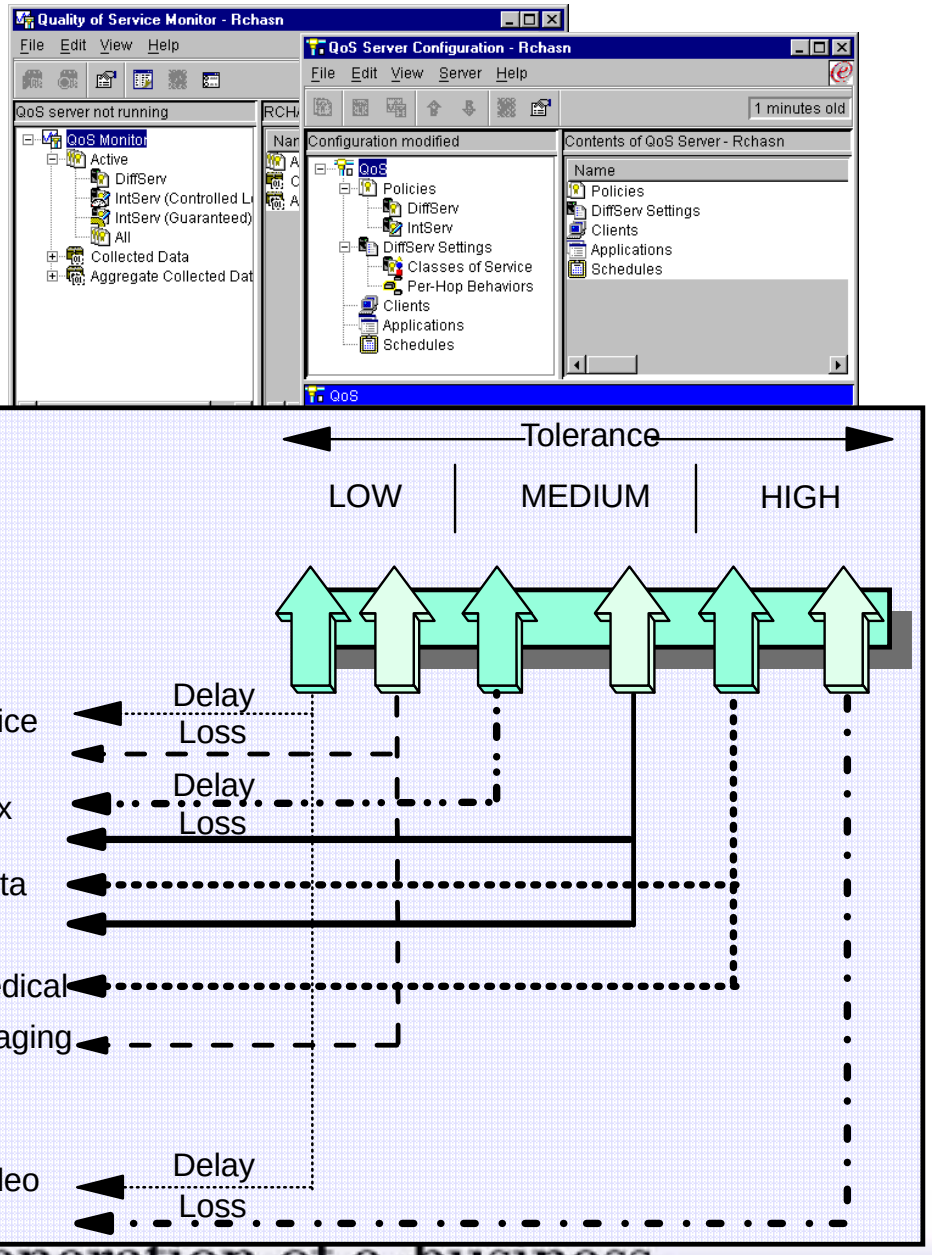
The iSeries cryptographic coprocessor is also enhanced as follows:

- The maximum number of Cryptographic Coprocessors (CC) per system is increased to 8 (from 3)
- A new graphical interface simplifies setup and management of cryptography
- The Cryptographic Coprocessors can improve performance of the Secure Sockets Layer requests for the initial connection "handshake" key information exchange. Using the coprocessor for data encryption does not yield significant performance improvements and is not recommended.

Networking: TCP/IP Quality of Service

What is QoS?

- A collection of functions that allows specific TCP/IP traffic to have certain priority or bandwidth across the network
- Important in multi-workload environments
- Mission critical applications can be given higher priority
- MQoS "aware" router required for best performance
- Two QofS algorithms supported:
  - Integrated Services
  - Differentiated Services



Notes: Networking: TCP/IP Quality of Service

In V5R1, OS/400 provides the ability to control and manage TCP/IP traffic in the network and take advantage of the leading-edge networking Quality of Service (QoS) functions contained in routers and switches. The iSeries QoS functions for managing TCP/IP traffic provide the ability to drop, mark, and shape TCP/IP traffic based on the QoS policy being applied. In addition, QoS admission control capability is provided for controlling bandwidth management requests. Support is provided for both integrated and differentiated services. Applications can either be written to use QoS APIs, or they can simply use QoS policies without making application changes. QoS can be monitored and policies maintained using Operations Navigator. APIs are also provided for network devices to monitor iSeries QoS functions.

Quality of Service (QoS) is a collection of functions that allow the user to define what kind of network priority or bandwidth to assign to a TCP/IP application program. As intranets and the Internet fill with more traffic, QoS provides a means for prioritizing system traffic. This will become a key factor in the success of e-business systems. QoS will be a key ingredient in the multi-load environment which is typical for the iSeries servers. The chart on the previous page illustrates how different types of data require different priorities. In the past, packets requesting information on sports scores received the same priority as a mission critical business application. With QoS, you can give that mission critical application the differentiation it needs.

QoS will be desired by users who are running mission critical applications. For Application Service Providers (ASP) and Business to Business (B2B), QoS will allow them to provide predictable e-business service. This is often a requirement of a Service Level Agreement. QoS, combined with Virtual Private Network (VPN), provides guaranteed security and predictable e-business flows.

QoS occurs across the network. QoS enabled routers are required to provide the requested bandwidth. If there are routers in the path that are not QoS enabled, the desired performance may not be obtained.

Note: The iSeries server is not a QoS aware IP router in V5R1 (or earlier). The iSeries server role in QoS, instead, is at the end points (the client or server) of the application.

QofS requires complex set up; the V5R1 Operations Navigator interface can assist in this area. The next foil gives a somewhat detailed description of the 2 QoS protocols supported with V5R1. The objective is to give an indication of the differences in the two protocols.

QoS Implementation

Integrated service

- Negotiated end-to-end and dedicated for duration of request
- Uses Resource Reservation Protocol (RSVP) and X/Open RSVP API
- Can dynamically change bandwidth
- Good for applications requiring dedicated quality of service

Differentiated service

- Traffic is classified, each class can be given different treatment
- Each class is best effort
- Replaces the current Type of Service (TOS)
- Transparent to applications

QoS "aware" router required for best performance

Integrated Service - Resource Reservation Protocol

RSVP is a resource reservation setup protocol designed for an integrated services Internet. The RSVP protocol is used by a host to request specific qualities of service from the network for particular application data streams or flows. RSVP is also used by routers to deliver quality-of-service (QoS) requests to all nodes along the path(s) of the flows and to establish and maintain state to provide the requested service. RSVP requests will generally result in resources being reserved in each node along the data path.

RSVP requests resources for simplex flows, i.e., it requests resources in only one direction. Therefore, RSVP treats a sender as logically distinct from a receiver, although the same application process may act as both a sender and a receiver at the same time. RSVP operates on top of IPv4 or IPv6, occupying the place of a transport protocol in the protocol stack. However, RSVP does not transport application data but is rather an Internet control protocol, like ICMP, IGMP, or routing protocols. Like the implementations of routing and management protocols, an implementation of RSVP will typically execute in the background, not in the data forwarding path.

RSVP is not itself a routing protocol; RSVP is designed to operate with current and future unicast and multicast routing protocols. An RSVP process consults the local routing database(s) to obtain routes. In the multicast case, for example, a host sends IGMP messages to join a multicast group and then sends RSVP messages to reserve resources along the delivery path(s) of that group. Routing protocols determine where packets get forwarded; RSVP is only concerned with the QoS of those packets that are forwarded in accordance with routing.

In order to efficiently accommodate large groups, dynamic group membership, and heterogeneous receiver requirements, RSVP makes receivers responsible for requesting a specific QoS. A QoS request from a receiver host application is passed to the local RSVP process. The RSVP protocol then carries the request to all the nodes (routers and hosts) along the reverse data path(s) to the data source(s), but only as far as the router where the receiver's data path joins the multicast distribution tree. As a result, RSVP's reservation overhead is in general logarithmic rather than linear in the number of receivers.

Differentiated Service

Differentiated services enhancements to the Internet protocol are intended to enable scalable service discrimination in the Internet without the need for per-flow state and signaling at every hop. A variety of services may be built from a small, well-defined set of building blocks which are deployed in network nodes. The services may be either end-to-end or intra-domain; they include both those that can satisfy quantitative performance requirements (e.g., peak bandwidth) and those based on relative performance (e.g., "class" differentiation). Services can be constructed by a combination of:

- Setting bits in an IP header field at network boundaries (autonomous system boundaries, internal administrative boundaries, or hosts)
- Using those bits to determine how packets are forwarded by the nodes inside the network
- Conditioning the marked packets at network boundaries in accordance with the requirements or rules of each service

Differentiated Services in V5R1 use classes to determine what type of per-hop treatment the traffic should be given. The Classes are built by using the *Per-Hop Behavior* (PHB). The per-hop behavior is a description of a forwarding treatment for IP packets; it addresses a set of parameters inside a router that networks use to control how packets are scheduled, dropped, and queued. A network must be capable of handling differentiated services to uphold these per-hop behaviors. IP packets have an IP header which contains *codepoint* information. This codepoint information tells the routers how to treat the assigned IP packets. PHBs may be specified in terms of their resource (e.g., buffer, bandwidth) priority relative to other PHBs, or in terms of their relative observable traffic characteristics (e.g., delay, loss). The PHB describe what kind of delay/thruput/loss characteristics are desired for the packet of data. The *Type of Service* (TOS) bits in the IP header are used to support the Differentiated Service Classes of service. The first six bits are used and are referred to as *Differentiated Services Codepoint* (DSCP). The pre-V5R1 TOS support will be used for route selection only and will not be used to set the IP header TOS bits. When the data is sent, the TOS field will be looked at by the router to determine what kind of service is desired. The router will then attempt to provide the service on a best effort basis.

Networking: General Enhancements

Key Enhanced Areas

- FTP
  - SSL support
  - Increased protection from misuse
- Telnet
- SMTP
- Point-to-Point and RADIUS
- Quality of Service
- Dynamic Domain Name System
- Virtual Private Network
- Operations Navigator interfaces

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Notes: General Enhancements

Many areas of TCP/IP-based functions receive enhancements with V5R1. Some of them are summarized here, followed by some additional details for some of these functions.

FTP (File Transfer Protocol) gets new SSL support and addresses security concerns stated in RFC 2577 (*FTP Security Considerations*):

- **Password attacks**
  The V5R1 FTP server currently uses QMAXSIGN system value to limit password attempts per session. The iSeries will now add a time delay following each invalid password received to slow down the password attacks.
- **Port stealing**
  In the past the OS/400 FTP client and server would select ports in sequential increasing order. This could allow someone to predict the next port used by FTP. The FTP code is changed in V5R1 so that it will bind to a randomly-chosen TCP port instead of using sequential increasing order ports.
- **Bounce attack**
  This occurs when a hacker uses the FTP server as an intermediary to send an untraceable datastream to another server. The implementation of the PORT subcommand will be changed to disallow TCP port values of less than 1024. This will prevent the server from being used to mount a bounce attack against most of the well-known TCP services.

The subsystem in which the FTP server job will run in can be set from either operations navigator or via the CL Command *Change FTP Attributes* (CHGFTPA). This can eliminate performance issues that can arise with sharing the resources in the QSYSWRK subsystem.

The FTP client can now specify the port it will use to communicate with the server. The PORT parameter can be selected when initiating an FTP client connection.

Notes: General Enhancements -2

Telnet

Client certificate authentication was available at earlier releases with PTF SF61406 (V4R4) and SF61427 (V4R5). It was enabled through the use of a data area. At V5R1, client authentication enablement is now handled through Digital Certificate Manager (DCM). Client certificate authentication gives additional security to your Telnet connections. This can be beneficial when making connections from the Internet. The Telnet server listens for SSL traffic on port 992.

Note: Configuration of client certificate authentication done at V4R4 or V5R5 will not migrate to V5R1.

The OS/400 Telnet server will now support 128 byte passwords. Enabling 128 byte passwords on the iSeries is done by setting the *Maximum Password Length* system value (QPWDMAXLEN) to 128.

Before V5R1, the OS/400 Telnet server supported DES7 password encryption. At V5R1, the Telnet server can additionally support *Secure Hash Algorithm-1* (SHA-1). The *Password Level* system value (QPWDLVL) determines whether DES7 or SHA-1 is used. If it has a value of '0' or '1', then DES7 will be used. If the value is '2' or '3', then SHA-1 will be used. Encryption is used for automatic sign-on. If the encryption used by the client does not match the server, the automatic sign-on will fail and user will be presented with a sign-on display on the target system or a failure message on the source system.

SHA-1 provides a better encryption algorithm than DES7 but is a little bit slower.

The Telnet server supports a new option which allows diagnostic information to be sent to the client. If the iSeries Telnet server receives this new parameter from the client, it will then provide information to the client on such things as why automatic sign-on failed.

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Notes: General Enhancements -3

SMTP

- **ETRN or dial-up retrieval** uses a mechanism to define extensions to the SMTP service whereby a client ("sender-SMTP") may request that the server ("receiver-SMTP") start the processing of its mail queues for messages that are waiting at the server for the client machine. If any messages are at the server for the client, then the server should create a new SMTP session and send the messages at that time. The ETRN command is sent when a dial up connection (PPP) is made to the ISP's mail server. The ISP's server responds by sending all mail queued for the registered domain over the connection. The ISP defines a "domain" for the subscriber (SMTP server). It is registered by the ISP with the Mail record being that of the ISP provider. Any mail directed to a user on this domain (userid@domain) will be resolved to the provider's mail hub and queued for delivery. The iSeries SMTP server can also play the role of ISP and respond to a ETRN command by sending queued to a subscriber.
- **Delivery Status Notification (DSN)** is a MIME content-type that may be used by a message transfer agent (MTA) or electronic mail gateway to report the result of an attempt to deliver a message to one or more recipients. This content-type is intended as a machine-processable replacement for the various types of delivery status notifications currently used in Internet electronic mail.
- The **8-bit MIME transport service** extension allows a client SMTP to submit, using the MAIL command, a content body consisting of a MIME message containing arbitrary lines of octet-aligned material, it first issues the EHLO command to the server SMTP. If the server SMTP responds with code 250 to the EHLO command, and the response includes the EHLO keyword value 8BITMIME, then the server SMTP is indicating that it supports the extended MAIL command and will accept MIME messages containing arbitrary octet-aligned material.

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Notes: General Enhancements -4

Point-to-Point enhancements include:

- DHCP enablement for PPP
- Multilink support
- Remote Authentication Dial-in User Support (RADIUS)
- GUI Interface changes
- CL Commands and APIs
- Group Access Policies
- New documentation collection
- SLIP support integrated into PPP support

Point-to-Point and RADIUS support

Remote Authentication Dial-In service (RADIUS) is a distributed security system developed by Lucent Technologies InterNetworking Systems. RADIUS was designed based on a previous recommendation from the IETF's Network Access Server Working Requirements Group. RADIUS is the de facto industry standard for user authentication, authorization, and accounting.

Radius has three main functions:

- Authentication - RADIUS server will authenticate users for dial-in remote access. (It can distribute IP addresses to clients)
- Authorization - the RADIUS server can be configured to control access to specific services on the network for an authenticated user. Such services are routes, time-outs and port limits.
- Accounting - RADIUS server accounting permits system administrators to track dial-in use. This is often used for billing purposes.

The RADIUS server is installed on a central computer at the customer's site. The RADIUS Network Access Server (NAS) can be installed on the iSeries. The NAS is responsible for passing user information designated for the RADIUS servers and then acting on the response which is returned.

Notes: General Enhancements -5

See the Communications presentation for more details on these topics and the following topics with specific foils.

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Networking: DNS, VPN, Management

Simple, graphical network management

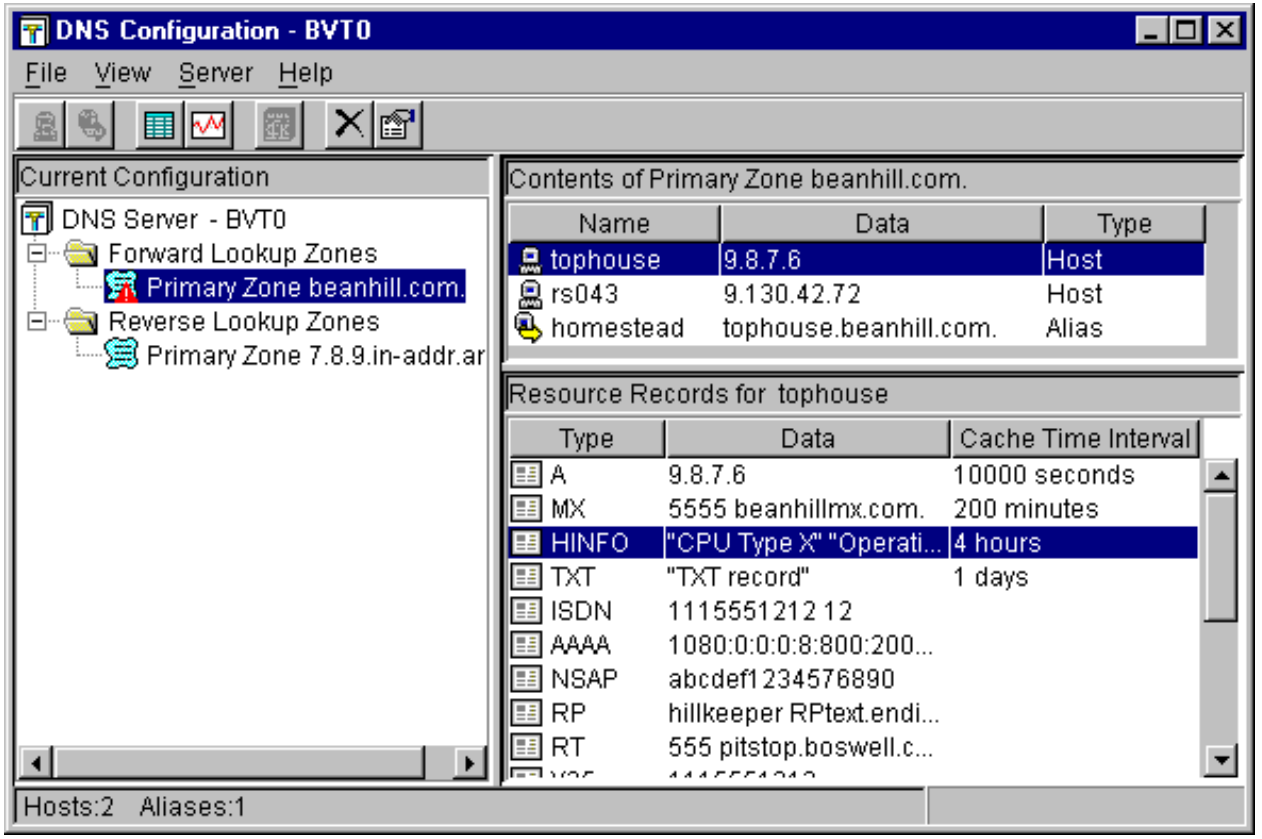
Dynamic DNS

- DHCP enhancements
- Implemented on OS/400 PASE

Connections through VPN for Internet security

NetStat now part of Operations Navigator

- Monitor/Work with TCP/IP
- Interfaces, Routes, Connections
- Address Resolution Protocol
- DNS Lookup and Trace Route



Notes: Networking: DNS, VPN, Management

With OS/400 V5R1, iSeries now provides support as both a Dynamic DNS (DDNS) and a DHCP (Dynamic Host Configuration Protocol) server. Enhancements to DHCP allow it to be configured to send dynamic DNS update transactions, to provide a fully integrated and dynamic IP solution, with automatic management of both TCP/IP addresses and their associated DNS host names. Dynamic DNS requires OS/400 PASE.

iSeries VPN (Virtual Private Networking) support, introduced in V4R4, has been enhanced to provide additional security, greater reliability and performance. Operations Navigator has been redesigned to intuitively navigate VPN configurations, and you can use the VPN wizard to set up and implement your network security policy. Digital certificates provide a scalable and secure mechanism for cryptographic security operations, and in V5R1 you can now use them in your VPN configurations to authenticate the identities of the VPN endpoints. IP packet filtering is an integral part of iSeries VPN, and in V5R1 it is enhanced to allow filter activation and deactivation on a per-TCP/IP interface basis. SSL support for FTP is also included in V5R1 as well as OnDemand VPN.

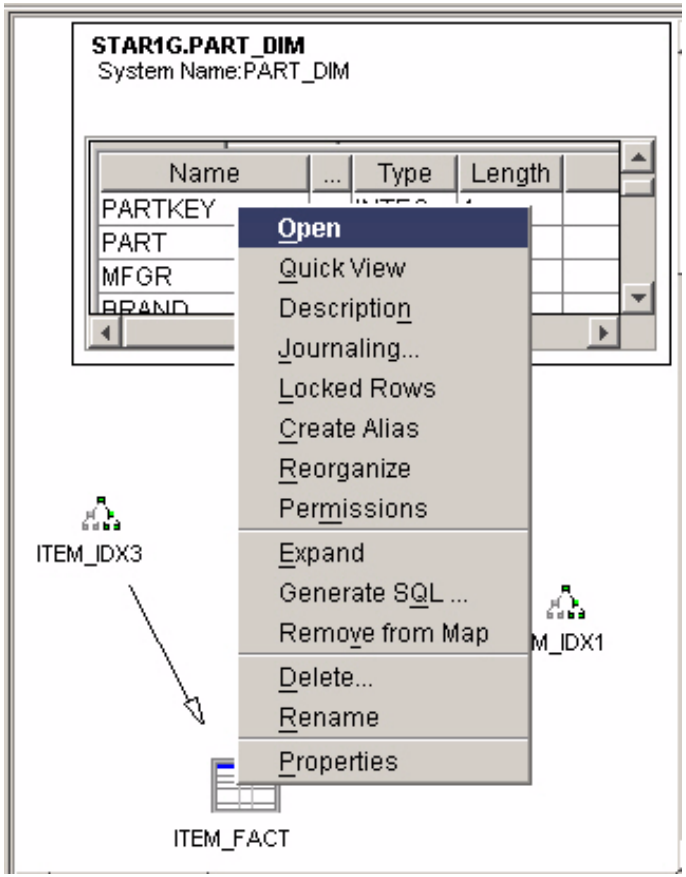
Several TCP/IP management enhancements have been made in V5R1 give the network administrator more control when monitoring their TCP/IP network as well as troubleshooting networking problems. The enhancements include:

- A graphical version of network status (NetStat)
- Graphically mapping a socket connection to a list of jobs for that connection
- The ability to trace the route a TCP/IP packet will take through the network
- Address resolution protocol (ARP) monitoring.

Database and File System

Database

- Operations Navigator Database Navigator and more
- SQL Triggers
- ODBC V3.5 support including Unicode support
- Maximum size of large objects increased
- DRDA over TCP/IP



Integrated File System (IFS)

- Improved backup support via
  - Journaling of byte stream files, directories, symbolic links, data queues, data areas
  - Switched disks (IASP) for all IFS file systems except QSYS.LIB objects

Notes: Database and File System

DB2 Universal Database for iSeries is enhanced with V5R1, providing new support for open standards and portability enhancements. Support for distributed databases is improved with DRDA running over TCP/IP, allowing transactions which span databases to be committed or rolled back by using two-phase commit protocols. Another key DRDA enhancement is the ability to return multiple result sets from iSeries servers to clients for improved performance.

Database triggers can now be written in the SQL language, allowing more business logic to be built directly into the database. The number of possible trigger definitions active is now increased to up to 300. A new Database Navigator interface (part of Operations Navigator) displays the relationship among relational objects such as tables, views, and indexes. Another enhancement to Operations Navigator is the ability to generate SQL statements used to create a database object, regardless if it was created with SQL or not.

The ODBC driver for DB2 is enhanced with ODBC 3.5 support and support for Microsoft Transaction Server (MTS) which enables DB2 to participate in transactions involving two-phase commit coordinated through MTS. ODBC 3.5 also delivers support for Unicode.

The maximum size of large objects stored in column is increased from 15 MB to 2 GB and the maximum total size for all large objects for a table row is increased from 1.5 MB to 3.5 GB. In addition, DB2 UDB for iSeries supports the ability to optionally minimize the size of journal entries.

The Integrated File System is used to hold files in a variety of files systems, such as NFS, NTFS etc and is used to store and share PC files on the iSeries with NetServer. The IFS is also used as to store Lotus Domino databases as well as Windows disk images that are attached to the Integrated xSeries Server or via an Integrated xSeries Adapter. With V5R1, files and directories held in the IFS can now be journaled, allowing clustering support through third party software via replication to another iSeries server. The journaled information can also be used for other recovery and monitoring purposes.

Notes: Database and File System-2

Files within a file system mounted to a V5R1 IASP can be configured within Clustering support to enable switching disks between iSeries servers within the Cluster domain.

When the IASP is moved (switched) from one system to another the file system can be mounted and made available to applications and users on that second system (cluster node).

As discussed earlier under Domino and HTTP serving, and potentially High Availability Business Partner solutions, the switched disk support can be used to streamline some steps in a higher availability process.

There is a statement of direction that QSYS.LIB file system objects will be supported within an IASP in the future. Note that in V5R1 you cannot journal objects within an Independent ASP, because of this restriction on QSYS.LIB objects.

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Database Extenders (XML) Support

Implemented via a New Licensed Program:

- DB2 UDB Extenders for AS/400 , 5722-DE1
- Contains options for both:
  - Text Extenders (option 1)
  - XML Extenders (option 2)

Contains Extender commands and command interface

Includes powerful full text search and data retrieval to SQL queries of documents within your DB2 UDB tables

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Notes: Database Extenders (XML) Support

As XML (Extensible Markup Language), which generically separates data description from the visual representation of that data (for example, on a browser screen), increases its usage in pervasive computing, the integration of XML and database storage structures becomes more important in B2B environments.

The DB2 UDB Extenders for AS/400 , 5722-DE1, product provides a major step forward in this XML and Database integration.

The next foil gives a view of what is involved in this integration.

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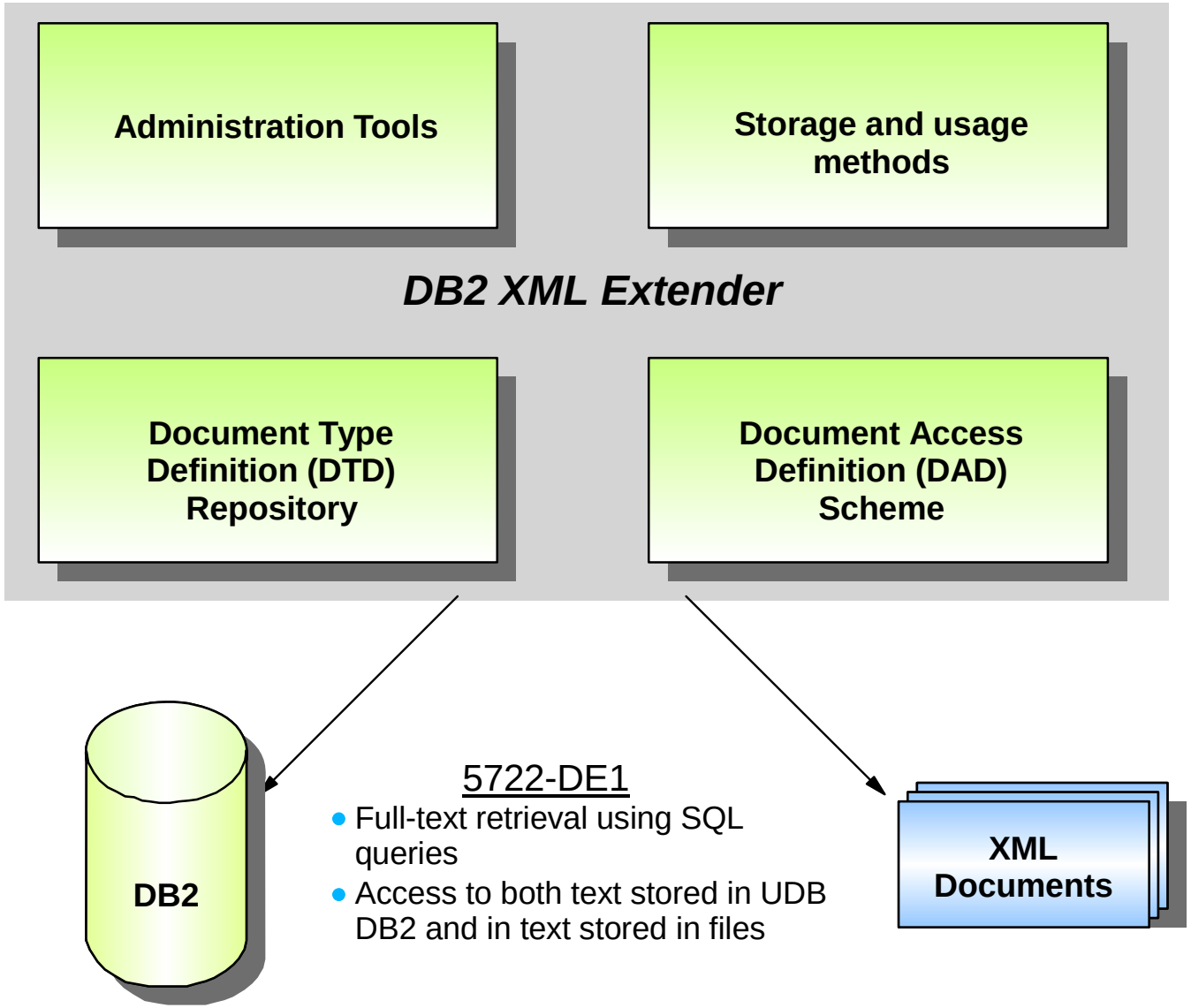
XML Integration in DB2



5722-DE1

- Full-text retrieval using SQL queries
- Access to both text stored in UDB DB2 and in text stored in files

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Notes: XML Integration in DB2

Text Extender adds the power of full-text retrieval to SQL queries in documents embedded in your DB2 tables with a size of up to 2 GB. This feature provides users and application programmers a fast, versatile, and intelligent method of searching through such text documents. Text Extender's strength lies in its ability to search through many thousands of large text documents at high speed, finding not only what you directly ask for, but also word variations and synonyms.

You are not restricted to searching only in text documents stored in DB2 databases, you can also search in text documents stored in files, since Text Extender can access any kind of text document, including word-processing documents in their original native form, and offers a rich set of retrieval capabilities including word, phrase, wildcard, and proximity searching using Boolean logic.

At the heart of Text Extender is IBM's high-performance linguistic search technology. It allows your applications to access and retrieve text documents in a variety of ways.

Your applications can:

- Search for documents that contain specific text, synonyms of a word or phrase, or sought-for words in proximity, such as in the same sentence or paragraph.
- Do wildcard searches, using front, middle, and end masking, for word and character masking.
- Search for documents of various languages in various document formats.
- Make a "fuzzy" search for words having a similar spelling as the search term. This is useful for finding words even when they are misspelled.
- Make a free-text search in which the search argument is expressed in natural language.
- Search for the names of people, places, or organizations.
- Search for words that sound like the search term.

Windows Clients

iSeries Access for Web client (9/2001)

- End user access to the Web client through a browser
  - 5250 display, printer output, data transfer, message responses
- Includes IBM Host Publisher

Client Access Express for Windows

- PC5250 Emulation V5.0
- Extended data transfer support for Microsoft Excel 8.0
- Enhanced OLE DB 2.1, ADO 2.1, and ODBC 3.5 drivers

NetServer

- iSeries acts as a file/print server to Windows clients
  - Access to IFS files larger than 2 GB
- iSeries can:
  - Be Primary Logon Server in Windows Network, provide home directory, be used to store Windows user profiles (Desktop, Start Menu..) and policies

Operations Navigator extensively enhanced

~~CA for Windows 95/NT (XD1)~~
~~Client Access Enhanced for Windows 3.1 (XK1)~~

Notes: Windows Clients

The new iSeries Access for Web client is planned for availability in September, 2001. It will be added to iSeries Access Client Family (5722-XW1). Access for the web provides 5250 and data file transfer end user access to the Web client through a browser. No code is installed on the end user workstation and it runs on any desktop that has a browser (such as Netscape and Internet Explorer). A special version of IBM Host Publisher is included to help facilitate giving a modern graphical interface to existing 5250-based applications..

Client Access Express for Windows is refreshed to provide an enhanced PC5250 Emulation (new V5.0 version) and an enhanced Data Transfer which includes an Excel add-in for uploads, supports Excel 8.0 file types, and supports floating point. The Client Access OLE DB and ODBC drivers are enhanced to support new Windows standards including Microsoft ODBC V3.5 specification, OLE DB 2.1 specification and ADO 2.1. Client Access Express for Windows now also provides support for large database objects and integers through data transfer, ODBC, OLE DB and new SQL APIs.

Note the following clients are no longer available with V5R1:

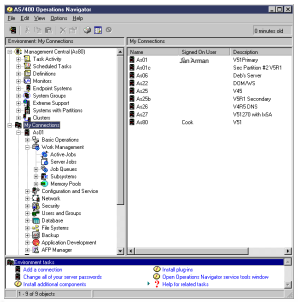
- Client Access for Windows 95/NT (XD1)
- Client Access Enhanced for Windows 3.1 (XK1)

NetServer provides the capability to share PC files and printers among Windows clients. On the Windows client, users access NetServer using their standard Explorer and Network Neighborhood capability. With V5R1, NetServer is enhanced so iSeries can operate as the Logon Server for Windows clients. The iSeries can be used to authenticate logging onto Windows, providing home directory and logon scripts to the Windows user. Additionally, Windows user profiles can be stored and retrieved from an iSeries server. A Windows NT or Windows 2000 server is no longer needed in the network to provide these functions.

The next foil summarizes the wide array of enhancements to V5R1 Operations Navigator.

V5R1 Operations Navigator Summary

- **Task pads**
- **Work Management**
  - Active jobs, job queues, memory pools, subsystems
- **Backup and Recovery**
  - BRMS GUI plug-in
- **All System Values**
  - Includes ability to compare and copy to other AS/400s via Management Central
- **LPAR Configuration and Management**
- **TCP/IP, Network Enhancements**
- **Job, Message Monitoring**
- **System Performance Monitor and Collection Services Enhancements**
- **Database Enhancements**
  - Navigator: show database objects and their relationships
  - Enhanced Visual Explain
  - Supports SQL new function, enhancements
- **Distributed User, Group Management**
  - Manage users and groups across the network via Management Central
- **DASD Management, Stage 2**
  - Create and manage switchable Independent ASP's
- **Application Packaging**
- **Cluster Configuration and Management**
- **Windows Admin Enhancements**



Notes: V5R1 Operations Navigator Summary

The enhancements to V5R1 Operations Navigator are too many to list in this presentation, but this foil gives a good indication of the major extensions to the graphical interface into the system.

Many of the enhancements have been discussed in previous topics of this presentation, including the areas of LPAR Configuration, TCP/IP and Network Enhancements, Windows Administration, Database-related enhancements, Disk Management including Independent Auxiliary Storage Pools and the associated Cluster Configuration and Management.

Some "new things" shown on this foil include the new Work Management "branch," which includes a graphical interface with some improvements to the "work with" functions for active jobs, job queues, memory pools, and subsystem jobs.

Management Central functions are automatically included when the Client Access Express software is installed on a client workstation when another higher level function, such as Configuration and Services is installed.

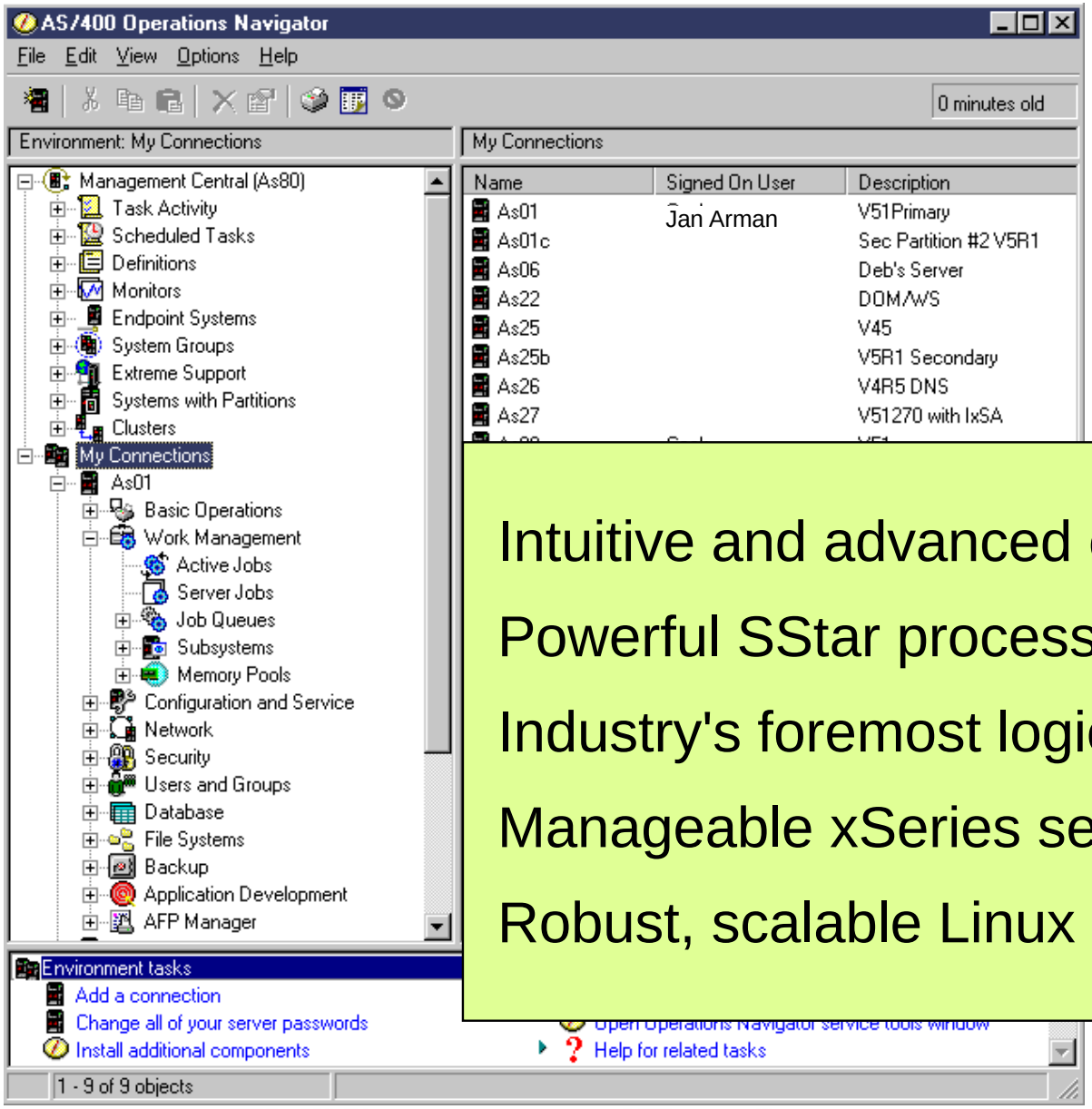
Under Management Central you can do additional job and message monitoring, such as amount of resource utilization and specific messages. You can compare and copy system values from a model system technique it previous had for PTFs. Collection Services completely replaces the previous release "start performance monitor" function and has "graph history" support for collected data that can viewed at the work station or cause a link to the IBM website for PM/400.

You can build and manage iSeries Applications for deployment to other V5R1 systems.

Last, but not least, is the new Operations Navigator Task Pad support. Each major Operations Navigator "branch function" has a predefined set of "short cuts" that are included at the bottom of each screen. The items within a task pad list offer "quick access" (less point and click steps) to popular or "hard to find" functions.

Summary

2001 iSeries Announcement Highlights



OS/400 V5R1 and SStar
Availability 5/25/2001

Intuitive and advanced operations

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Industry's foremost logical partitioning

Manageable xSeries servers for Windows 2000

Robust, scalable Linux servers

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LPAR

64-Bit

OS/400 PASE

WebSphere

Domino

XML

Java

B2B

CRM

Windows 2000 Server

IPP

Innovative technology that simply works

Appendix

Appendix Topics

Host/Server Access Product Comparisons

Release to Release Compatibility, increased system maximums

Content Management Enhancements

Planning Information

Product Previews

General Statement of Direction

Hardware, Software Withdrawal Summary

Model 250, Year 2000 270, Year 2000 820 Summaries

New Migration Tower option - RPQ

DASD Number of Arms Tool

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Host/Server Access Product Comparisons

Comparison of IBM Suite of Host/Server Access Products

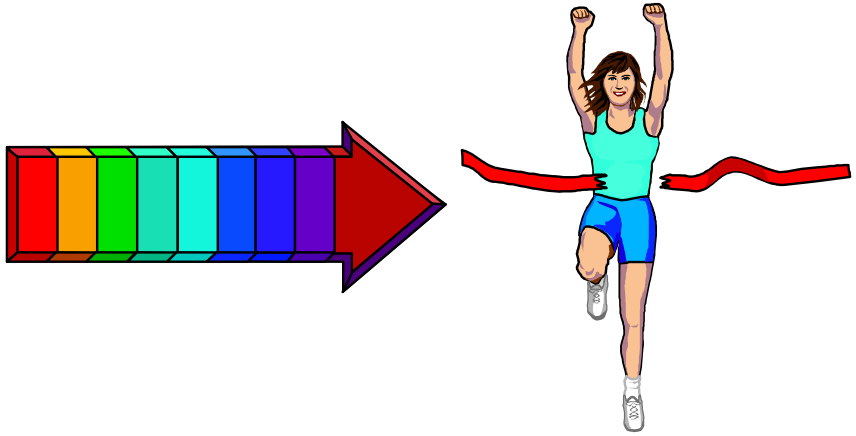
- iSeries Client Access family of products
- WebSphere Host Integration products

End user products

- Windows-based products
  - AS/400 Client Access Express for Windows
  - IBM Personal Communications
- Browser-based products
  - iSeries Access for the Web
  - WebSphere Host-On-Demand (HOD)

Application Development Tools

- IBM WebSphere Host Publisher server
- WebFacing Tool
- WebSphere Transcoding Publisher
- IBM Screen Customizer
- WebSphere Development Studio for iSeries



Notes: Host/Server Access Product Comparisons

This foil is a good summary of the many end user and programming tools available for iSeries from IBM and gives pointers where each tool is more useful than another tool.

Comparison of IBM Suite of Host/Server Access Products

IBM has continually provided many end user, server-access related product choices for its customers, and it has recently been extending its product choices to include more Web-to-host e-business solutions. Some of these product solutions may appear to overlap with other IBM products; however, each solution has a different focus. The following reviews the focus of the products available from IBM.

iSeries Client Access family of products

Client Access products are targeted for customers accessing iSeries and AS/400 systems. The focus of Client Access products is twofold:

- Bring all the power of the iSeries and AS/400 to the end user desktop. Some examples in Client Access Express are Operations Navigator (the OS/400 GUI), an ODBC driver fine-tuned to work with DB2/400, Data Transfer that provides a wizard to create new File Definitions for users uploading data to DB2/400, using built-in AS/400 NetServer function for PC file and AS/400 print serving.
- Tightly integrate the client software into the desktop environment it is running on. Client Access Express is tightly integrated with the Windows desktop. For example, you can change your OS/400 passwords through the Microsoft Windows Password panel, you can create new shortcuts or icons for iSeries connections simply by right clicking on the Windows desktop area, and you can use Operations Navigator Application Administration to control what Client Access functions can be used to access your iSeries and AS/400 systems.

IBM Host Integration family of products

The WebSphere Host Integration products support multiple host application environments, including the iSeries, zSeries, and pSeries environments. The Host Integration product set focuses on:

- Providing the same end user look and feel whether running on a Windows 32-bit operating system or another platform. Some examples of this are that IBM Personal Communications runs on Windows 32-bit systems, OS/2, and Windows 3.x. The Host On-Demand product runs in many additional desktop environments such as Linux, Sun Solaris, etc.

IBM Host Integration family of products continued

- Providing a common and consistent interface to a variety of servers and host systems.

This family of products provides many tools to enable access to applications and data that reside on midrange servers, enterprise servers, and ASCII hosts. For example, they provide Host Access Beans for Java and the Java Interface for Host Access Class Library (HACL) that can be used to provide an enhanced user interface to existing back-end applications.

Comparison of Current End User Products

There are two IBM offerings that are designed to run natively on Windows 32-bit systems:

- AS/400 Client Access Express for Windows provides TCP/IP connectivity to users running Windows 95, 98, Me, NT 4.0, and 2000. Client Access Express has 5250 emulation, access to DB2/400 through its Data Transfer (including Excel add-ins for uploading and downloading data through the spreadsheet interface), and utilizes AS/400 NetServer for working with the OS/400 Integrated File System and printers. It includes a variety of middleware for using and developing client applications to access OS/400 resources via AS/400 ODBC driver, OLE DB driver, and other iSeries enablers such as Data Queues, Remote SQL, and other Remote Command support, as well as Emulator High-Level Language Applications Programming Interface (EHLLAPI) for 5250 applications. It also includes Operations Navigator, the OS/400 GUI, for administering iSeries and AS/400 systems.
- IBM Personal Communications provides TCP/IP and SNA/APPC connectivity to users running Windows 95, 98, NT 4.0, and 2000. Personal Communications provides 3270, 5250, and VT emulation, File Transfer to store PC files on the host, ODBC driver to access any host supporting DRDA. It also provides Host Access Class Library (HACL) and EHLLAPI for working with host applications.

Comparison of Current End User Products continued

IBM has two end user products that are designed to run in a browser environment:

- iSeries Access for Web is a servlet that runs on OS/400 Java Virtual Machine (JVM) and generates HTML output to a browser (such as Netscape or Internet Explorer). iSeries Access for Web provides a subset of the capabilities provided in Client Access Express for Windows or IBM Host On-Demand. Its advantage is ease of deployment (no code to install or maintain on the end user workstation). It is designed for users needing either quick or infrequent 5250 access to the iSeries or AS/400 systems, a need to access DB2/400 data, work with OS/400 printers or printer output, and send/receive messages. It is currently in alpha testing and can be downloaded from the web; additional function is being added to this product, and it will be delivered as part of the iSeries Client Access Family product later in 2001.
- WebSphere Host On-Demand (HOD) is an applet that runs on servers with JVM 1.1, and its applet can be downloaded to browsers with JVM 1.1 (such as Netscape or Internet Explorer). HOD is IBM's answer for the Java-based host access through 3270, 5250, and VT emulation and primarily designed to meet the needs of intranet and extranet users. It is for users who are familiar with the original host application screens, users who are considered power users who require a full function customizable emulator. HOD is a good alternative when a user needs extended connection times. It also provides host-to-client file transfer as well as local print capability.

Notes: Host/Server Access Product Comparisons-4

Programming Tools

IBM offers a variety of tools to enable host applications to run in a web environment. Some of these are:

- IBM WebSphere Host Publisher server runs on OS/390, OS/400, AIX, Sun Solaris, and Microsoft Windows NT operating environment and enables applications created with its Host Publisher studio to run unchanged in a WebSphere Application Server environment. You can externalize selected portions of an application to the web as well as consolidating pieces of multiple host applications into a single HTML page. These users typically connect periodically for short periods of time and expect typical web response times. This solution requires both a development and runtime investment. No source code is required.
- The WebFacing Tool converts a 5250 host application into a Web GUI application with only minor changes required to the host application source code. This same application can support both the standard 5250 interface as well as the new Web GUI interface. This allows dedicated users to access their applications in the traditional manner as well as providing a Web interface for casual users. This tool allows iSeries and AS/400 developers to extend legacy applications to the Web using existing skills. Most developers will take advantage of the customization capabilities of the WebFacing Tool to enhance the Web interface. This is an 5250-only solution. This solution requires a development time investment and access to the source code.
- WebSphere Transcoding Publisher enables customers to run their existing web applications from hand-held information devices. It brings legacy data from the web and dynamically converts formats and the presentation style of host data to a new breed of personal data assistants. WebSphere Transcoding Publisher made available as a beta in December 2000. V4R5 level support is targeted for mid-2001. V5R1 support will follow that date.
- IBM Screen Customizer can be used to enhance individual Client Access Express, Personal Communications, and Host On-Demand screens with a GUI look and feel. This solution requires a development investment.
- V5R1 WebSphere Development Tools for iSeries consolidates the key AD tools into one host based package. The package includes the following host components: Application Development ToolSet, ILE RPG, ILE COBOL, ILE C/C++. It also includes the following workstation components: WebSphere Studio for iSeries (Professional Edition), VisualAge for Java for iSeries (Professional Edition), CoOperative Development Environment (CODE), VisualAge RPG, and WebFacing Tool (First Edition) as described above.

Programming Tools continued

These programming tools offerings complement each other by providing a total IBM solution to allow customers to quickly enable their host applications to the Web.

Web references for more information include:

- Client Access - www.iseries.ibm.com/clientaccess
- iSeries Access for Web - www.iseries.ibm.com/clientaccess/beta/webaccess.htm
- Personal Communications - www.ibm.com/software/enetwork/pcomm
- Host-On-Demand - www.ibm.com/software/webservers/hostondemand
- Screen Customizer - www.ibm.com/software/network/screencustomizer
- Host Publisher - www.ibm.com/software/webservers/hostpublisher
- Webfacing Tools - www.ibm.com/software/ad/wdt400
- Transcoding Publisher - www.ibm.com/software/websphere/transcoding

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General V5R1 Requirement Summary

V5R1 runs on all AS/400 and iSeries systems

V5R1 requires a minimum main memory size of 128 MB and a recommended minimum disk size of 8 GB

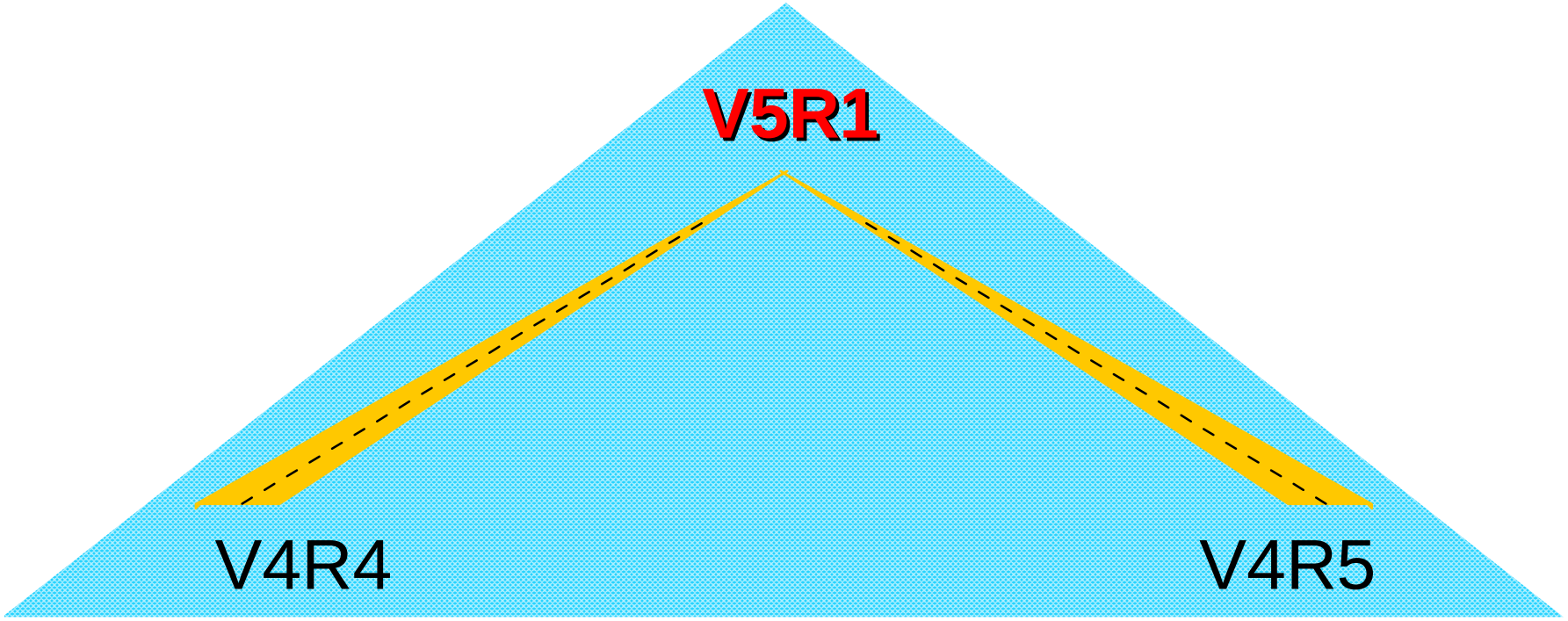
OS/400 V5R1 requires more free disk space than previous releases as follows:

- Additional 90 MB for installation than installation of V4R5 required
- Additional 270 MB for installation than installation of V4R4 required
- Total disk space required for OS/400 is in the range of 350 MB to 1 GB

Release-to-Release Compatibility

Single Step Upgrade from:

Interoperate, save/restore with:



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Increased Maximum Capacities

- Jobs on the system tripled: up to 485,000 jobs (includes spool files ready for print)
  - Set via new system value QMAXJOB
- Spool files per job increased 100 times: up to 999,999 spool files
  - Set via new system value QMAXSPLF
- Libraries in the user portion of the library list increased 10 times: up to 250 libraries
  - Could impact existing progammers who retrieve this information (see memo to users)
- User profiles that can be saved tripled: up to 340,000 profiles
- Private authorities a user profile can have to be saved increased 25 times to support up to five million private authorities
- Database physical file size doubled: up to a 1 terabyte physical file
- Database LOBs (BLOB, CLOB, DBLOB) can now grow up to 2 GB
- Journal entry maximum length is 4 GB

Complete list of limits and changes for V5R1 can be found under the Technical Reference topic on the iSeries Technical Studio web site at **http://www.ibm.com/eserver/iseries/tstudio**.

Notes: Increased Maximum Capacities

Library List enhancements

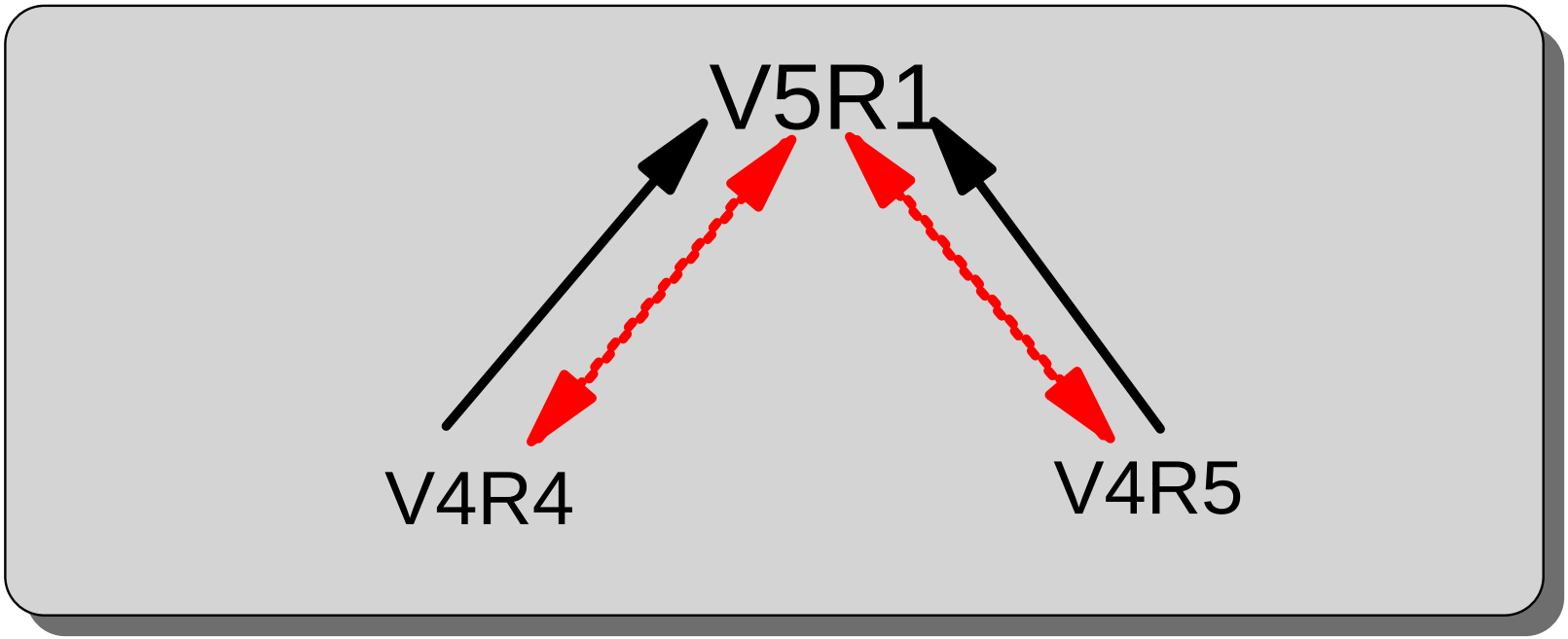
- V5R1 ships with number or entries on user library list limited to 25
- May be extended to maximum number of 250
- Number or entries in system library list remains at 15
- *SHRRD lock for library entries in library list can be turned off

The number of entries in the user library list portion of an active job can be extended from its previous value of 25 to a maximum of 250. To achieve this, you need to delete (or rename) a data area QLILMTLIBT in library QUSRSYS (see next foil). Once this data area has been deleted, any new job will be able to allocate a maximum of 265 libraries in the library list: 15 (unchanged from the previous releases) in the system library list portion (and defined system wide via the system value QSYSLIBL, changeable on job level via the *Change System Library List* (CHGSYSLIBLE) command), and 250 in the user library list portion.

At the same time, a system value called *Library Locking Level* (QLIBLCKLVL) is introduced that tells Work Management to not create a *SHRRD lock on every library which is in an active job's user portion of library list. This improves start up time of a job which has a huge amount of libraries in its library list, since the creation of locks will be minimized. It however will no longer prevent delete or clear a library that is in a library list with this setting turned off. A job accessing any object in that library during such a delete library attempt will still prevent the library from being deleted. However, if no single object within the library is locked during the delete library command, the library will be deleted from the system and the entry in the library list will show up without an identifier but with an entry description set to *DELETED. Changing this setting from one state to the other does not effect any active jobs: only newly created jobs will have this change in effect.

OS/400 Migrations - One-Step Upgrade Paths

Releases that directly install to V5R1



Releases that interoperate with V5R1

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Notes: One-Step Upgrade Paths

Two OS/400 supported one-step upgrade paths are available for moving to V5R1 from installed OS/400 releases, V4R4 and V4R5. OS/400 support is an important factor because it so greatly eases and shortens the upgrade. An upgrade path that doesn't have OS/400 support means the customer will be spending a lot more time and resource on checking things out and re-creating a lot of the infrastructure they set up on their current ^ when they put in their new release.

The same two releases of OS/400 have been tested and will be supported for full interoperability. Interoperability in this context includes transparently moving data, allowing applications being compiled to be targeted toward either release, providing transparent communications, allowing staging of movement of applications and/or data between systems, supporting centralized management facilities, and working with PC's running multiple levels of Client Access. Some of these capabilities work between V5R1 and older releases, but the customer would have to validate the function and the degree of transparency which could be achieved.

Note:

OS/400 "supported" upgrades means that OS/400 including:

-automatically moves user data/programs

-automatically moves, converts, validates many OS/400 and IBM software environments (profiles, configurations, customizations, authorities, etc.)

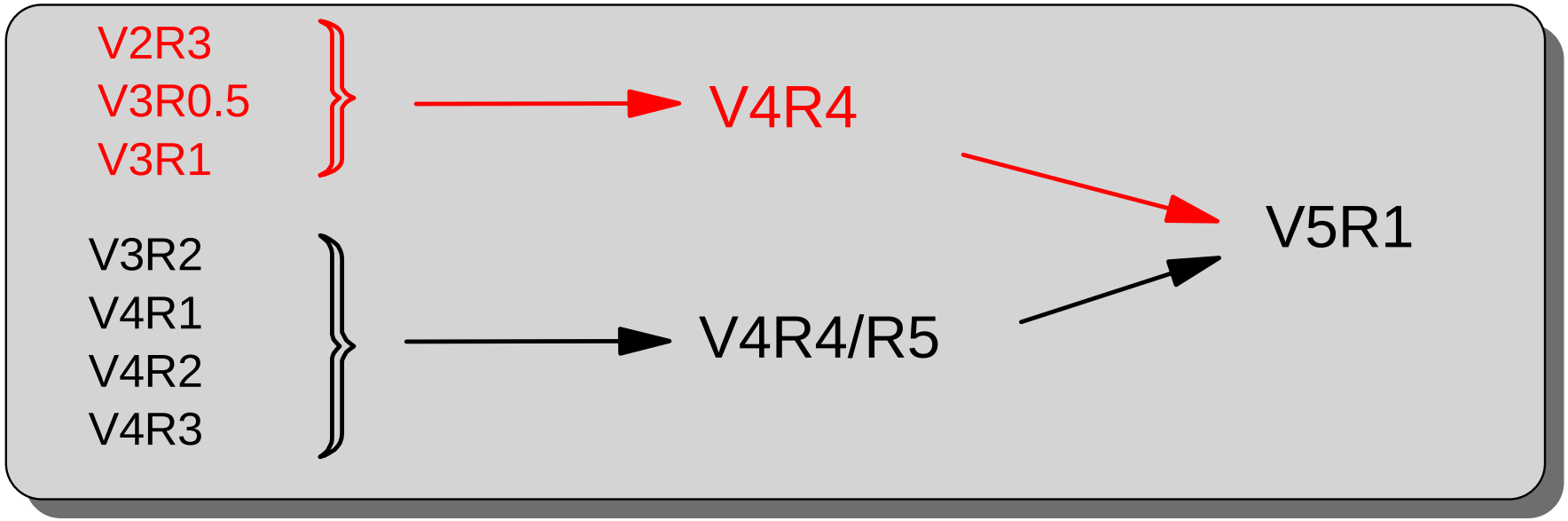
Note:

The previous two releases of OS/400 had more than two upgrade paths. This was provided because of the need for longer stability over the year 2000 testing period. The traditional n-2 (back to releases) is now provided.

OS/400 Migrations - Earlier Releases

(until May 31, 2001)

- OS/400 Supported Two-Step Upgrade Paths to V5R1



- NO OS/400 Supported Upgrade Path to V5R1

V1
V2 except R3
V3R6 and V3R7

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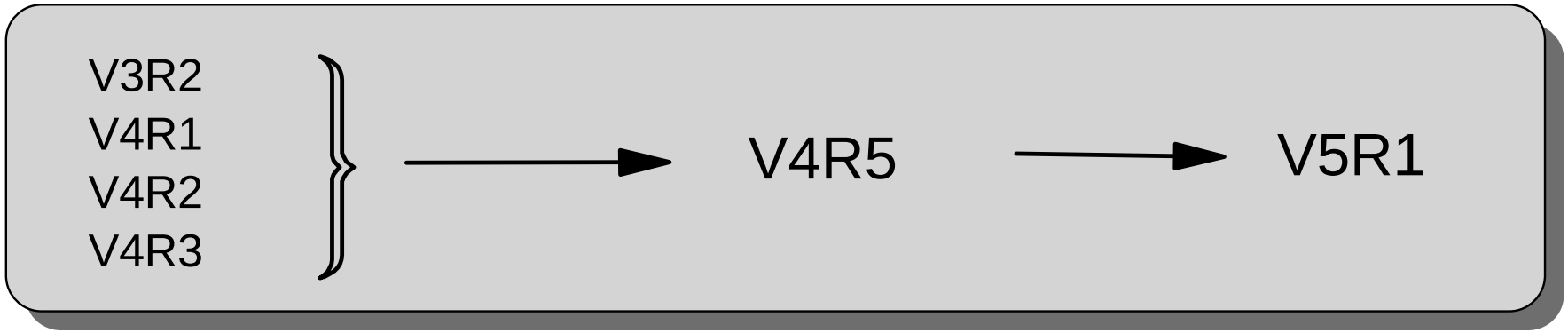
OS/400 Migrations - Earlier Releases

(after May 31, 2001)

- OS/400 Supported Two-Step Upgrade Paths to V5R1



- NO OS/400 Supported Upgrade Path to V5R1

V1
V2
V3 except V3R2

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Notes: OS/400 Migration - Earlier Releases

Two-step approaches are supported for the releases shown in the upper box. Other older releases shown in the lower box do not have a "supported" upgrade path to V5R1.

For these unsupported paths in the lower box - you can get there, but not as easily. It will require significantly more effort and time than a supported path.

Note:

Only show only one of the OS/400 Migrations-Earlier Releases. Show slide 6 before May 31 and show slide 7 after May 31. You can not order the software upgrades shown in red on foil 6 from IBM after May 31.

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OS/400 Release Migration History Summary

From -> To	End of Program Service	Upgrade to V4R1	Upgrade to V4R2	Upgrade to V4R3	Upgrade to V4R4	Upgrade to V4R5	Upgrade to V5R1
V2R3	05/31/96		02/25/00	12/29/00	05/31/01		
V3R0.5	05/31/97			12/29/00	05/31/01		
V3R1	10/31/98			12/29/00	05/31/01		
V3R2	05/31/00	02/25/00	02/25/00	12/29/00	05/31/01	Withdrawal date to be announced	
V3R6	10/31/98	02/25/00					
V3R7	06/30/99	02/25/00	02/25/00	12/29/00			
V4R1	05/31/00		02/25/00	12/29/00	05/31/01	Withdrawal date to be announced	
V4R2	05/31/00			12/29/00	05/31/01	Withdrawal date to be announced	
V4R3	01/31/01				05/31/01	Withdrawal date to be announced	
V4R4	**05/31/01 Extended Service**					Withdrawal date to be announced	Withdrawal date to be announced
V4R5	**07/31/02**						Withdrawal date to be announced
V5R1	**05/31/03**						

http://www.as400service.ibm.com

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Notes: OS/400 Release Migration History

Every release of OS/400 has a defined Program Services period, with the end date announced with the initial announcement of the release. After the end of that Program Services period, IBM will no longer accept any problems for analysis.

There is another aspect of remaining on a current release which may be less evident, but may be even more important to many users. Once a release has reached its end of Program Services, it will generally not be able to upgrade directly to any releases which are subsequently announced. If a release cannot upgrade directly to a new release, the user will need to do a multiple step upgrade, that is upgrade to an interim release just to be able to upgrade to the latest release.

The most important scenario to avoid is remaining on a release so long that all subsequent releases which supported a single step upgrade are withdrawn from marketing. Once that happens, there is no formal supported way for the user to upgrade their system. They will most likely require expensive custom services to perform their upgrade from the back-level release in the future.

Note: For specific hardware or software upgrade business situations that may require a custom service, consider initially contacting the Rochester Opportunity Center.

One-Step Hardware MES Upgrade Paths

TO

FROM

Model	820 Processors Annc'd 2000	820 Processors Annc'd 2001	830	840 Processors Annc'd 2000	840 Processors Annc'd 2001
600	yes				
S10	yes				
620	yes		yes		
S20	yes		yes		
720	yes	yes	yes		
820	yes	yes	yes	yes	yes
640			yes	yes	
S30			yes	yes	
730			yes	yes	yes
830			yes	yes	yes
650			yes	yes	
S40			yes	yes	
740			yes	yes	yes
840				yes	yes

iSeries Model 8xx Interactive CPW points are consistent with 7xx interactive points and more flexible.
6xx/Sxx upgrades orderable only through September 2001

One-Step Hardware MES Upgrade Paths to 820

TO

FROM

Model			820				820			
	Feat		2395	2396	2397	2398	2435#	2436#	2437#	2438#
		N-Way	1	1	2	4	1	1	2	4
600	2129	1	yes							
	2134	1	yes							
	2135	1	yes	yes						
	2136	1	yes	yes						
S10	2118	1	yes							
	2119	1	yes	yes						
620	2175	1	yes	yes						
	2179	1	yes	yes	yes					
	2180	1	yes	yes	yes					
	2181	2	yes	yes	yes	yes				
	2182	4		yes	yes	yes				
S20	2161	1	yes	yes						
	2163	1	yes	yes	yes					
	2165	2		yes	yes	yes				
	2166	4			yes	yes				
	2170	2		yes	yes	yes				
	2177	4			yes	yes				
	2178	4			yes	yes				
720	2061	1	yes	yes	yes	yes	yes	yes		
	2062	1		yes	yes	yes	yes	yes	yes	
	2063	2			yes	yes			yes	yes
	2064	4				yes			yes	yes

- iSeries Model 8xx Interactive CPW points are consistent with 7xx interactive points
- Upgrades from 6xx/Sxx to other models no longer sold after September 2001

2001 processor

One-Step Hardware MES Upgrade Paths to 830/840

TO

FROM

Model			830			840		840	840		
	Feat		2400	2402	2403	2418	2420	2461#	2352#	2353#	2354#
		N-Way	2	4	8	12	24	24	8/12	12/18	18/24
600	2129	1									
	2134	1									
	2135	1									
	2136	1									
S10	2118	1									
	2119	1									
620	2175	1	yes								
	2179	1	yes								
	2180	1	yes								
	2181	2	yes								
	2182	4	yes	yes	yes						
S20	2161	1	yes								
	2163	1	yes								
	2165	2	yes	yes							
	2166	4	yes	yes	yes						
	2170	2	yes	yes							
	2177	4	yes	yes	yes						
	2178	4	yes	yes	yes						
720	2061	1	yes	yes	yes						
	2062	1	yes	yes	yes						
	2063	2	yes	yes	yes						
	2064	4		yes	yes						

- iSeries Model 8xx Interactive CPW points are consistent with 7xx interactive points
- Upgrades from 6xx/Sxx to other models no longer sold after September 2001

2001 processor

640/S30/730 One-Step Hardware MES Upgrade Paths

TO

FROM

Model			820	830			840		840	840		
	Feat		ALL	2400	2402	2403	2418	2420	2461 #	2352 #	2353 #	2354 #
		N-Way	1-4	2	4	8	12	24	24	8/12	12/18	18/24
640	2237	1		yes	yes	yes	yes					
	2238	2		yes	yes	yes	yes					
	2239	4		yes	yes	yes	yes					
S30	2257	1		yes	yes	yes	yes					
	2258	2		yes	yes	yes	yes					
	2259	4		yes	yes	yes	yes					
	2260	8			yes	yes	yes	yes				
	2320	4		yes	yes	yes	yes					
	2321	8			yes	yes	yes	yes				
	2322	8			yes	yes	yes	yes				
730	2065	1		yes	yes	yes	yes	yes				
	2066	2		yes	yes	yes	yes	yes				
	2067	4			yes	yes	yes	yes				
	2068	8			yes	yes	yes	yes	yes	yes		

- iSeries Model 8xx Interactive CPW points are consistent with 7xx interactive points
- Upgrades from 6xx/Sxx to other models no longer sold after September 2001

2001 processor

650/S40/740 One-Step Hardware MES Upgrade Paths

TO

FROM

Model			820	830			840		840	840		
	Feat		All	2400	2402	2403	2418	2420	2461 #	2352 #	2353 #	2354 #
		N-Way	1-4	2	4	8	12	24	24	8/12	12/18	18/24
650	2240	8					yes	yes				
	2243	12					yes	yes				
	2188	8				yes	yes	yes				
	2189	12				yes	yes	yes				
S40	2256	8					yes	yes				
	2261	12					yes	yes				
	2207	8				yes	yes	yes				
	2208	12				yes	yes	yes				
	2340	8				yes	yes	yes				
	2341	12				yes	yes	yes				
740	2069	8				yes	yes	yes	yes	yes		
	2070	12				yes	yes	yes	yes		yes	

- iSeries Model 8xx Interactive CPW points are consistent with 7xx interactive points
- Upgrades from 6xx/Sxx to other models no longer sold after September 2001

2001 processor

One-Step Hardware MES Upgrade Paths to 820

TO

FROM

Model			820				820			
	Feat		2395	2396	2397	2398	2435#	2436#	2437#	2438#
		N-Way	1	1	2	4	1	1	2	4
820	2395	1		yes	yes	yes	yes	yes	yes	
	2396	1			yes	yes			yes	yes
	2397	2				yes				yes
	2398	4								
	2435#	1						yes	yes	yes
	2436#	1							yes	yes
	2437#	2								yes
	2438#	4								

2001 processor

One-Step Hardware MES Upgrade Paths to 830/840

TO

FROM

Model			830			840		840	840		
	Feat		2400	2402	2403	2418	2420	2461#	2352#	2353#	2354#
		N-Way	2	4	8	12	24	24	8/12	12/18	18/24
820	2395	1	yes	yes							
	2396	1	yes	yes	yes						
	2397	2		yes	yes	yes	yes				
	2398	4			yes	yes	yes	yes			
	2435#	1	yes	yes							
	2436#	1	yes	yes	yes	yes					
	2437#	2		yes	yes	yes	yes				
	2438#	4			yes	yes	yes	yes			
830	2400	2		yes	yes	yes	yes				
	2402	4			yes	yes	yes	yes			
	2403	8				yes	yes	yes			
840	2418	12					yes	yes		yes	yes
	2420	24						yes			
	2416	8/12					yes			yes	yes
	2417	12/18					yes				yes
	2419	18/24									yes
	2460#	12						yes			
	2461#	24									
	2352#	8/12								yes	yes
	2353#	12/18									yes
	2354#	18/24									

2001 processor

One-Step Hardware MES Upgrade Paths to 270

TO

FROM

Model			270				270			
	Feat		2248	2250	2252	2253	2302#	2431#	2432#	2434#
		N-Way	1	1	1	2	1	1	1	2
270	2248	1		yes	yes	yes		yes	yes	
	2250	1			yes	yes		yes	yes	yes
	2252	1				yes				yes
	2253	2								yes
	2431#	1							yes	yes
	2432#	1								yes
	2434#	2								

DSD 270 upgrades not shown

2001 processor

Miscellaneous

No model upgrades into or out of Model 250, iSeries Models 270, DSD, SB2, or SB3 (asset swap - different serial number required)

- Processor upgrades within Model 250, iSeries Models 270, DSD, and SB3 are possible
- F/C #0205 RISC-to-RISC Data Migration is available

Upgrades to iSeries Model 820 from 620/720/S20 may need more memory as memory is installed four-cards-at-a-time vs two-cards-at-a-time (quads vs pairs)

Planning Information

- OS/400 V5R1 is the final release to be supported on AS/400 Models 400, 436, 40S, 500, 510, 530, 50S, 53S
- iSeries Client Access Family: IBM intends to remove the support of the Windows 95 operating system for the Client Access Express for Windows client. Client Access Express on Windows 95 will continue to be supported in V5R1, but not in subsequent releases.
  This removal of Windows 95 support applies to all of the functions shipped with Client Access Express, including EZ-Setup, Operations Navigator, Management Central, and Operations Console. Client Access Express for Windows will continue to be supported on the Windows 98, NT 4.0, Me, and 2000 operating systems.
- AS/400 Support for Windows Network Neighborhood (AS/400 NetServer): IBM intends to remove the support of the Windows 95 operating system from AS/400 NetServer. Windows 95 will continue to be supported from AS/400 NetServer in V5R1 but will not be supported in the next release.
  AS/400 NetServer will continue to support the Windows 98, NT 4.0, Me, and 2000 operating systems.
- OfficeVision/400: As previously announced, V4R5 is the final release to support OfficeVision/400, and end of program services for OfficeVision/400 is May 31, 2001. OfficeVision/400 will be uninstalled upon upgrading to V5R1, or later releases.
  Refer to Withdrawal Announcement 999-031, dated February 9, 1999, Service Discontinuance: IBM OfficeVision/400 V4 and IBM OfficeVision JustMail for OS/400 V4.
  Refer to Software Announcement 299-192, dated July 20, 1999, OfficeVision/400 has Software Services Extended - **See also http://www.dominodotoffice.com**

Planning Information...

- BEST/1: V5R1 is the final release in which the BEST/1 Capacity Planning tool is supported. BEST/1 is included in Performance Tools for iSeries, 5722-PT1. Direction for future capacity planning capabilities will be made available prior to the next OS/400 release.
- Wireless Connection for AS/400 (5798-TBW): V5R1 is the final release to support Wireless Connection for AS/400.
- IPX: V5R1 will be the final release to support the IPX protocol in OS/400. The largest OS/400 users of IPX are customers who have Option 25, Enhanced Integration for Netware. Customers can change their configurations from IPX connectivity to IP connectivity.
- V5R1 is the final release to ship and support OS/400 Option 4 - S/36 and S/38 Migration, OS/400 Option 11 - S/36 Migration Assistant and the RSTS36FLR command within OS/400 used to restore S/36 folders.
- Lotus Domino Client Subscription: IBM intends to provide on or about July 1, 2001, a new offering for customers to renew their software subscription entitlement for Lotus Domino clients previously purchased under Lotus Domino Enterprise Server for AS/400 (5769-LNT). Under the new offering, customers can purchase client entitlement for one year of subscription at a price similar to Lotus' Passport Advantage. The terms of the current offering for Lotus Domino client software subscription are extended until the new offering is announced.
  Refer to Software Announcement 299-358, dated November 30, 1999, Client Subscription for Lotus Domino for AS/400.

Planning Information...

- 1/4-Inch Cartridge Tape: V5R1 is the final release of OS/400 which will support the #6385/#6485 1/4-Inch Cartridge Tape Unit features. iSeries and AS/400 customers using the #6385/#6485 1/4-Inch Cartridge Tape Units can order a feature conversion from 6385/6485 to one of the following three alternatives:
  - 16GB (4483/4583/6383/6483) 1/4-Inch Cartridge Tape Unit
  - 25GB (4486/4586/6386/6486) 1/4-Inch Cartridge Tape Unit
  - 50GB (4487/4587) 1/4-Inch Cartridge Tape Unit
- iSeries Planning Information Web Site: This site contains information such as Product Previews, Statements of Direction, and products no longer supported on a release, with mitigation plans, as available.
  - http://www.ibm.com/servers/eserver/iseries/support/planning

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Content Management Enhancements

IBM Content Manager OnDemand for iSeries V5R1

- Provides a powerful Enterprise Report Management that electronically captures and archive large volumes of computer-generated information including:
  - Customer statements
  - Invoices
  - Management reports
- New more powerful indexing capabilities
- Web access via standard browsers
- Multiple OnDemand servers on a single system

IBM Content Manager for iSeries V5R1

- Enhanced Content Manager Advanced Workflow
- New multiple Windows Client and foldering options
- Web access via standard browsers
- Multiple capture, audit, and storage management usability improvements
- Archive capabilities for SAP R/3 via support for Content Manager CommonStore for SAP

Notes: Content Management Enhancements

Content Manager on Demand

IBM Content Manager OnDemand for iSeries V5R1 provides a powerful Enterprise Report Management solution to electronically capture and archive large volumes of computer-generated information including customer statements, invoices, and management reports.

Content Manager OnDemand supports electronic statement presentment solutions through robust, advanced client applications for both desktop and standard Web browsers, with advanced search and report mining capabilities. With Content Manager OnDemand, enterprises can automatically organize printed output, and provide rapid, direct access to specific information, making more effective use of the massive amounts of information captured over time. Together, Content Manager OnDemand and the iSeries server make a robust combination for improving service and productivity, and extending access to your customer information to include the Web.

To meet varying content management needs, Content Manager OnDemand for iSeries is modular and flexible to address your exact enterprise report management requirements. In V5R1, Content Manager OnDemand continues to support the existing Content Manager OnDemand server and its inherent strengths, and in addition now provides an enhanced Content Manager OnDemand server with exciting, new capabilities.

For V5R1:

- The new Content Manager OnDemand server is referred to as the Common Server because this is the result of a port from IBM's industry leading Content Manager OnDemand for Windows™ and UNIX® product.
- The new Content Manager OnDemand Common Server provides enhanced indexing capabilities for documents and reports, providing users more flexible ways to search for key information.
- The ability to support multiple Content Manager OnDemand environments on a single iSeries server, to allow multiple departments or ASP clients to run distinct applications on the same physical server, while ensuring users can not access information managed for a separate business area.
- New, optional PDF Indexer feature for the Content Manager OnDemand Common Server
- New, optional OnDemand Web Enablement Kit for Content Manager OnDemand Common Server

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Notes: Content Management Enhancements-2

Content Manager on Demand continued

For more details, see April 23, 2001 announcement letter - IBM Content Manager OnDemand for iSeries V5R1: High-performance Management of Your Computer Output

Notes: Content Management Enhancements-2

IBM Content Manager for iSeries V5R1

IBM Content Manager for iSeries V5.1 (previously known as IBM EDMSuite™ ImagePlus® for AS/400®) provides best-of-breed document imaging and workflow technology designed to replace cumbersome paper document processing with image processing to achieve greater productivity and process reliability. With Advanced Workflow, Content Manager provides a fast, efficient way to customize and automate business processes by automatically routing documents and folders through a business.

V5R1 enhancements include:

- Host-based workflow:
  - New variables that enhance Decision Points
  - Enhanced Collection Point information
  - Improved suspend or pend options
  - Ownership of work packages
- Client-based enhancements
  - A new, Explorer-like interface
  - Usability improvements, including Basic Search enhancements
- Improved content organization via enhanced foldering.
- Capture, audit, and storage management usability improvements.
- Support for Content Manager CommonStore for SAP, allowing SAP R/3 customers to archive aging business data to maintain high performance levels. Alternately, inbound or outbound business documents may also be captured and accessed directly from the SAP desktop or Inbox as needed.

For more details, see April 23, 2001 announcement letter - IBM Content Manager for iSeries V5R1 Provides Best-of-Breed Content Management and Workflow Technology

Product Previews

- Dual Power Line Cords: IBM intends to provide dual power line cords on the iSeries Models 820 830, 840, and 5074 and 5079 Towers as another high-availability option

Previews provide insight into IBM plans and directions. General availability, prices, ordering information and terms and conditions will be provided when the product is announced. IBM plans and directions are subject to change without notice.

Statements of Direction

- Database File Support in Independent Auxiliary Storage Pool/Switchable Disk:: In a future release, IBM intends to enhance OS/400 support for switching the ownership of objects between Primary and Secondary Servers (cluster nodes) through the use of Independent Auxiliary Storage Pool (IASP) and switchable disk technologies by extending the list of possible switched objects to objects within the QSYS.LIB file system. Additions would include objects associated with the DB2 Universal Database for iSeries and other OS/400 library based objects.

All information being released represents IBM's current intent, is subject to change or withdrawal, and represents only goals and objectives IBM plans and directions are subject to change without notice.

Hardware Withdrawal Summary

May 31, 2001

- AS/400e™ Server 9406 Model 170 — new model sales only (processor upgrades remain supported)
- Dedicated Server for Domino™ 9406 Model 170 — new model sales only (processor upgrades remain supported)
- Selected machine types and models: See February 27, 2001 Announcement letter 091-044
- Selected features and feature conversions: See February 27, 2001 Announcement letter 091-044

July 31, 2000

- #2722 and 6180 (Twinaxial Work Station IOAs), #2724 (16/14 Mbps Token Ring IOA), #6181 (Ethernet IEEE 802.3 IOA), #6501 (Tape/Disk Device Controller) #6513 (Internal Tape Device Controller

September 28, 2001

- Model upgrades from 6xx/Sxx to 7xx/8xx. For 6xx/Sxx customers who need more performance or capacity, IBM recommends ordering an upgrade to an 8xx model before September 28, 2001.

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Hardware Withdrawal Summary...

December 28, 2001

- Model 170 processor upgrades
- Model 170 Dedicated Servers for Domino processor upgrades
- AS/400e Server 7xx models (new)
- AS/400e Server 7xx model upgrade to 7xx model, except:
  - 7xx processor upgrades within each 7xx model remain supported
  - 7xx interactive processor upgrades on all 7xx models remain supported
- Selected OptiConnect features (#0045, #0046, #0088)
- Other features (See April 23, 2001 Announcement letter xxx-xxx, for more details)

For new orders, the customer requested arrival date (CRAD) must be no later than August 31, 2001, October 30, 2001, and January 29, 2002. See April 23, 2001 Announcement letter xxx-xxx, for more details.

Year 2000 Processor and HSL Summaries

iSeries Physical Specifications

DIMENSIONS	Height mm / in	Width mm / in	Depth mm / in	Weight (max.) Kgs / lbs
250 Server	610 / 24	340 / 13.4	662 / 26.1	38.6 / 85
250 with #7102	610 / 24	550 / 21.7	662 / 26.1	70.5 / 155
270 Server	610 / 24	246 / 9.7	728 / 28.7	52.7 / 116
270 with #7104	610 / 24	432 / 17	728 / 28.7	82.0 / 181
0551 Rack (2 270s)	1800 / 70.9			
820 Server	610 / 24	483 / 19	728 / 28.7	96.0 / 212
830/SB2 Server	1270 / 50	483 / 19	1080 / 42.5	400 / 882
0550 1.8m rack	1800 / 70.9			
840/SB3 Server	1577 / 62.1	565 / 22.2	1320 / 52.0	397 / 875
Base #9079 tower	910 / 35.8	485 / 19.1	1075 / 42.3	280 / 617
8079 1.8m rack	1800 / 70.9			
Expansion Towers				
Tower #5075	610 / 24	246 / 9.7	728 / 28.7	52.7 / 116
Tower #5074	910 / 35.8	485 / 19.1	1075 / 42.3	282 / 622
Tower #5079	1800 / 70.9	650 / 25.6	1020 / 40.2	726 / 1601

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Model 250 Overview

- Small business expandability and price
- Packaged interactive performance for traditional applications
- Packaged software
  - PPS: Client Access Family for windows, DB2 Query Manager and SQL Development Kit for AS/400, Query for AS/400

- 1-Way Northstar
- RAID-5
- Up to 10 disks
- Up to 75 CPW
- 333 MHz Integrated Netfinity Server

Processor Feature	2295 (1-Way)	2296 (1-Way)
Processor CPW	50	75
Interactive CPW	15	20
Main Storage (MB) Minimum Maximum	 256 1024	 256 1024
Disk Storage (GB) Minimum Maximum	 8.58 175	 8.58 175
Disk Drives (arms)	10	10
Maximum Twinax Controllers/WS	6/240	6/240
Maximum Tapes Internal/External	1/2	1/2
Software Tier	PPS/P05	PPS/P05

Model 270 Overview

Processor Feature / Attributes	#2248	#2250	#2252	#2253
Processors	Single	Single	Single	2-way
Processor CPW	150	370	950	2000
Orderable Interactive Feature, Interactive CPW (Processor Feature)	#1517 = 25 (22A2)	#1516 = base/0 (22A4) #1518 = 30 (22A5)	#1516 = base/0 (22A7) #1519 = 50 (22A8)	#1516 = base/0 (22AA) #1520 = 70 (22AB)
Software Tier	P05	P10/P10	P10/P10	P20/P20
Main Storage (MB) Minimum Maximum	 256 MB 4096 MB	 256 MB 4096 MB	 256 MB 8192 MB	 256 MB 8192 MB
DASD Capacity (GB) Minimum Maximum	 8.58 421.1	 8.58 421.1	 8.58 421.1	 8.58 421.1
Communication Lines	50	50	50	50
LAN Ports	8	8	8	8
Integrated Netfinity Servers (With 1 or 2 LANs)	3	3	3	3
1 GB Ethernet	3	3	3	3
Twinax Controllers	6	6	6	6
Twinax Workstations	240	240	240	240
1/4-Inch Cartridge Tape Internal	1	1	1	1
External tapes / Tape libraries	3	3	3	3
Optical Libraries	4	4	4	4

Note: Maximums shown require a #7104 and a #5075

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iSeries Model 270 Characteristics

	2431 Proc. Feat.	*2432 Proc. Feat.*	*2434 Proc. Feat.*
Processor CPW	**465**	**1070**	**2350**
Interactive CPW #1518 Int. Feat. #1516 #1519 #1520	**30 (23E7)**	**0 (23F0) 50 (23F1)**	**0 (23F4) 70 (23F5)**
# of processors	**1**	**1**	**2**
Storage (min/max) MB	**256/8192**	**256/8192**	**256/16384**
DASD (min/max) GB	**8/421**	**8/421**	**8/421**
Max DASD arms	**24**	**24**	**24**
Max DASD LUNs	**23**	**23**	**23**
Internal/External xSeries	**3/2**	**3/2**	**3/2**
CD-ROM/DVD/Int. Tape	**2**	**2**	**2**
Max External Tapes	**3**	**3**	**3**
Max Cryptographic Card	**3**	**3**	**3**
Max LAN ports	**8**	**8**	**8**
Max WAN lines	**50**	**50**	**50**
Max Twinax Ctlrs	**6**	**6**	**6**
Software Group	**P10**	**P10**	**P10**

Model 820 Overview

Processor Feature / Attributes	#2395	#2396	#2397	#2398
Processor	Single	Single	2-way	4-way
Processor CPW	370	950	2000	3200
Orderable Interactive Feature, Interactive CPW (Processor Feature)	#1521 = 35 (23A1) #1522 = 70 (23A2) #1523 = 120 (23A3) #1524 = 240 (23A4)	#1521 = 35 (23A9) #1522 = 70 (23AA) #1523 = 120 (23AB) #1524 = 240 (23AC) #1525 = 560 (23AD)	#1521 = 35 (23B1) #1522 = 70 (23B2) #1523 = 120 (23B3) #1524 = 240 (23B4) #1525 = 560 (23B5) #1526 = 1050 (23B6)	#1521 = 35 (23B8) #1522 = 70 (23B9) #1523 = 120 (23BA) #1524 = 240 (23BB) #1525 = 560 (23BC) #1526 = 1050 (23BD) #1526 = 2000 (23BE)
Software Tier	P10 (23A1)/P20	P20 (23A9)/P30	P20 (23B1)/P30	P30 (23B8)/P40
Main Storage (MB) Minimum Maximum	 256 MB 4096 MB	 256 MB 8192 MB	 256 MB 16384 MB	 256 MB 16384 MB
DASD Capacity (GB) Minimum Maximum	 8.58 4159.1	 8.58 4159.1	 8.58 4159.1	 8.58 4159.1
Communication Lines	160	160	160	160
LAN Ports	30	30	30	30
Integrated Netfinity Servers (With 1 or 2 LANs)	12 / 16 *	12 / 16 *	12 / 16 *	12 / 16 *
1 GB Ethernet LAN	17	17	17	17
Twinax Controllers	62	62	62	62
Twinax Workstations	2480	2480	2480	2480
Internal Tape / CD-ROM	12	12	12	12
External tapes / Tape libraries	8	8	8	8
Optical Libraries	14	14	14	14

iSeries Model 820 Characteristics

	#2435 Proc Feat.	#2436 Proc Feat.	0150	#2437 Proc Feat.	0151	#2438 Proc Feat.	#0152
Processor CPW	600	1100	1100	2350	2350	3700	3700
Interactive CPW Int. Feat. #1521 #1522 #1523 #1524 #1525 #1526 #1527	35=249B 70=249C 120=249D 240=249E	35=24A8 70=24A9 120=24AA 240=24AB 560=24AC	0	35=24B0 70=24B1 120=24B2 240=24B3 560=24B4 1050=24B5	0	35=24B8 70=24B9 120=24BA 240=24BB 560=24BC 1050=24BD 2000=24BE	0
Number of processors	1	1	1	2	2	4	4
Storage (GB)	8	16	16	32	32	32	32
DASD (GB)	4159	4159	4159	4159	4159	4159	4159
Max DASD arms	237	237	237	237	237	237	237
Max DASD LUNs	236	236	236	236	236	236	236
Internal/Exter xSeries	12/4	12/4	12/4	124	12/4	12/4	12/4
CD-ROM/DVD/Int Tape	12	12	12	12	12	12	12
Max External Tapes	8	8	8	8	8	8	8
Max Cryptographic Cards	8	8	8	8	8	8	8
Max LAN Ports	30	30	30	30	30	30	30
Max WAN Lines	160	160	160	160	160	160	160
Max Twinax Ctlrs	62	62	62	62	62	62	62
Software Group	P10/P20	P20/P30	P20	P20/P30	P20	P30/P40	P30

iSeries Model 830 Characteristics

	#2400 Proc Feat.	#2402 Proc Feat.	#2403 Proc Feat.	#2351 Proc Feat.
Processor CPW	1850	4200	7350	7370
Interactive CPW Int. Feat. #1531 #1532 #1533 #1534 #1535 #1536 #1537	70=23C1 120=23C2 240=23C3 560=23C4 1050=23C5	70=23D1 120=23D2 240=23D3 560=23D4 1050=23D5 2000=23D6	70=23D8 120=23D9 240=23DA 560=23DB 1050=23DC 2000=23DD 4550=23DE	70=23D8 120=23D9 240=23DA 560=23DB 1050=23DC 2000=23DD 4550=23DE
Number of processors	2	4	8	4/8
Storage (GB)	32	32	32	32
DASD (GB)	11056	11056	11056	11056
Max DASD arms	630	630	630	630
Max DASD LUNs	629	629	629	629
Internal/ Exter. xSeries	28/8	28/8	28/8	28/8
CD-ROM/DVD/	18	18	18	18
Internal/External Tapes	18/10	18/10	18/10	18/10
Max Crypto. Cards	8	8	8	8
Max LAN Ports	72	72	72	72
Max WAN Lines	300	300	300	300
Max Twinax Ctlrs	152	152	152	152
Software Group	P10/P20	P20/P30	P20/P30	P30/P40

iSeries Model 840 Characteristics

	#2461 Proc. Feat.	#2352 Proc. Feat	#2353 Proc. Feat	#2354 Proc. Feat
Processor CPW	20200	9000 - 12000	12000 - 16500	16500 - 20200
Interactive CPW Int. Feat. #1540 #1541 #1542 #1543 #1544 #1545 #1546 #1547 #1548	120=26D0 240=26D1 560=26D2 1050=26D3 2000=26D4 4550=26D5 10000=26D6 16500=26D7 20200=26D8	120=26B0 240=26B1 560=26B2 1050=26B3 2000=26B4 4550=26B5 10000=26B6	120=26B8 240=26B9 560=26BA 1050=26BB 2000=26BC 4550=26BD 10000=26BE 16500=26BF	120=26C0 240=26C1 560=26C2 1050=26C3 2000=26C4 4550=26C5 10000=26C6 16500=26C7 20200=26C8
Number of processors	24	8/12	12/18	18/24
Max Storage (GB)	128	128	128	128
Max DASD (GB)	18953	18953	18953	18953
Max DASD arms	1080	1080	1080	1080
Max DASD LUNs	1079	1079	1079	1079
Max Internal/External xSeries	32/16	32/16	32/16	32/16
MaxCD-ROM/DVD	24	24	24	24
Max Internal/External Tapes	26/26	26/26	26/26	26/26
Max Cryptographic Cards	8	8	8	8
Max LAN Ports	96	96	96	96
Max WAN Lines	400	400	400	400
Max TwinaxCtlrs	175	175	175	175
Software Group	P40/P50	P40/P50	P40/P50	P40/P50

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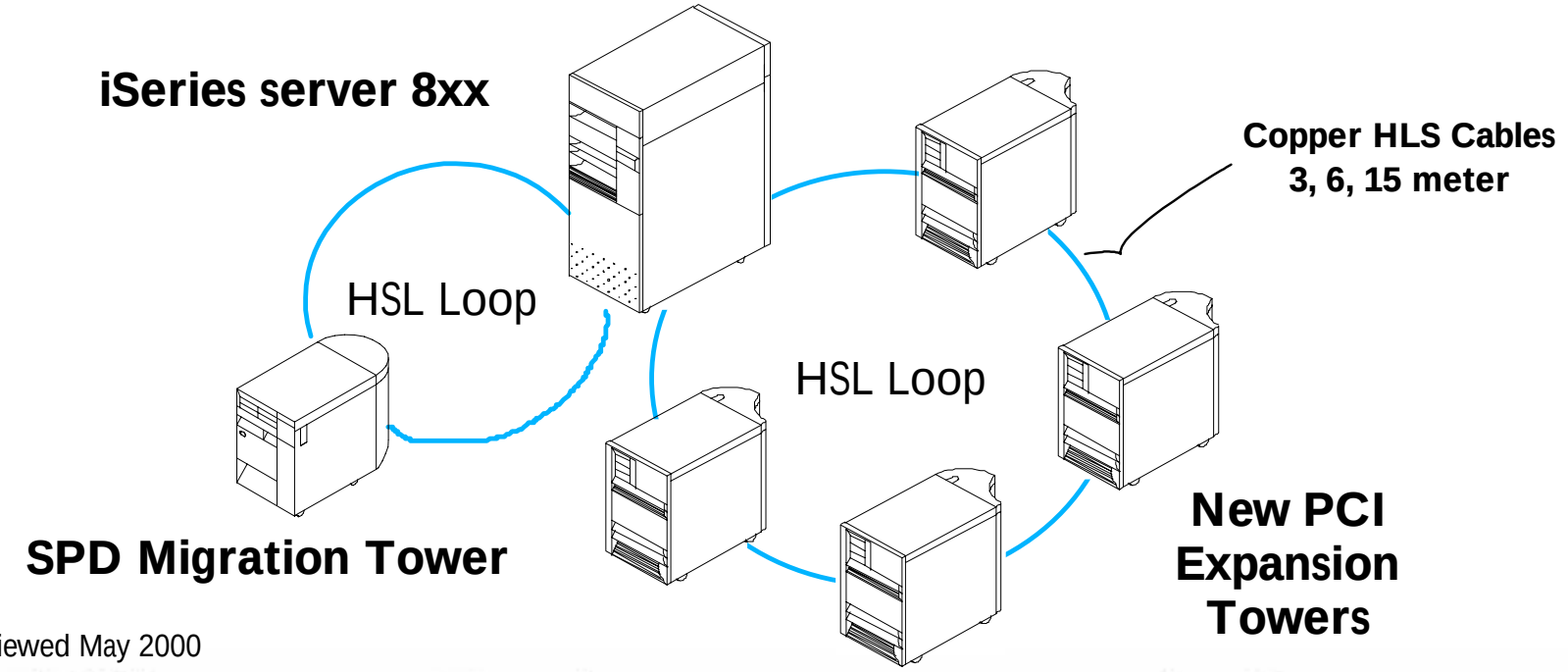
High-Speed Link

- 1GigaByte/sec bandwidth - up to 10x performance increase
  - 700 MB/sec achievable in duplex environment
  - 350 MB/sec achievable to Migration Tower
- Over 2 Terabyte/hour Save performance
- Loop provides redundancy for improved availability
- Attaches PCI Expansion Towers and Migration Towers
- OptiConnect over High-Speed Link (HSL)*



* Product Previewed May 2000

Notes: High-Speed Link

iSeries servers 270 and 8XX make use of the new High Speed Link (HSL), using Copper cabling to connect new PCI Expansion Towers and SPD Migration Towers to the servers. HSL provides the following:

- Rated full duplex bandwidth of up to 1 Gigabyte/sec (700 MB/sec effective via duplex traffic) offering an I/O throughput up to ten times faster than the previous implementation. This 10x comparison is derived from the top speed rating of 40 MB/sec of the SPD bus, in comparison to the top rating of 400 MB/sec of the PCI bus.
- Allows running multiple 3590s and disk in the same tower at rated speed
- Enables over 2 Terabyte/hour Saves on 8XX servers (840-2420 with 24 3590s)
- Enables up to 100 Megabyte/hr Saves on 270 server
- Cable loops provide redundancy for the new PCI Expansion Towers

For V4R5 the maximum cable length between a system and a tower or between towers is 15 meters.

The following HSL OptiConnect Product Preview was made during May 2000:

- IBM intends to further leverage the significant bandwidth, flexibility, and speed of High-Speed Link (HSL) for system-to-system connectivity by offering HSL OptiConnect

High Speed Link - Loops and Towers

MODEL	HSL Loops	Towers / Loop	Total Towers
270	1	1	1
820	1	5	5
830	4	4	13
840	8	4	23

Each system has specific maximum supported numbers of loops, towers per loop, and maximum towers per system.

These tower maximums do NOT include existing SPD towers that could be migrated and attached via a migration tower.

Notes: High Speed Link - Loops and Towers

This chart shows a summary of the number of High Speed Links supported by each 270/8xx server and the number of PCI-based Towers per HSL. If a Migration Tower is involved, that is an additional tower supported.

We discuss more about the Towers following the next set of foils on I/O-based features.

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Migration and new Tower Option

Things to Remember

Hardware MES upgrades

- 270/8xx to 270/8xx are simple, business-as-usual to explain
- 6xx/Sxx/7xx to 8xx are straight forward to do, but with the new I/O architectures, migration tower and V5R1 feature support, need to be understood
- 6xx/Sxx MES upgrades are available only through September 2001

Smooth, uneventful, low-stress software or hardware upgrades require planning

Avoid "shortcuts" and follow standard upgrade processes

- Install V5R1 prior to a hardware upgrade

Most existing features continue to be used

LPAR provides additional opportunities but requires planning

Miscellaneous

No model upgrades into or out of Model 250, iSeries Models 270, DSD, SB2, or SB3 (asset swap - different serial number required)

- Processor upgrades within Model 250, iSeries Models 270, DSD, and SB3 are possible
- F/C #0205 RISC-to-RISC Data Migration is available

Upgrades to iSeries Model 820 from 620/720/S20 may need more memory as memory is installed four-cards-at-a-time versus two-cards-at-a-time (quads versus pairs)

OS/400 Upgrade Path Withdrawal Dates

- When can a one-step supported upgrade no longer be ordered:

From / To ->	V4R3	V4R4	V5R1	Future
GA ->	09/98	05/99	07/00	05/01	
V2R3	12/31/00	05/31/01	-	-	-
V3R0.5	12/31/00	05/31/01	-	-	-
V3R1	12/31/00	05/31/01	-	-	-
V3R2	12/31/00	05/31/01	WNA	-	-
V3R6	-	-	-	-	-
V3R7	12/31/00	-	-	-	-
V4R1	12/31/00	05/31/01	WNA	-	-
V4R2	12/31/00	05/31/01	WNA	-	-
V4R3	-	05/31/01	WNA	-	-
V4R4	-	-	WNA	WNA	-
V4R5	-	-	-	WNA	x
V5R1	-	-	-	-	x

WNA: Withdrawal Not Announced at this time

Notes: OS/400 Upgrade Path Withdrawal Dates

The column on the left in blue is where we are in May 2001. The four columns in the table are potential releases you could target going to. If there is a "-" (dash) in the column, that means there is no supported one-step release.

In the future, IBM will announce a withdrawal date and the "WNA" in that particular column will change to a date.

For example, if you were on V4R1 today and wanted to go to V4R4, you need to order the software upgrade before May 31, 2001. After this date IBM will withdraw the ability to order and ship this software upgrade.

A key point on this chart is that there will be only two OS/400 supported upgrade paths in the future. With year 2000 challenges under control in most customer accounts, there is no longer the business requirement for IBM to test and support so many paths. Note that V4R5 is the last release with a one-step upgrade for a CISC release (V3R2). V5R1 does not have a one-step, OS/400-supported upgrade path.

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Attach 5035 to new 820 (RPQ 847120)

Obtain Migration tower 5035 on new 820:

- Allows to install SPD cards into new 820 configuration
- Allows to attach expansion towers via optical cable and optical adapter (#2688)
- Requires HSL cables and SPCN cable

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Notes: Attach 5035 to new 820 (RPQ 847120)

This chargeable RPQ allows a new Migration Tower 1 (FC 5035) to be ordered, shipped, and attached to a plant-shipped 820. A typical Migration Tower 1 is created from the Model 620/S20/720 system unit during an MES upgrade to a Model 820. Before this RPQ, there was no way to order a migration tower for a new, non-MES Model 820. As the migration tower was the only way to use the older SPD adapters and older SPD bus-attached I/O towers, this caused a restriction for the few functions which had not yet been implemented using newer AS/400 PCI packaging.

This RPQ migration tower is equivalent to the 620/S20/720/820's no-charge Feature Codes 5035 and 9331. Feature Codes 5035 and 9331 are in fact used in the configuration record. It provides six SPD slots and eleven PCI slots. These slots may be used at the customer's discretion for any supported configuration. Only a small subset of the possible SPD/PCI adapters which will work in this RPQ migration tower can be installed by manufacturing in the migration tower and shipped to the customer. Adapters not on the following list can be ordered/shipped separately and installed at the customer site.

Feature codes which can be ordered and installed by IBM manufacturing plant, if ordered with this RPQ on the same MES order:

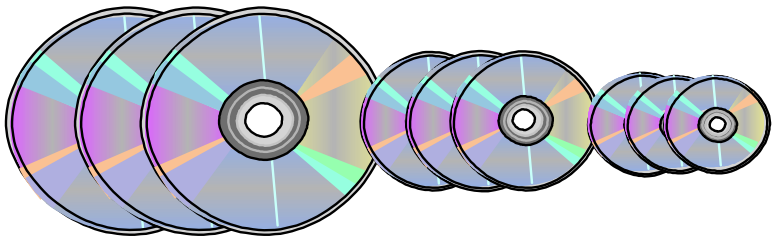
- #6501 - Magnetic Storage Controller (SCSI adapter for external disk - maximum 3 in migration tower)
- #6534 - SPD Magnetic Media Controller SCSI card
- #2688 - Optical Link Processor (maximum 2).

As this migration tower does not come from an MES upgrade, it does not contain a CD-ROM, tape, or any disk drives in the migration tower itself. These I/O devices could be ordered after the migration tower has been installed via a separate MES order. However, most customers should choose to use newer I/O devices located in the 820 or in newer technology PCI I/O towers such as FC 5074 or 5075. The Migration Tower 1 includes one Optical Bus Adapter. No additional Optical Bus Adapters can be added. The Optical Bus Adapter supports up to two 1063 Mbps Optical Link (#2688) cards. Each Optical Link card can attach up to two 50xx SPD I/O towers. This migration tower is not CSU (customer setup). #14xx line cord and HSL cable(s) should be specified on the order.

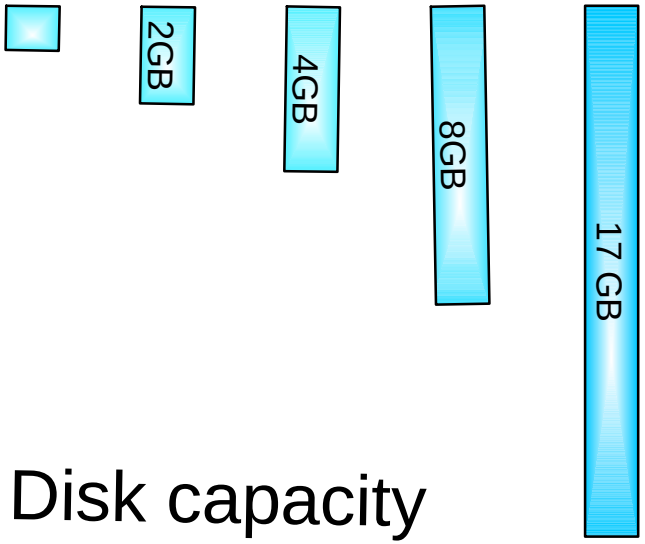
The RPQ does not come with a redundant power supply. If a redundant power supply is desired, it must be ordered separately.

Sizing number of disk arms

Estimating number of disk arms



Disk size



Disk capacity

Facts

- High density drives reduce CPU performance when same total disk capacity is maintained, i.e. fewer disk arms
- Disk arms define performance - not disk capacity

Challenge

- avoid disk constraint installations due to dramatic reduction in the number of disk drives as high density drives and/or disk compression became available
- The need to properly position the high density (18GB, 35GB (future)) and high RPM (10,000 rpm) disks

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Estimating number of disk arms solutions

Disk Arms Considerations White Paper

- widely used in the field for 3 years
- key document in selling additional DASD arms

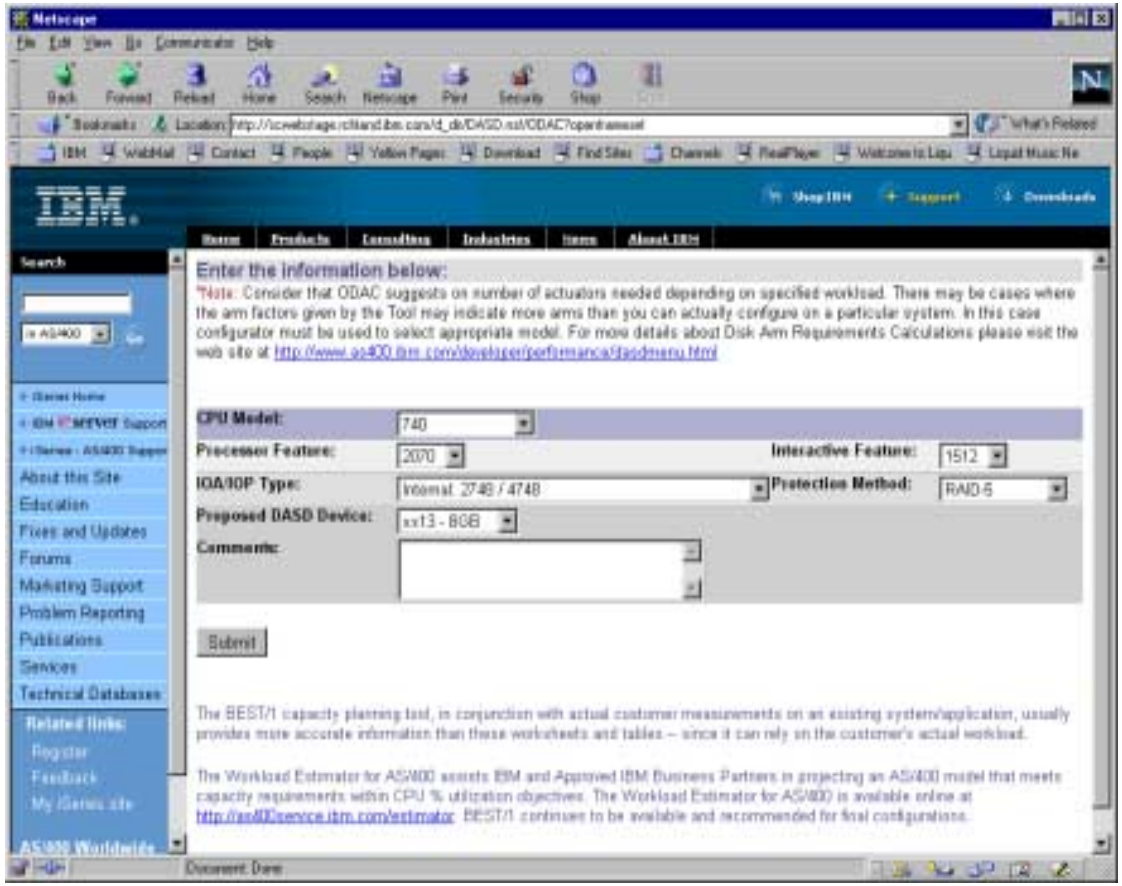
Requires:

- some technical skills
- time for manual calculations

Automated calculations:

- very fast - estimated usage time about 5 minutes
- no need for technical background
- work in progress ...

Disk Calculator on the Web



- Easy to maintain
- Easy to keep current

Required input

- CPU Model
- Processor Feature
- Interactive Feature
- IOA/IOP Type
- Protection Method
- Proposed DASD Device

Output

- number of disk Arms required to insure that CPU will not wait on disks

The ODAC tool and white paper may be found through the System Performance web site at::

- http://www.ibm.com/eserver/iseries/perfmgmt/

ODAC, Workload Estimator, BEST/1

Tool	Answers question	Primary use	Required input	Output	Estimated time to use
ODAC	What number of disk arms are needed to avoid having the CPU waiting on the disks?	New sales / upgrades Focusing on disk arms	• CPU Model • Processor Feature • Interactive Feature • IOA/IOP Type • Protection Method • Proposed DASD Device	Number of disk arms	5 min
Workload Estimator	What is the minimum number of disk arms required for good performance on a specific and known workload?	New sales / upgrades Focusing on workload	• Input can be from one of these sources: • PM/400e data • Model and CPW • Workload parameters for Domino, Java, or WebSphere	- Model, feature, memory - Number of disk arms - Total disk - CPU % utilization - Growth projections	5 - 20 min
BEST/ 1 * BEST/1 will not be supported by IBM after V5R1	What is the number of disk arms needed in a complex configuration environment and for actual workload running on iSeries or AS/400	Upgrades BEST/ 1 is intended for the use of experts knowledgeable in performance	• CPU model • Processor feature • Interactive feature • IOA/IOP type • Number of arms • Protection method • Measured performance data • Proposed device features • Proposed growth rates • Compression information	- Disk features - Total disk utilization - CPU % utilization - IOA/IOP % utilization - MSecs per I/O - Communications - Growth projections	Depends on the user experience . Can span from 30 min to a week.

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