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Make the most out of your DB2 Connect system

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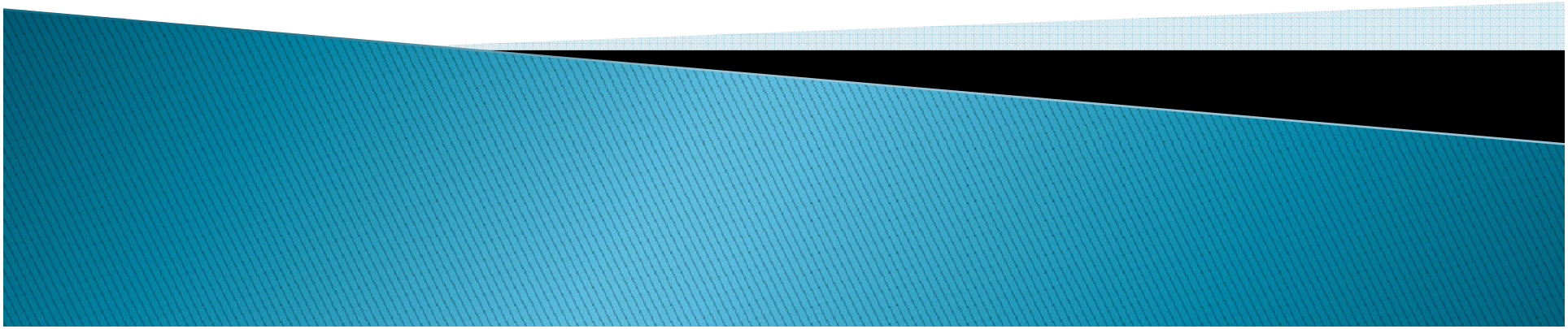
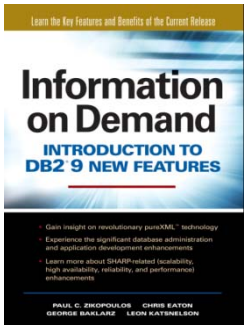
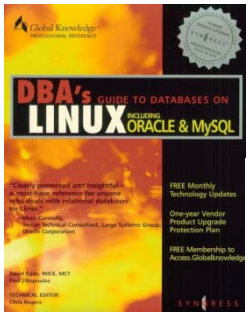
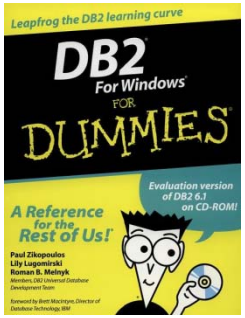


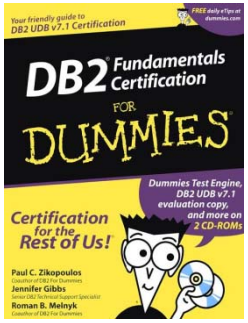
Presenter's Biography

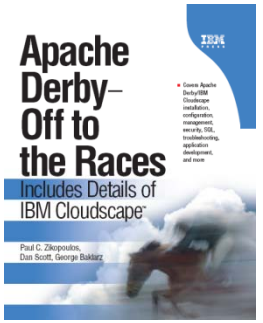
Paul C. Zikopoulos, BA, MBA, is an award-winning writer and speaker with the IBM Database Competitive Technology team. He has more than ten years of experience with DB2 UDB and has written over sixty magazine articles and several books about it. Paul has co-authored the books: DB2 9 New Features, DB2 Version 8: The Official Guide, DB2: The Complete Reference, DB2 Fundamentals Certification for Dummies, DB2 for Dummies, and A DBA's Guide to Databases on Linux. Paul is a DB2 Certified Advanced Technical Expert (DRDA and Cluster/EEE) and a DB2 Certified Solutions Expert (Business Intelligence and Database Administration). In his spare time, he enjoys all sorts of sporting activities, running with his dog Chachi, and trying to figure out the world according to Chloë – his new daughter. You can reach him at: paulz_ibm@msn.com.





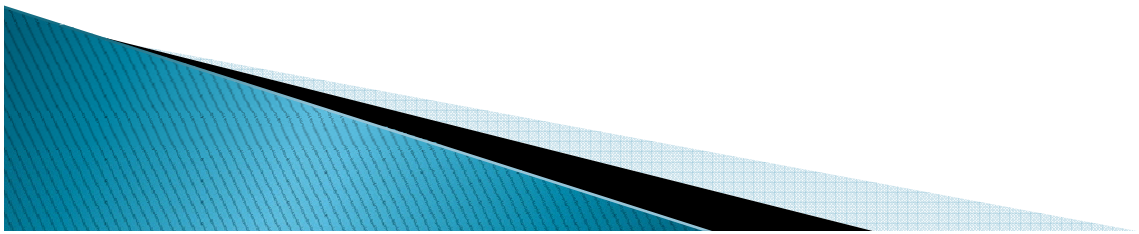






DB2 Connect
Getting More Value

- Greatly improve programmer productivity with provided Java, .NET, PHP and database object development tools
- Make DB2 for z/OS and DB2 for i5/OS enterprise database servers for ADO.NET, ODBC, OLE DB, JDBC, SQLJ, DB2 CLI and Embedded SQL Applications
- Deliver continuous application availability
- Manage and balance the workload in a SYSPLEX DB2 for z/OS environment
- Reduce mainframe resource consumption
- Provide transparent access via SQL and standard APIs to CICS, IMS, MQ, VSAM and other data sources
- Extend applications and data to mobile devices
- Allow DB2 for z/OS and DB2 for i5/OS to easily participate in SOA architectures and enable it for Web Services
- Simplify application deployment



Simplified data access DB2 Connect solution

- Complete application development environment for:
  - Microsoft .NET and Microsoft legacy (ODBC, OLE DB, ADO)
  - Java and J2EE
  - PHP
  - SOA and Web Services
  - Many platforms: Windows, Linux (Intel, AMD, iSeries, pSeries, zSeries), UNIX (AIX, Solaris, HP-UX), mobile OS (Palm OS, Windows Mobile, QNX, Symbian etc.)
- Benefits:
  - Value:
    - Complete set of drivers for all programming languages:
    - Readily available programming skill (.NET, Java, PHP); increased motivation for staff to learn new leading edge technologies
  - Developer productivity: comprehensive set of productivity tools:
    - DB2 add-ins for Visual Studio .NET: best in class for .NET development
    - Plug-ins for Eclipse (IBM WebSphere Studio and Rational Application Development)
    - Developer Workbench for database programmers and application DBAs
  - Leverage investment: build once … access many data sources:
    - DB2 Connect delivers the same drivers/tools that are used for the rest of the DB2 family
    - Federated database support when used with WebSphere Federation Server expands access to SQL Server, Oracle, Sybase and many other data sources

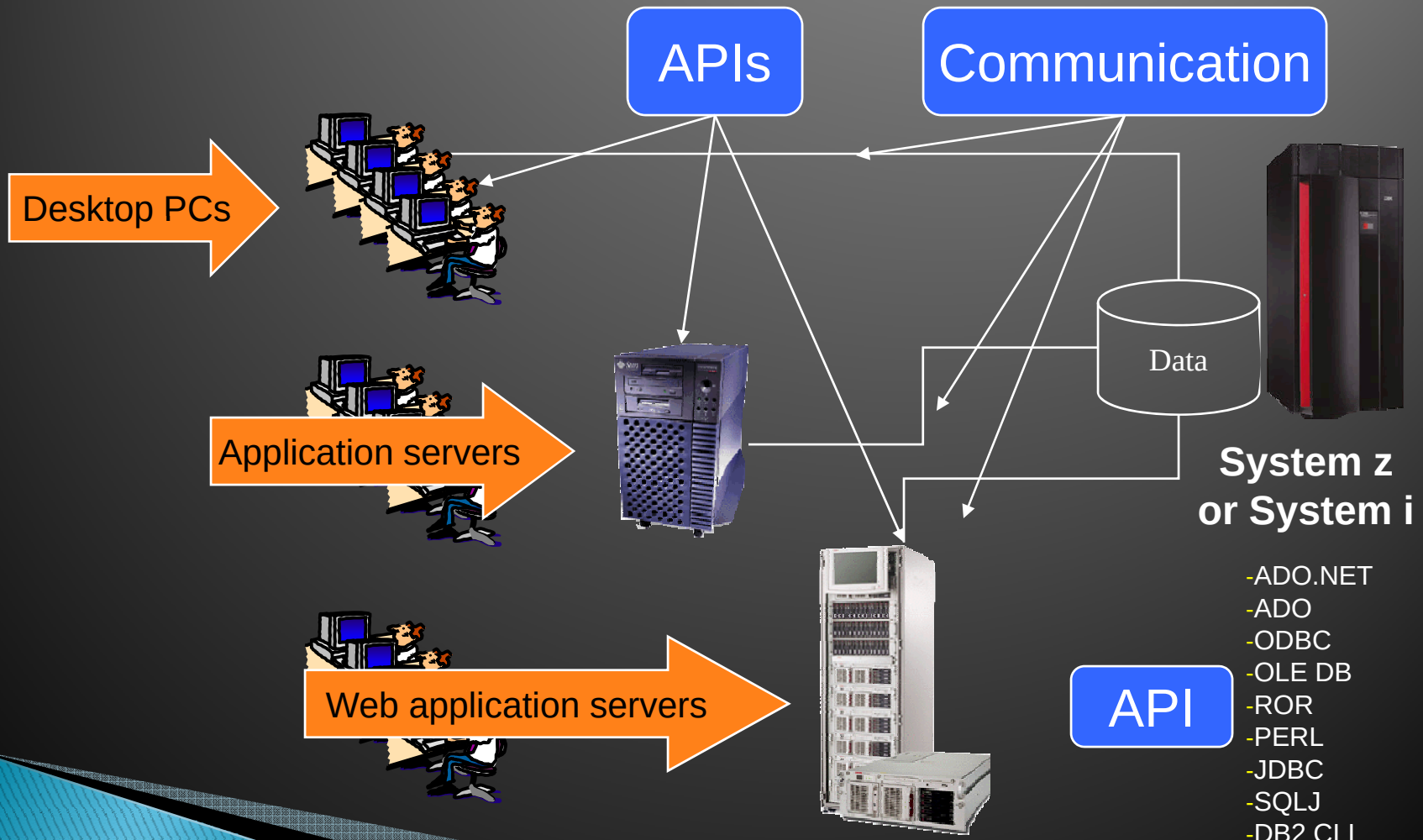
Simplifying Access to Mainframe and Host Data

- Do you find that you have a need to access mainframe and host data from PC applications like Microsoft Excel, Access, Cognos, Crystal Reports, Business Objects etc.?
- Do you have application servers like Microsoft IIS, WebSphere, BEA, or others that need to work with data on these systems?
- Do you find that you are spending resources for data copy solutions because applications can't or don't want to access data on these systems?
- Are you training your staff to access each of these data stores? Are you spending resources to build and maintain separate data access mechanisms for each data source?
- Are you planning to use the new partitioning capabilities of the System i servers for consolidating AIX, Linux, and Windows servers?
  - Do you see this putting more requirements on easy access to native i5/OS data from AIX, Linux partitions, and Windows (IXS)?

Improving Programmer productivity Questions

- Do you find that getting programmers with ‘modern’ methodology skills is becoming harder?
- Are your programmers looking to get skilled in leading edge technologies like .NET, Java, PHP, Service Oriented Architectures, Web Services, XML etc?
- Do you find that you are not exploiting advanced functions of DB2 like Stored Procedures, triggers, user defined functions?
- Are you investigating SOA and Web Services enabling your System i and System z servers to extend access to new applications without re-architecting existing applications
- Do you anticipate a need to extend your applications to mobile devices like BlackBerry, smart phones/PDAs, portable warehouse and retail floor devices (e.g. Symbol)?

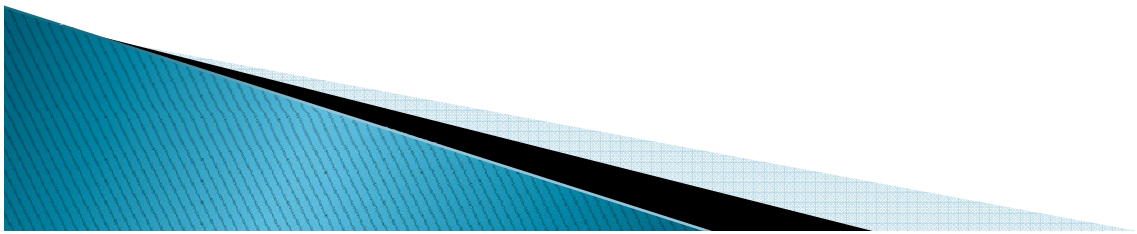
DB2 Connect In a nutshell



DB2 Connect SERVER vs. DB2 Connect PRODUCT

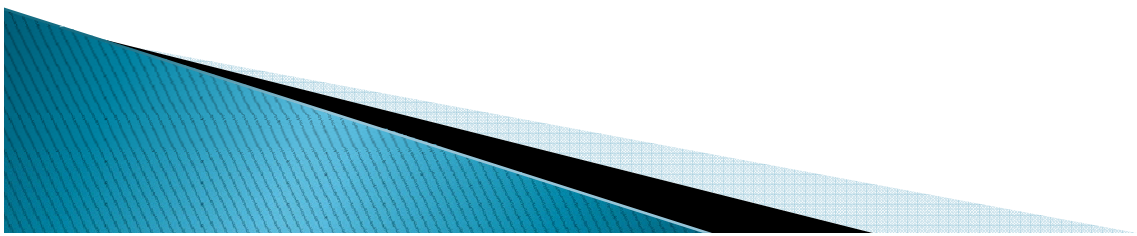
- DB2 Connect PRODUCT:
  - A part number you purchase from IBM. Four different Editions are available: Personal Edition, Enterprise Edition, Application Server Edition, Unlimited Edition

- DB2 Connect SERVER:
  - One of several components that you get when you purchase the PRODUCT
  - You install it on a
    - Linux: Intel/AMD, POWER (System p & System i), zSeries
    - UNIX or
    - Windows server.
  - In some circumstances you may decide not to deploy the DB2 Connect SERVER component but deploy one or more of the other components (JDBC Type 4 driver) that are a part of the DB2 Connect PRODUCT.



DB2 Connect Deployment Models

- **Direct connectivity from each desktop: DB2 Connect Personal Edition**
  - Install DB2 Connect Personal Edition on each desktop for direct connectivity to the mainframe
- **Utility**: DB2 Connect server farm:
  - A cluster of DB2 Connect servers to be used by multiple applications
  - Drivers (ODBC, OLE DB, .NET, JDBC, SQLJ, Embedded SQL etc.) deployed to all desktops and application servers
- **Application server co-location**:
  - DB2 Connect installed on each application server

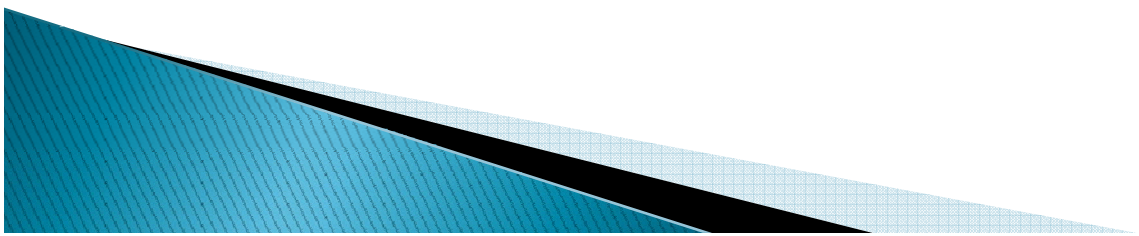


DB2 Application Development Overview

Improving programmer productivity

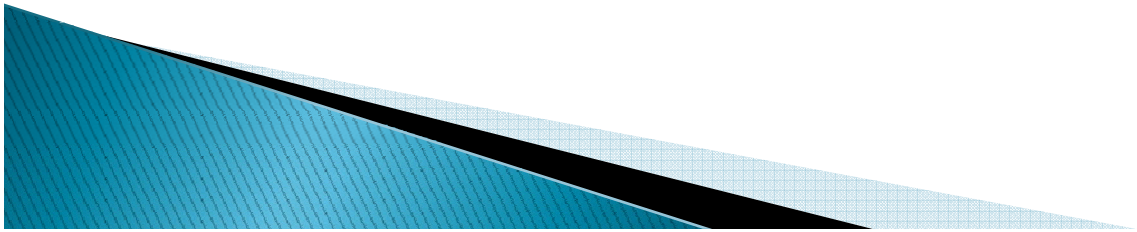
DB2 Application Development Who is it for?

- Application programmers
  - Java and J2EE programmers
  - Microsoft NET programmers
  - Other
- Application DBAs
- Data architects



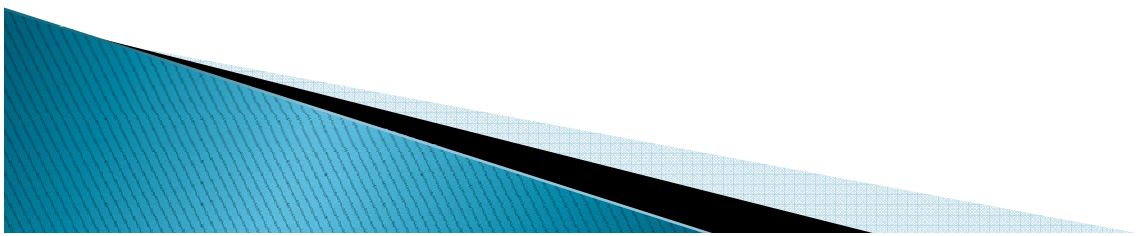
DB2 Application Development What is about?

- SQL
- APIs and drivers that implement them
- Application Development Tools and Utilities
- Information
- Application deployment



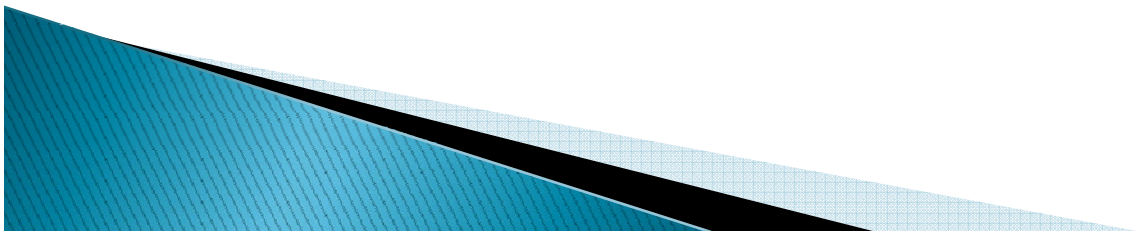
SQL-based DB2 APIs

- **Microsoft environments:**
  - ADO (via ODBC or OLE DB)
  - ADO.NET
- **Java programmers:**
  - JDBC
  - SQLJ
- **UNIX, Windows C programmers**
  - DB2 Call Level Interface (DB2 CLI)
  - ODBC
  - Embedded SQL
- Open Source
  - Ruby on Rails, PHP, Perl, and so on



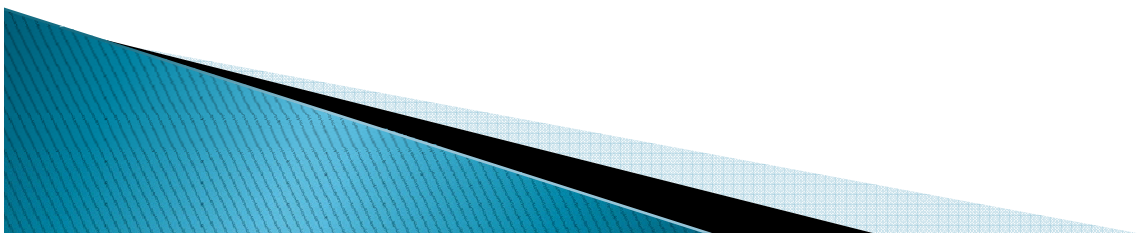
Non-SQL based DB2 APIs

- **Microsoft environments:**
  - Web Services: application programmer accessing DB2 as a set of Web Services created by an application DBA
- **Java programmers:**
  - Java Beans: J2EE programmer accessing DB2 as a set of Java Beans created by an application DBA by wrapping DB2 stored procedures.
  - Web Services: application programmer accessing DB2 as a set of Web Services created by an application DBA

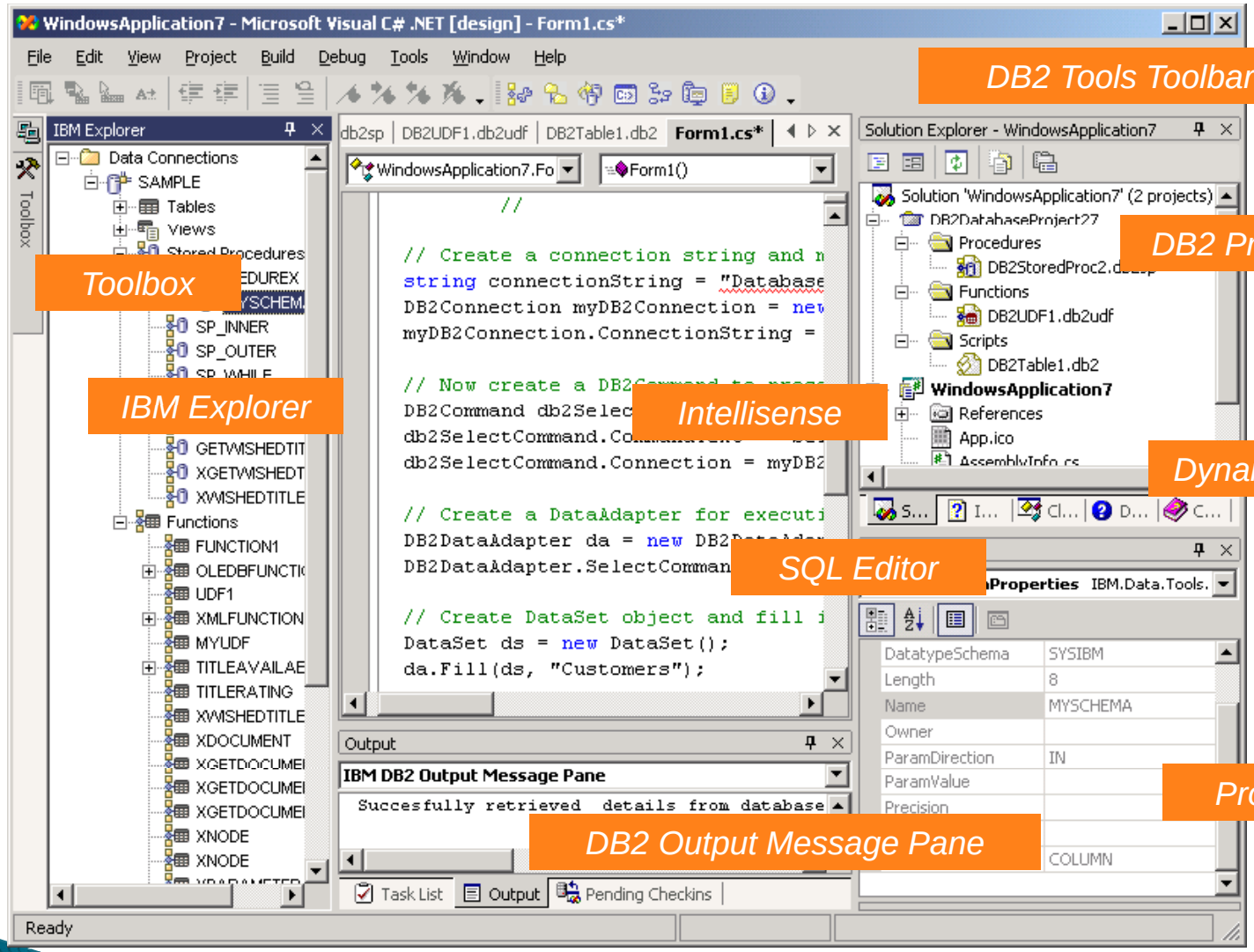


DB2 Application Development Tools
Key audiences

- **Application DBA**: Development Center (Developer Workbench in DB2 Viper), an Integrated Development Environment (IDE) for building server-side objects that does not require knowledge of a programming language
- **Java programmer**: IBM Rational Application Developer plug-ins allow Java programmers to build DB2 applications within the Java IDE
- **Microsoft programmer**: DB2 add-ins for Visual Studio .NET make building complete DB2 applications a natural experience for VS.NET users.



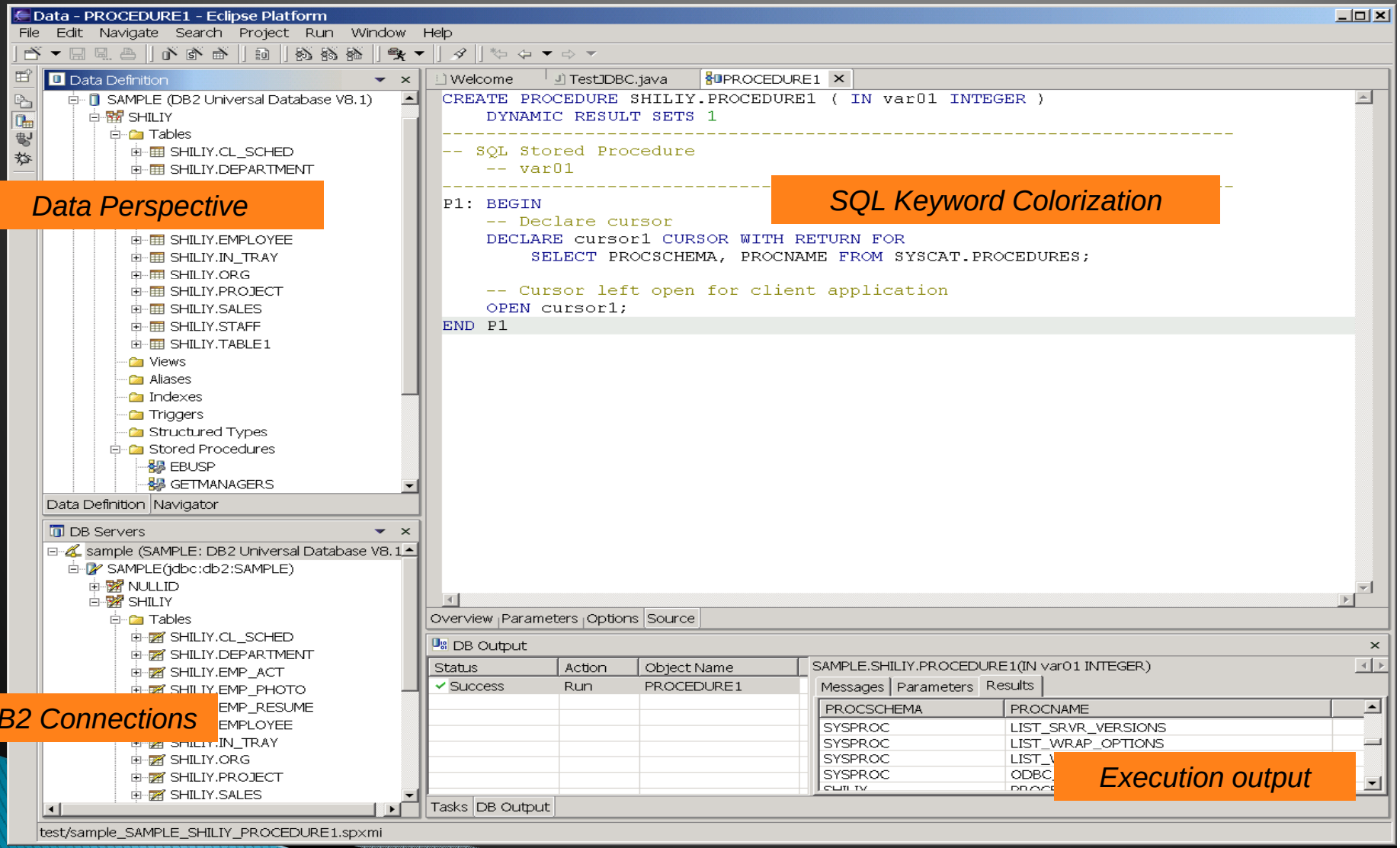
Integration into Visual Studio .NET



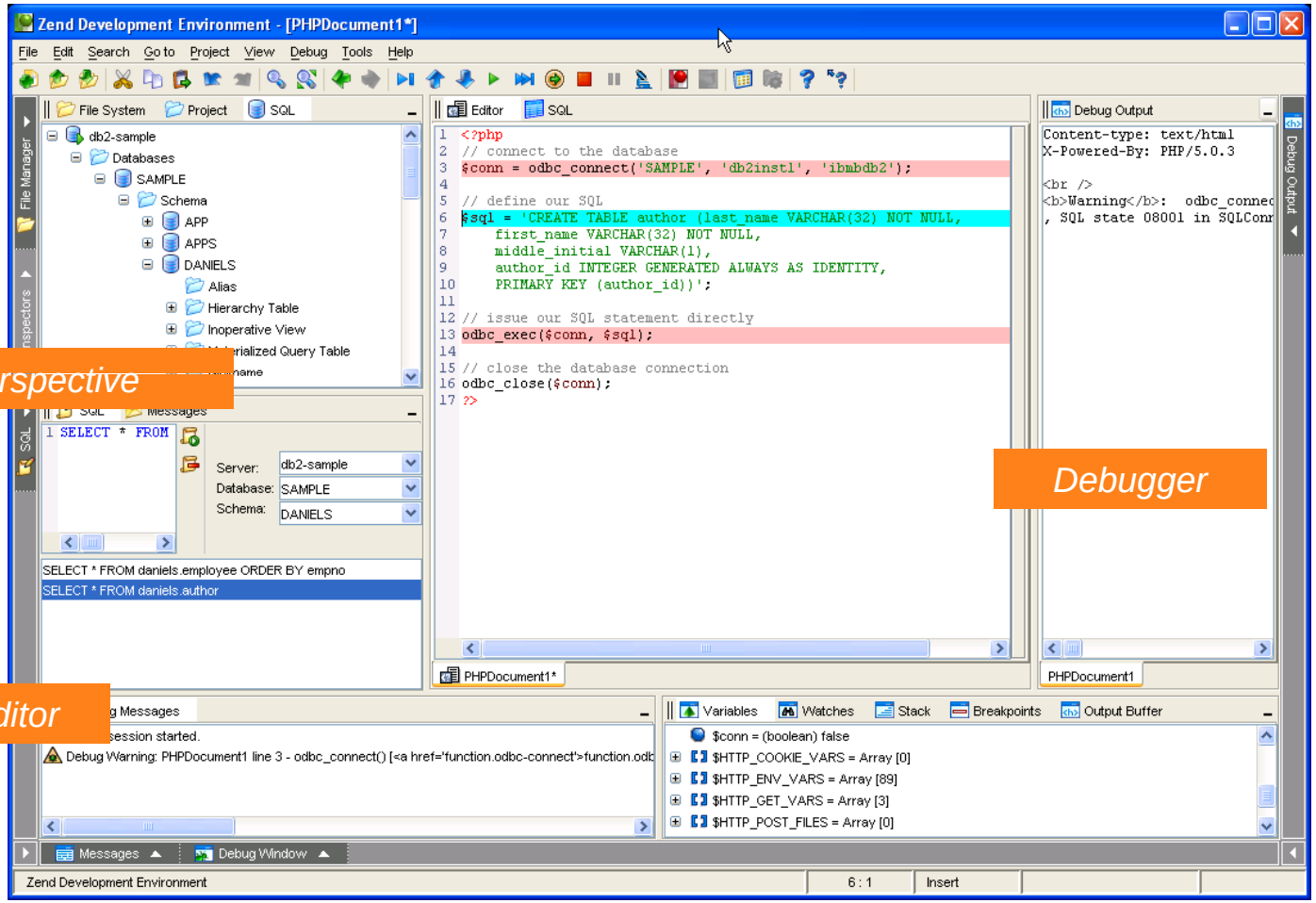
Optimized for Microsoft Visual Studio .net

vsip Summit PREMIER Support

Integration into Eclipse



Integration: Zend Studio for PHP



Data Perspective

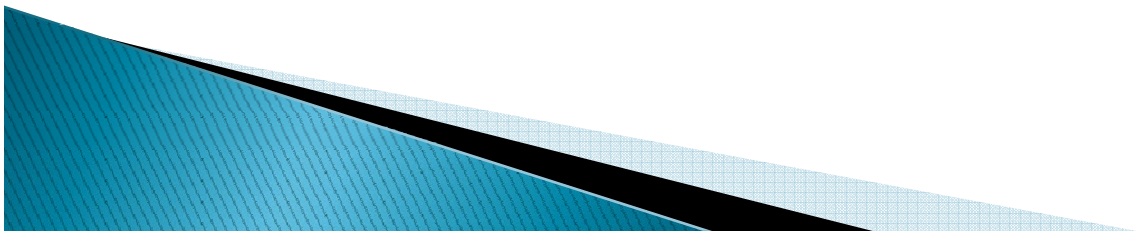
SQL Editor

Debugger

DB2 Output Message Pane

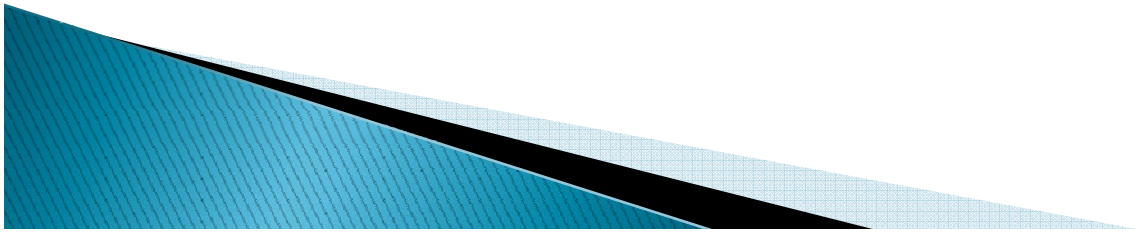
DB2 Connect Version 9 Simplified Application Deployment

- JDBC Type 4 driver redistribution
  - Royalty-free distribution
  - Fully licensed for redistribution and connectivity to DB2 UDB and Cloudscape
  - Small (about 2meg.)
  - Supports both SQLJ and JDBC
- New DB2 Run-Time Client
  - .NET, ODBC, OLE DB, JDBC Type 2 and Type 4
  - Fully licensed for redistribution and connectivity to DB2
  - Small (about 12meg.)
  - MSI Merge Modules to make it easy to embed DB2 client in the application installer (for Windows)

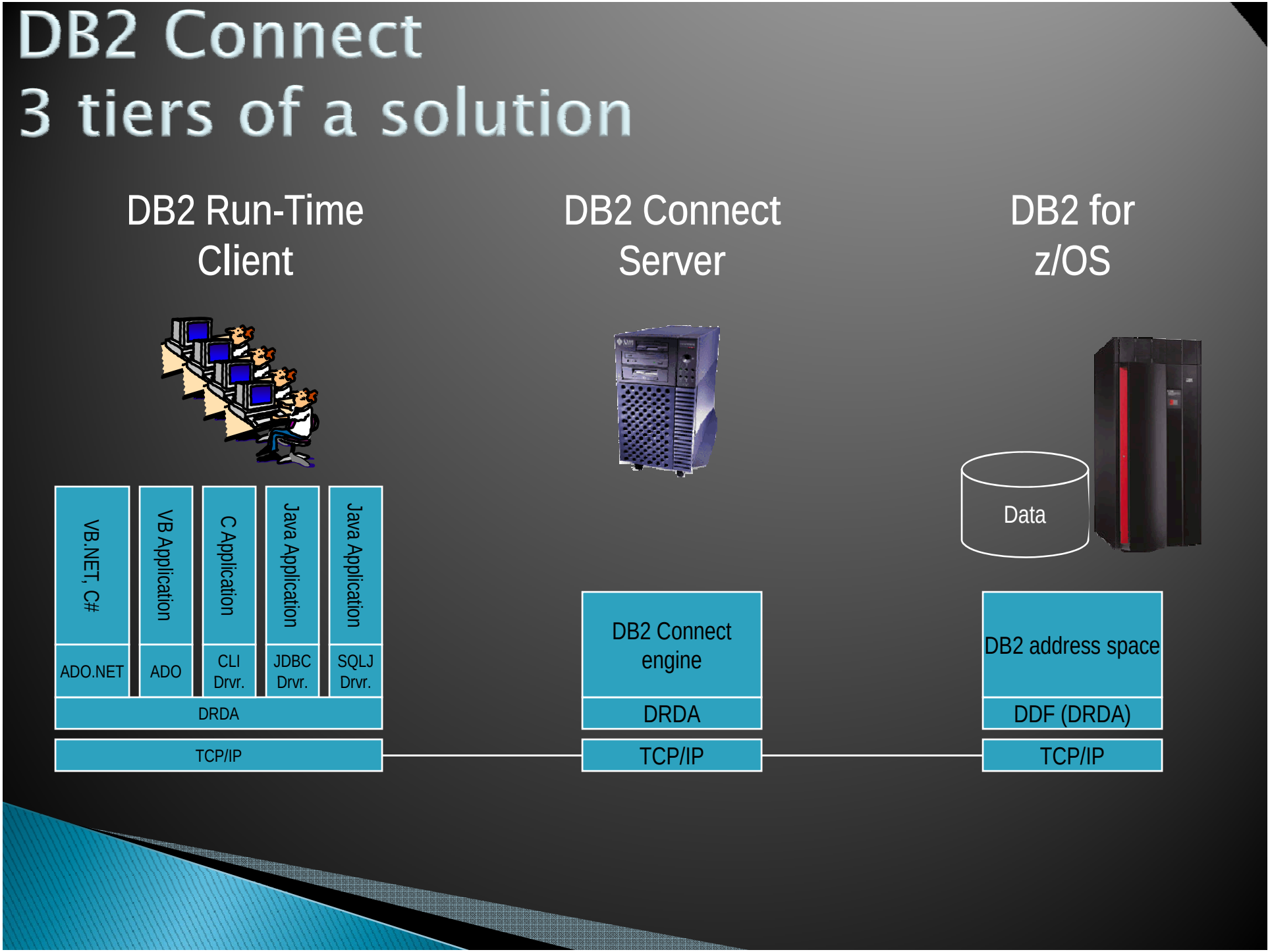


DB2 Connect Version 9 Simplified Application Deployment

- ODBC driver redistribution
  - Royalty-free distribution
  - Fully licensed for redistribution and connectivity to DB2 UDB and Cloudscape
  - Small (about 2meg.)
  - Supports both CLI and ODBC

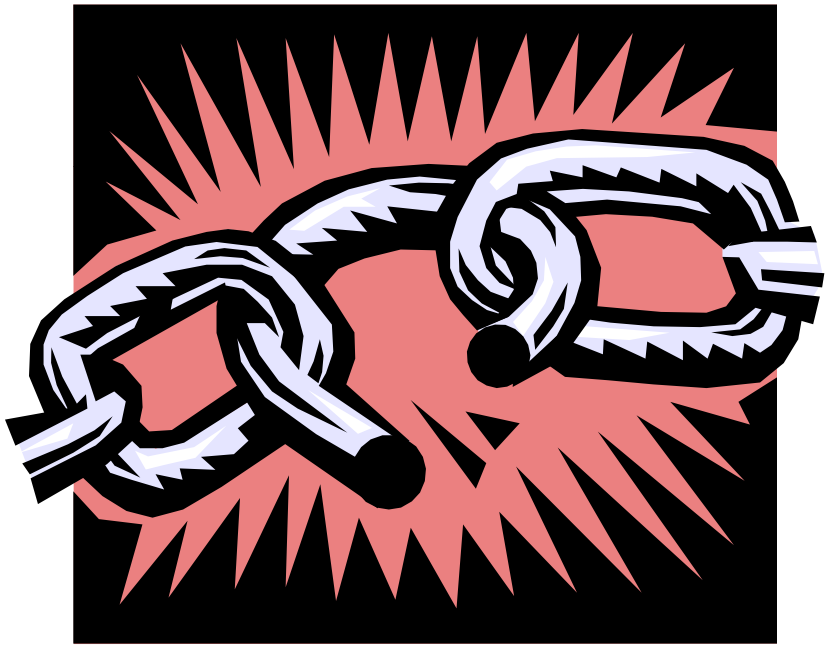


DB2 Connect
3 tiers of a solution

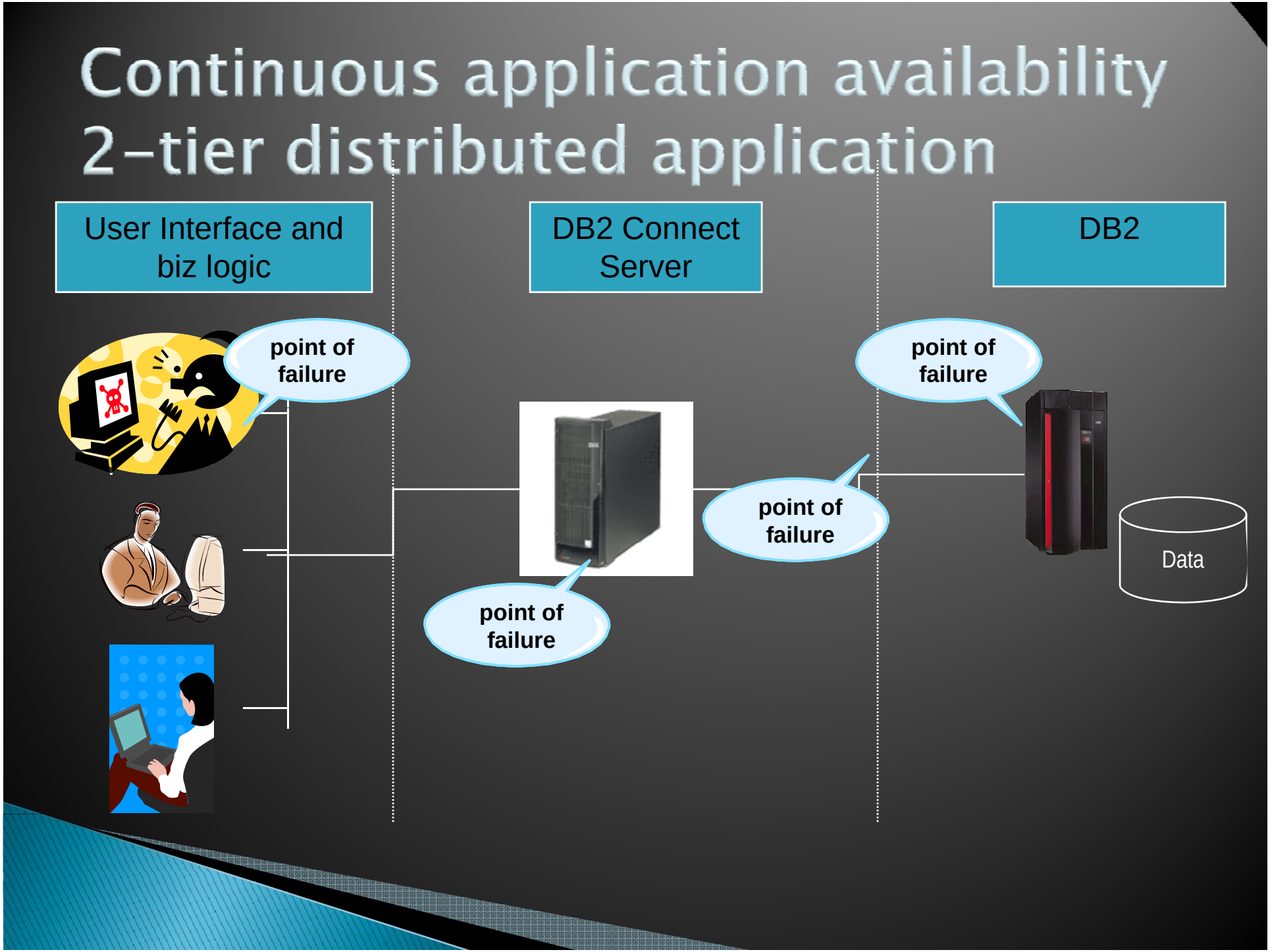


Continuous application availability

- DB2 for z/OS is considered to be a "gold standard" for database availability
  - System z hardware reliability
  - Datasharing
- For applications running off-mainframe, the rest of the infrastructure can become the weak link:
  - Failure to exploit datasharing
  - Inability to route around network failures
  - Lack of resilient infrastructure

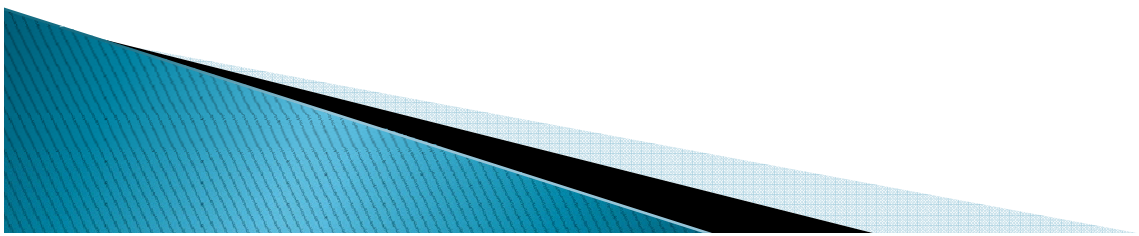


Continuous application availability 2-tier distributed application

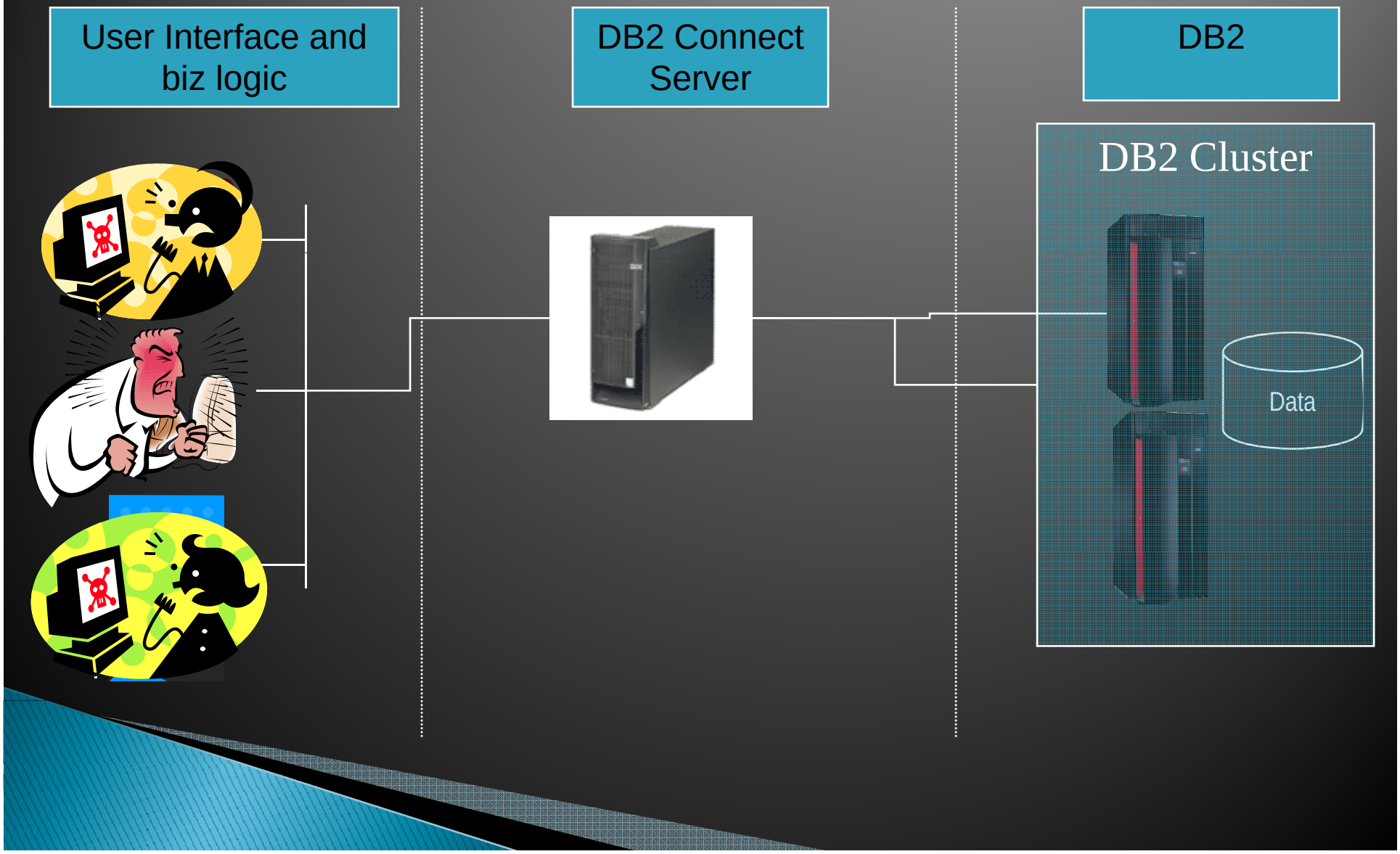


Dealing with failures
2-tier distributed application

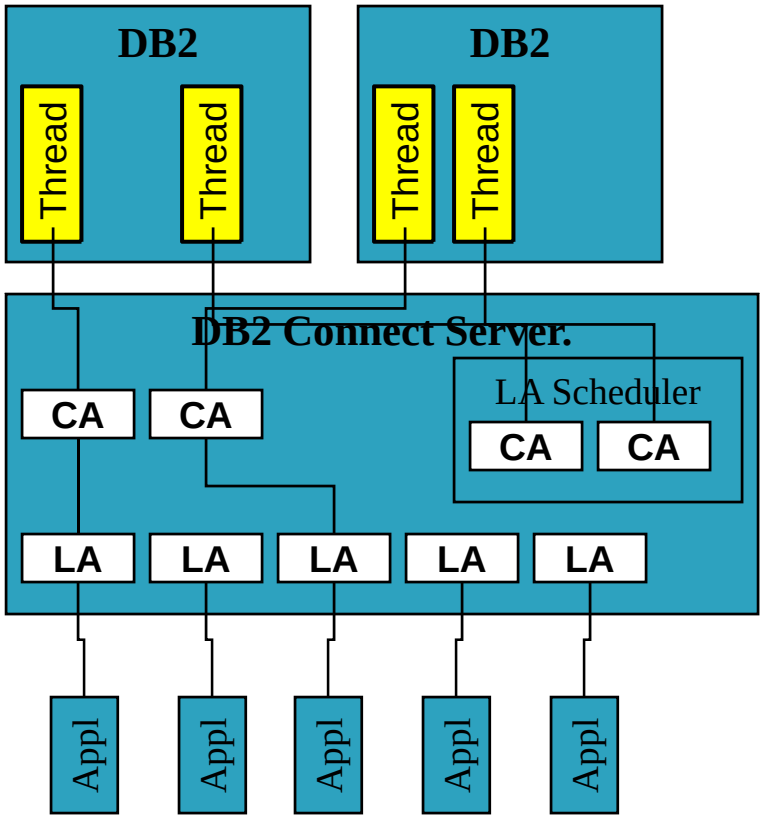
- Database (DB2 for z/OS)
  - Failure will make DB2 unavailable to all applications
  - Introducing redundancy is the most common way to deal with it
  - Datasharing is the most common way to introduce redundancy
  - Redundancy must be transparent to the application and DB2 Connect
- DB2 Connect
  - Failure will make DB2 unavailable to the application
  - Introducing redundancy is the most common way to deal
  - Redundancy must be transparent to the application
  - If Unlimited put all you want
- Application
  - Failure results in an outage for a single person
  - Three finger salute (Ctrl-Alt-Del) is the most common way to deal with failures



Continuous application availability
Dealing with DB2 outages



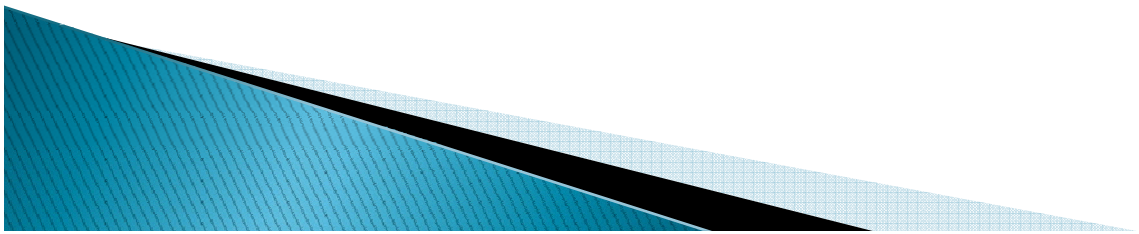
DB2 Datasharing + DB2 Connect Connection Concentrator



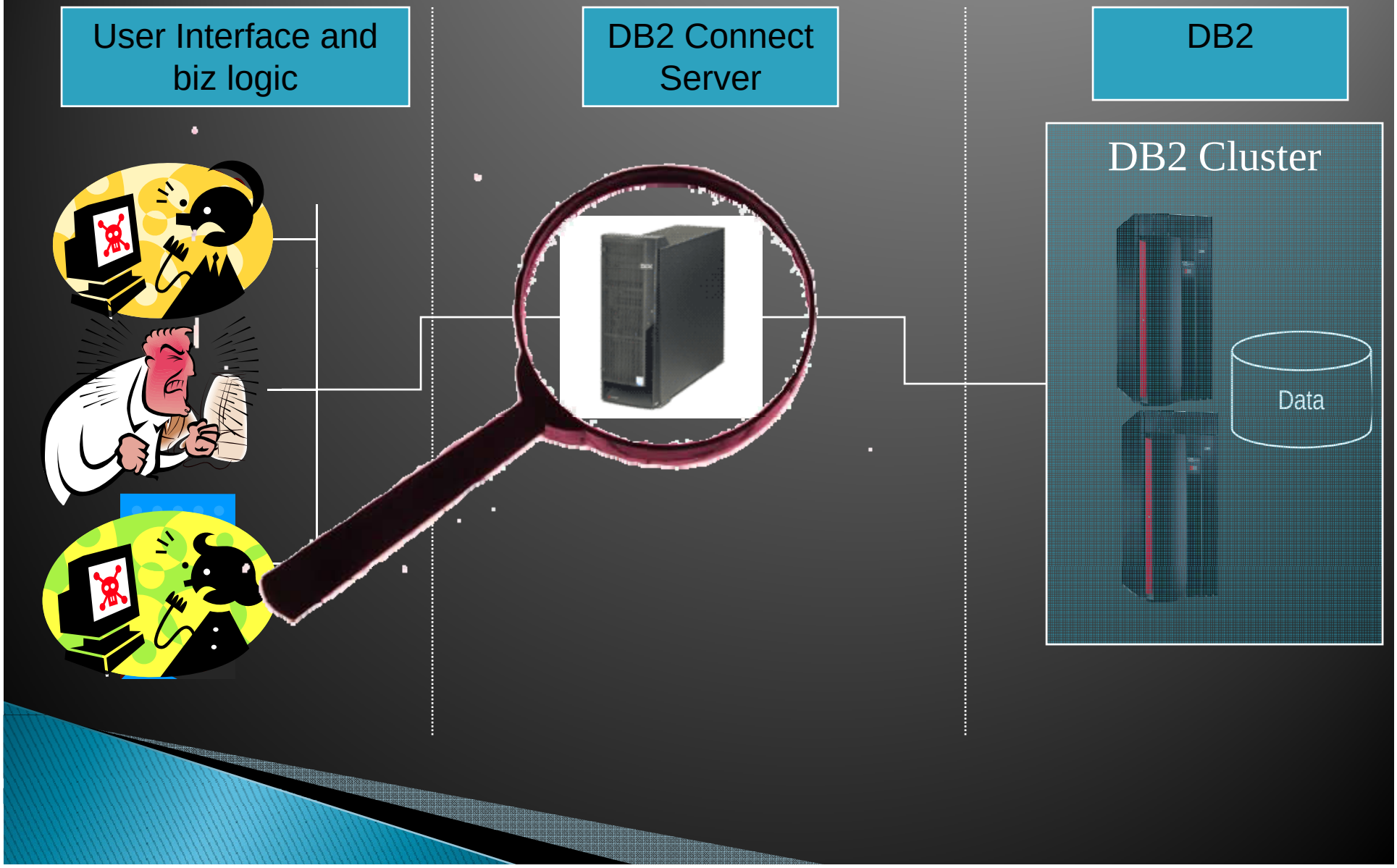
- DB2 datasharing: DB2 cluster for high availability
- DB2 Connect Connection Concentrator routes transactions around failed members
- On failures:
  - In-flight transactions get -SQLCODE -30108 that suggests to re-execute transaction
  - New transactions get automatically routed to surviving members

DB2 Connect Connection Concentrator for High Availability

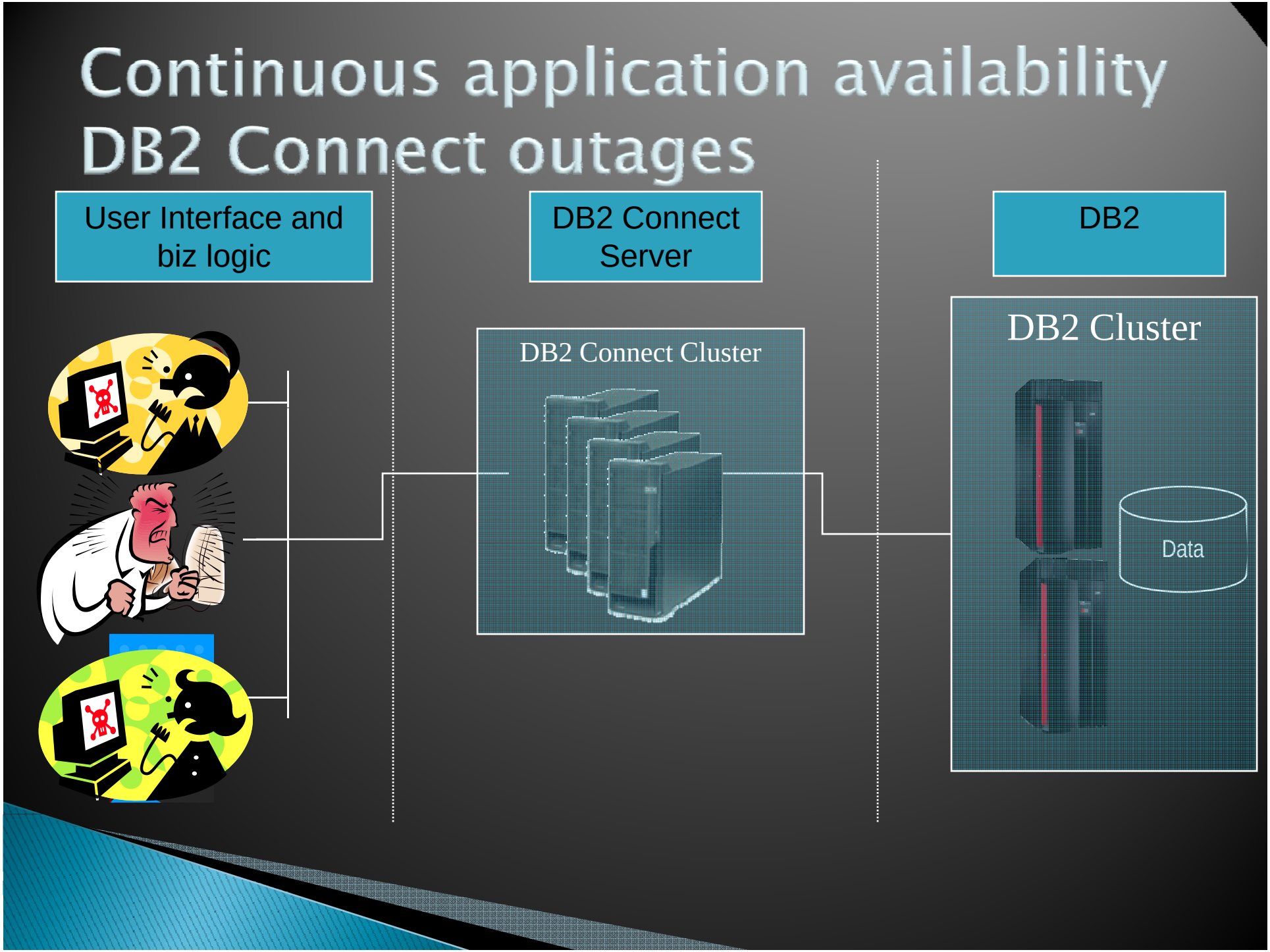
- Fully exploits datasharing
- Transparent routing around failed members. New transactions are routed to (most) available DB2 subsystems regardless of where initial connection was made
- Very fast routing around unavailable subsystems:
  - Informed about unavailable members by the WLM, plus
  - Will notice unavailable members even if WLM does not yet know about an outage
  - Does not wait for DB2 subsystem to restart on another LPAR
- Integrates with Dynamic VIPA but does not require it



Continuous application availability
DB2 Connect outages

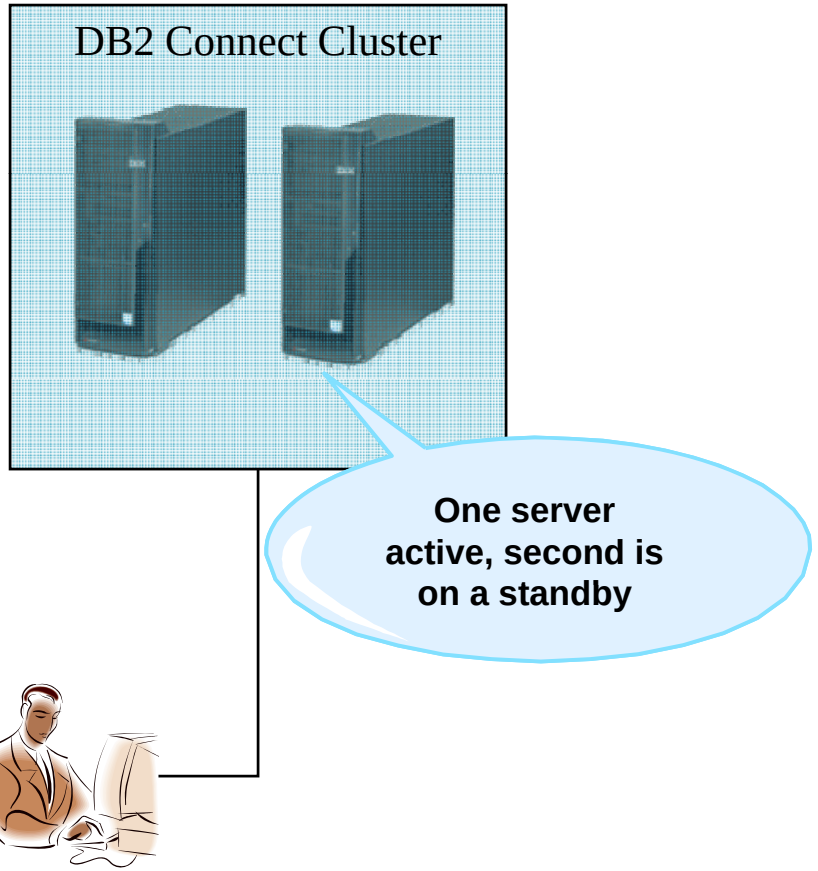


Continuous application availability DB2 Connect outages



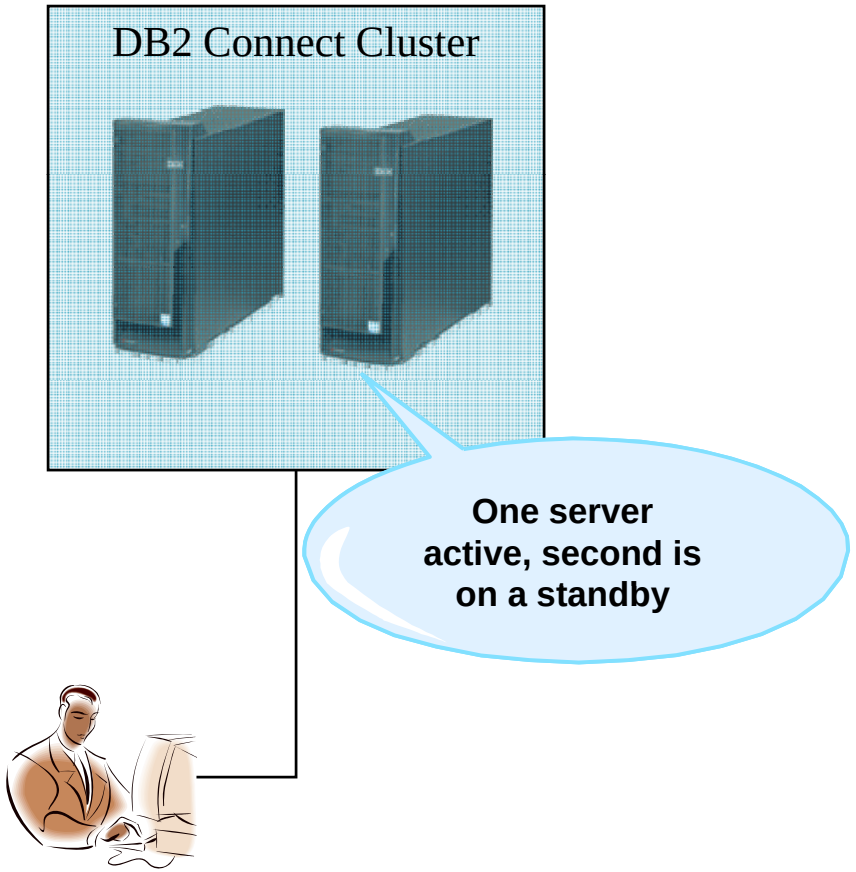
DB2 Connect Clustering Using Cluster Manager software

- Use cluster managers (HACMP, SUN Cluster, Windows Cluster Server, TSA etc.) to maintain an idle stand-by server
- Pros:
  - Same capacity during server outage
  - Full support for DB2 Connect servers that require persistent local data store (eg. federation, Mobility on Demand etc.)
- Cons:
  - Typically only two nodes in a cluster
  - Idle stand-by server is not doing DB2 Connect work
  - Slower take over times



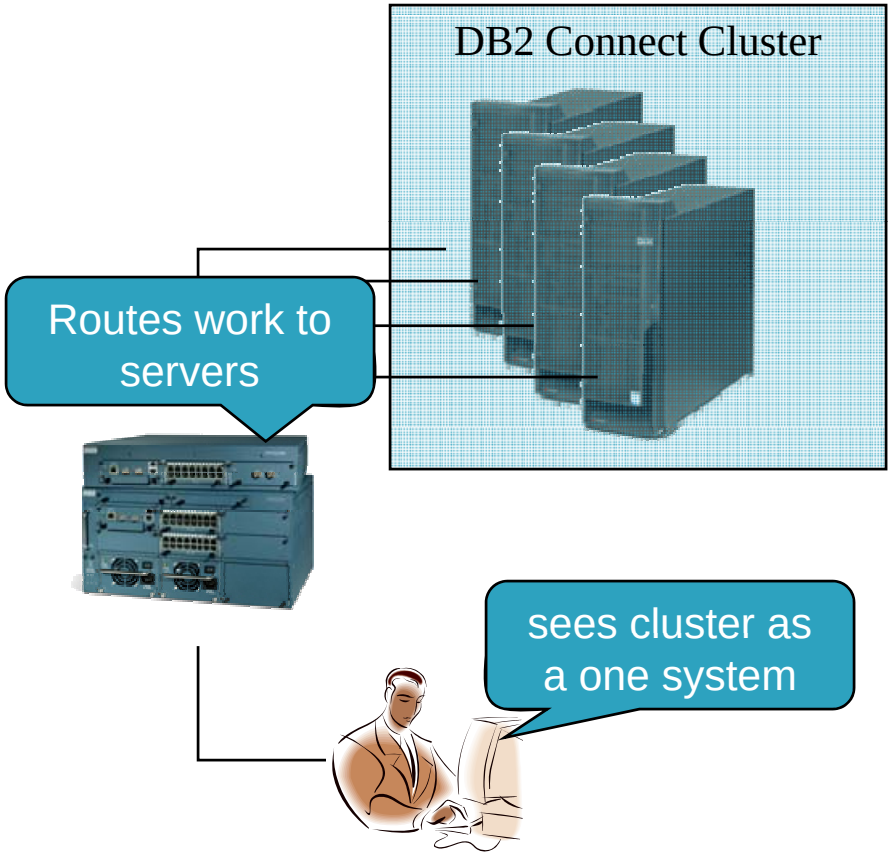
DB2 Connect Clustering Using HADR and Client Reroute

- Client Reroute and HADR introduced in DB2 Connect V8.2
- Pros:
  - Same capacity during one server outage
  - Full support for DB2 Connect servers that require persistent local data store (eg. federation, Mobility on Demand etc.)
  - Fast take over time
- Cons:
  - Limited to two nodes in a cluster
  - Only one machine is not doing DB2 Connect work
  - Need clustering software to automate takeover
  - Does not support 2-phase commit failover



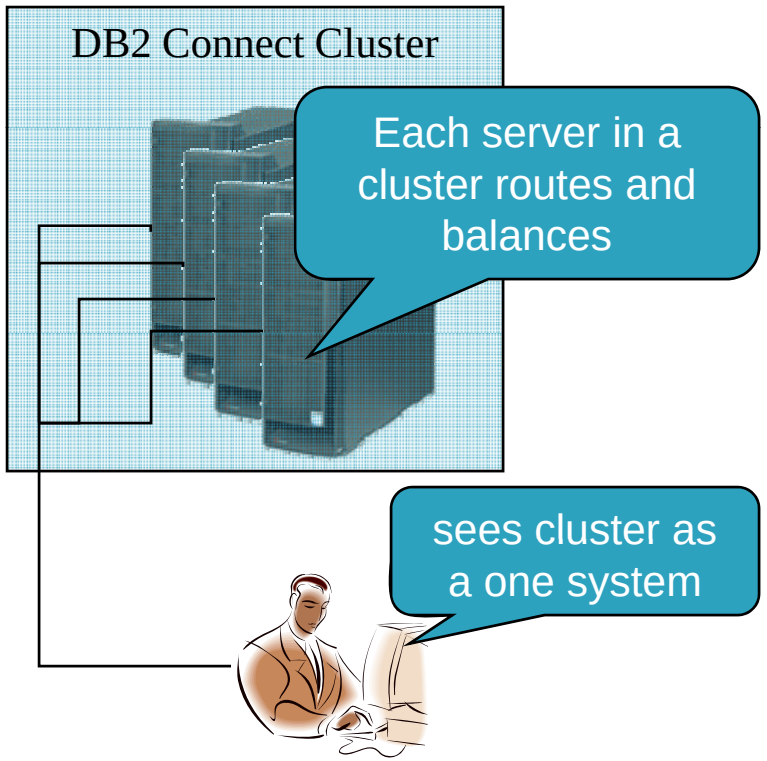
DB2 Connect Clustering Using Network Equipment for virtual IP

- Relies on network gear (e.g. CISCO CSS) for creating a single system image
- Pros:
  - Large number of servers can be clustered
  - All servers are active and doing DB2 Connect work
- Cons:
  - Extra expense for the network gear
  - Reduced capacity during outages
  - No support for DB2 Connect servers that require persistent local data store (eg. federation, Mobility on Demand etc.)



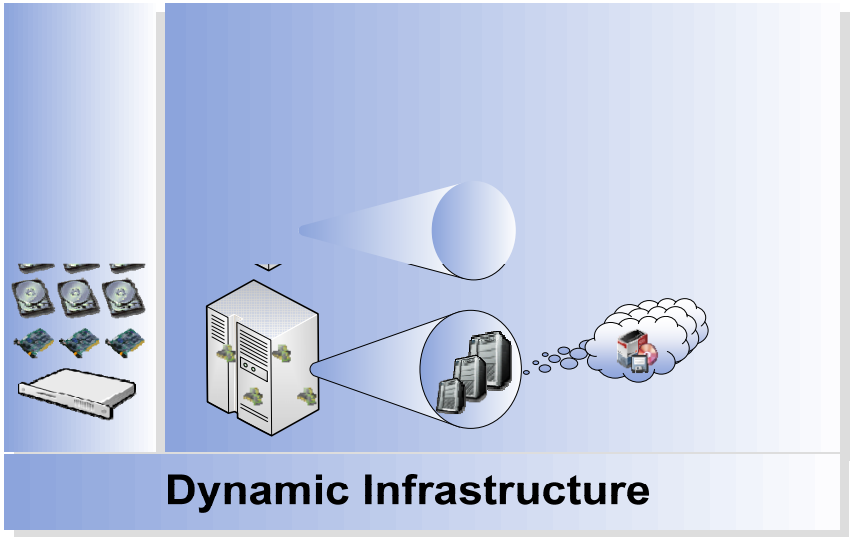
DB2 Connect Clustering Using Windows Server NLB facility

- Relies on Network Load Balancing component of Windows Server OS
- Pros:
  - Large number of servers can be clustered (max 32)
  - All servers are active and doing DB2 Connect work
  - Work balanced across cluster
  - No need to purchase any extra software or hardware
- Cons:
  - Reduced capacity during outages
  - No support for DB2 Connect servers that require persistent local data store (eg. Federation, Mobility on Demand etc.)
  - DB2 Connect server must be on Windows



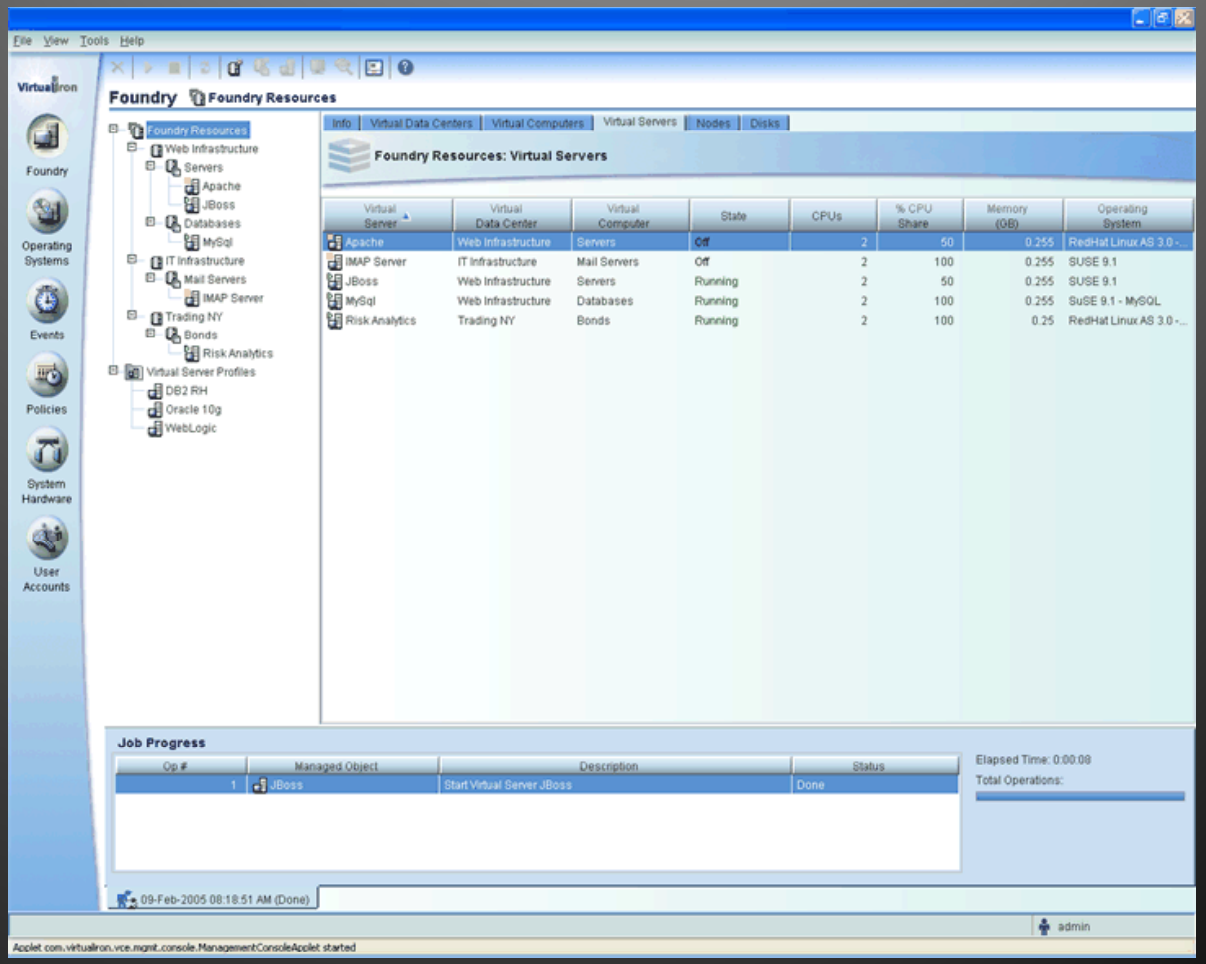
DB2 Connect Clustering Using Virtual Iron VFe for Linux servers

- Build clusters from inexpensive Linux servers
- Add/remove capacity of the cluster on demand
  - Share cluster resources with other uses (eg. WebSphere)
- Mix and match hardware in the cluster
- Easy to use administration interface
- Single system view allows for DB2 Connect servers that require persistent local data store (eg. Federation, Mobility on Demand etc.)

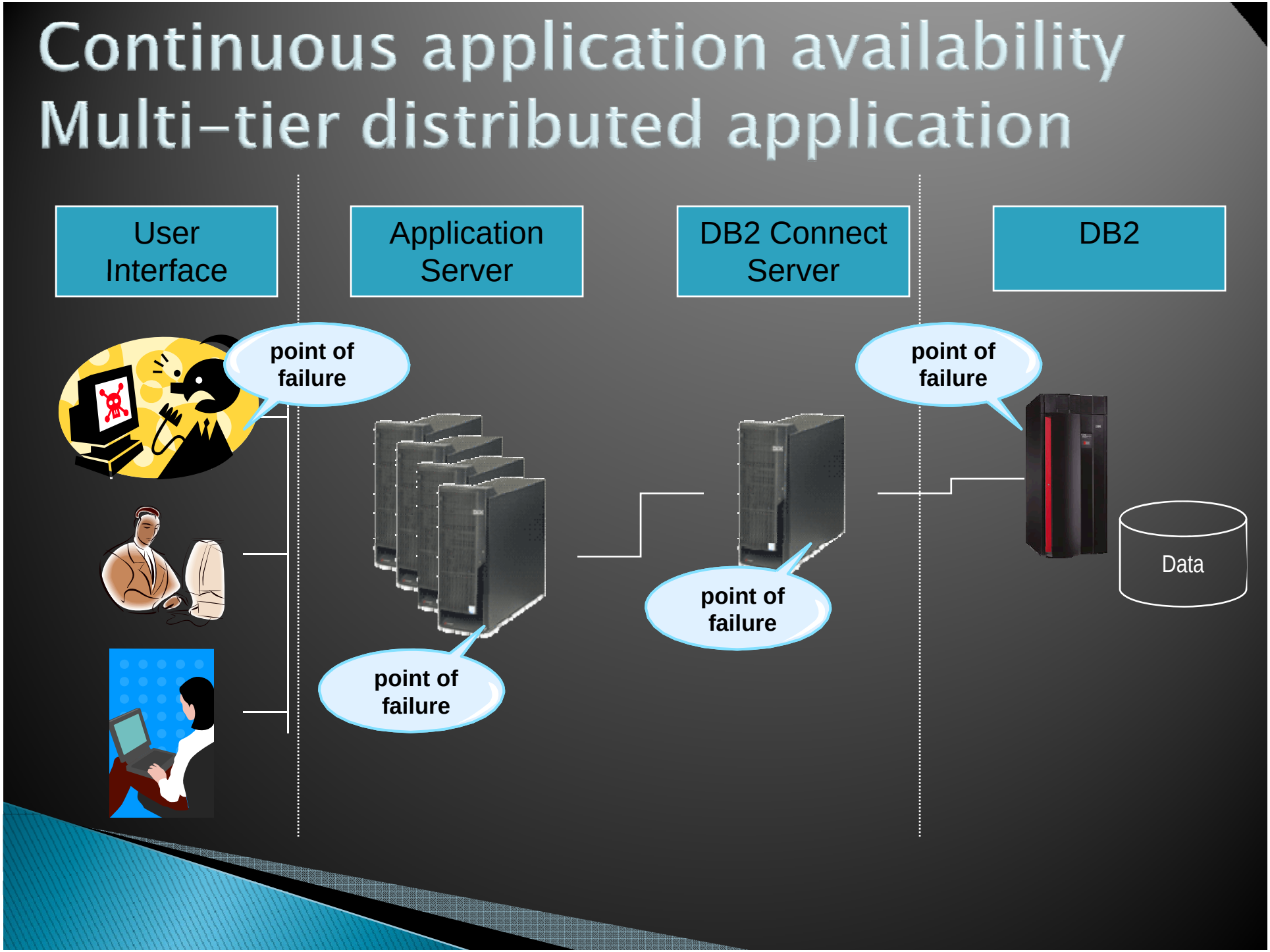


Virtual Iron VFe for Linux

- Centrally manage virtual computers and physical servers as a single resource pool
- Interchangeable resources
- Self-configurable, with auto discovery & provisioning
- Policy-based Management & Automation
- Manage your datacenter with the click of a mouse

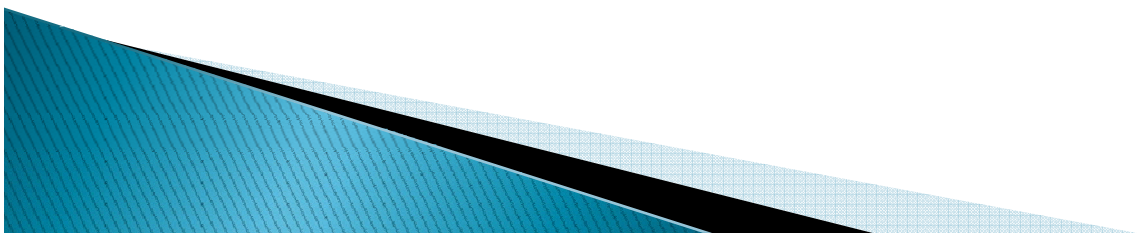


Continuous application availability
Multi-tier distributed application

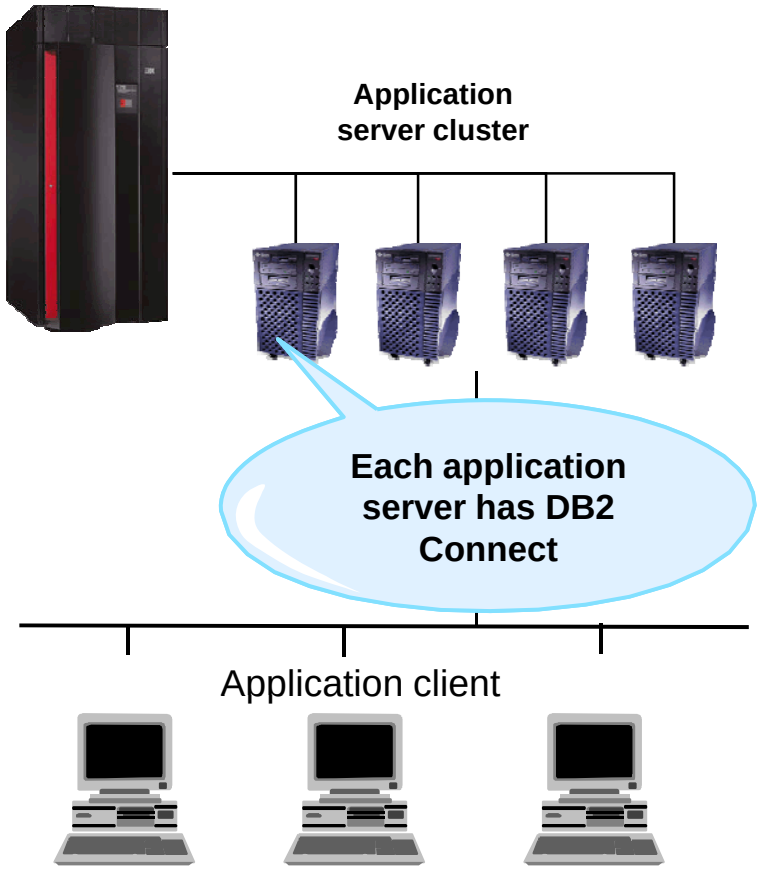


Dealing with failures
3-tier distributed application

- Database (DB2 for z/OS)
  - Same as in 2-tier
- DB2 Connect. Two options:
  - Application Servers and DB2 Connect on separate servers
    - Same considerations and solutions as in 2-tier
  - Co-locate DB2 Connect with application servers
    - Each application server has their own DB2 connectivity i.e. failure of one or more server does not affect application availability
    - Reuses infrastructure that is already in place for application server clustering



Co-locating DB2 Connect and Application Server



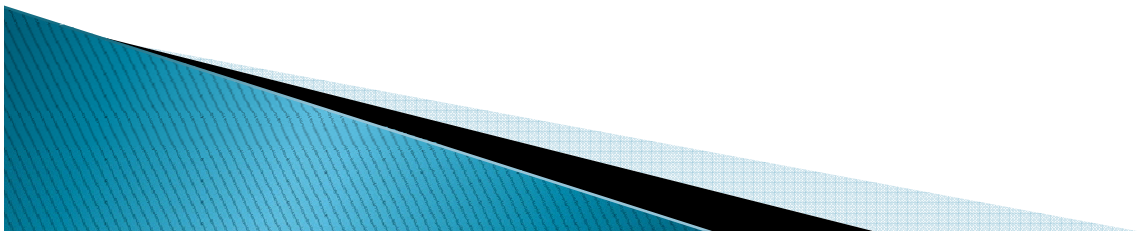
- Each application server has its own copy of DB2 Connect
- No difference in DB2 Connect license cost
- DB2 Connect resources usage on each server are marginal
- To exploit DB2 Connect server function set DB2CONNECT_IN_APP_PROCESS=NO

Minimizing impact on mainframe resources

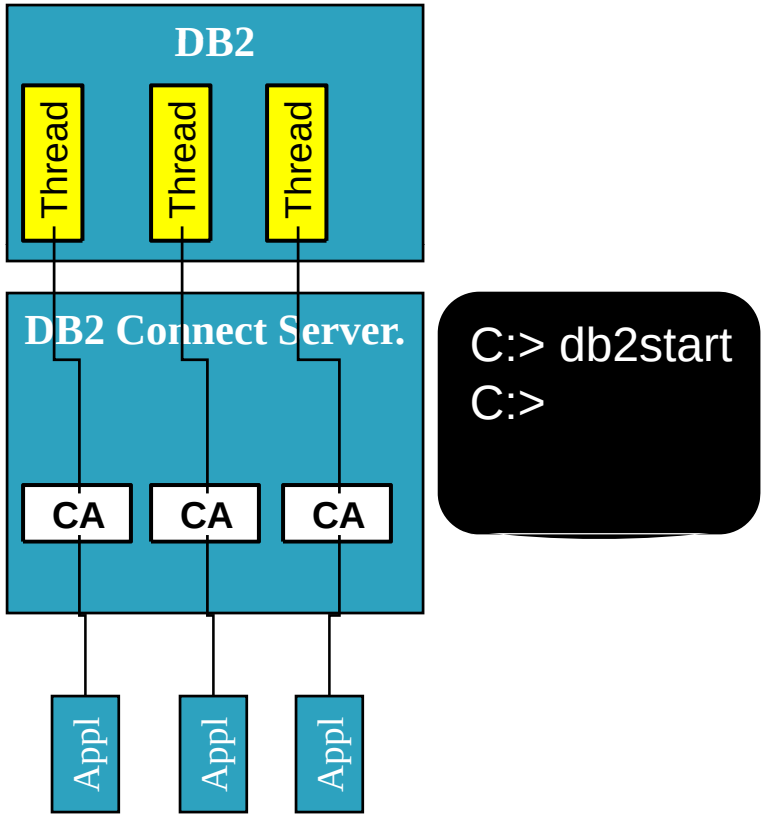
A look at how to deploy DB2 Connect to minimize use of mainframe CPU, storage and other resources.

DB2 Connect Exploiting DRDA (DDF) Advantages

- DDF is built on Enclave SRB architecture i.e. much more scalable than TCB-based approaches
- DDF avoids checking SQLDA data types after prepare (around 20 instructions/column)
- DDF address space uses key 7 for move instructions instead of key 8. Cost depends on number of bytes being moved but it is typically around 1/10th of the key 8 cost
- DB2 for z/OS V8 moved the DRDA data stream generation into the DBM1 address space, so there is no switching from DDF to DBM1 on each FETCH (saves 3K instructions/FETCH)

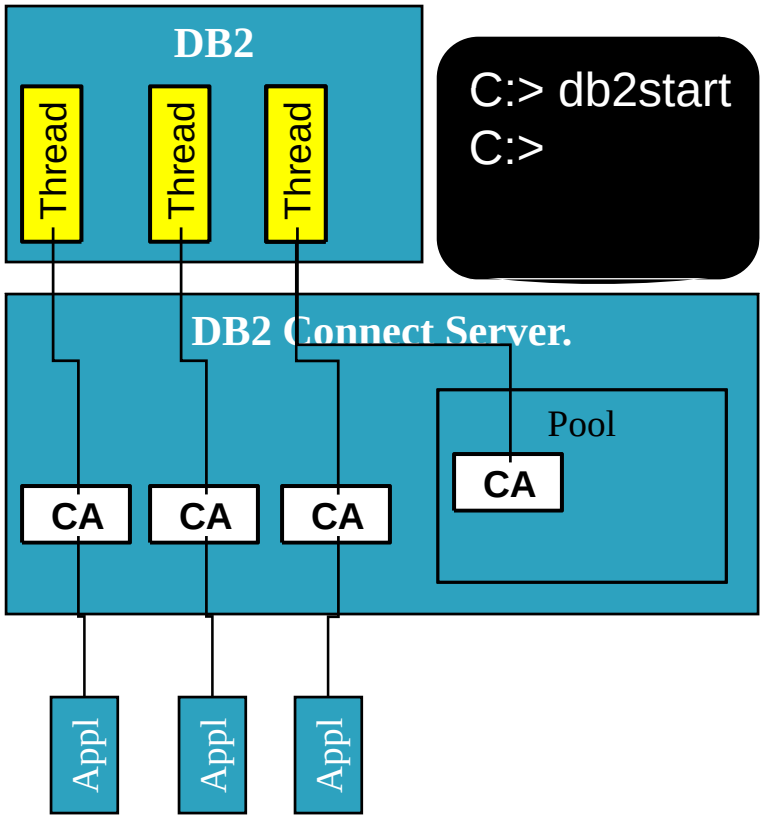


DB2 Connect Server
Basic Architecture Overview



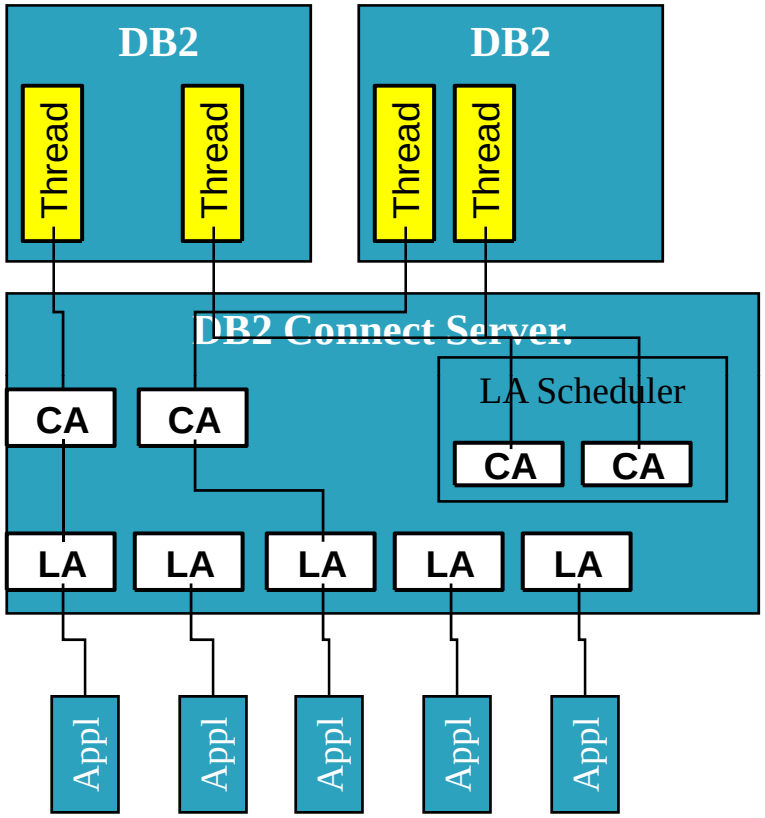
- db2start starts instance
- Multiple instances/machine
- 1-1-1 relationship between applications, coordinating agents and DB2 threads
- Capacity of the server is determined by the MAXAGENTS (64K)
- LIST DCS APPLICATIONS display info for all agents

DB2 Connect Server Connection Pooling Overview



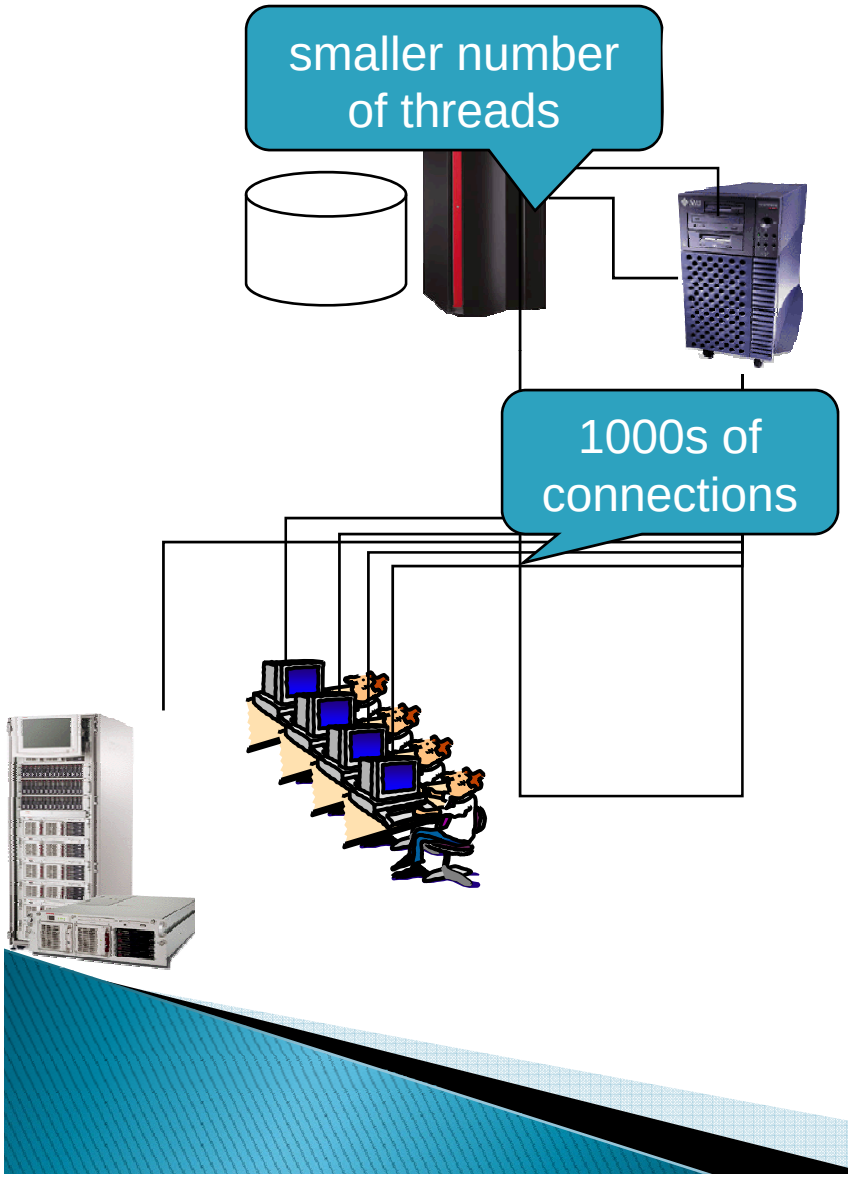
- 1-1-1 relationship between applications, coordinating agents and DB2 threads
- Initial pool size is controlled by NUM_INITAGENTS
- Max pool size is controlled by NUM_POOLAGENTS
- CA and corresponding connection returned to the pool on disconnect

DB2 Connect Server Connection Concentrator



- N-1 relationship between applications and threads
- CA and corresponding connection returned to the pool on commit/rollback
- Connection concentrator is activated when MAX_LOCICAGENTS > MAX_COORDAGENTS
- Initial pool size is controlled by NUM_INITAGENTS

Connection Concentrator Reduce z/OS resource usage



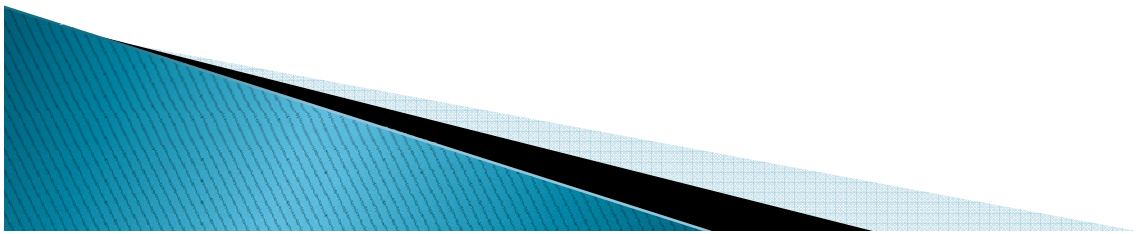
- Connection Concentrator reduces number of DB2 threads
- Saving a thread saves:
  - Active: 250K
  - Inactive:7K
- You decide how many threads to keep around by setting DB2 Connect parameter MAX_COORDAGENTS
- There is a cost (special registers and user id switching)

Access more then just DB2 data

A look at how to use DB2 Connect to broaden access to additional data sources.

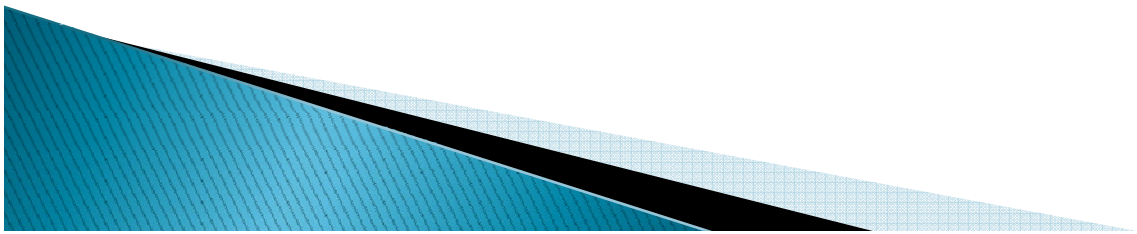
Types of data you can combine with your DB2 for z/OS data

- Other DB2 for z/OS subsystems
- DB2 Family servers:
  - DB2 UDB on UNIX, Windows, Linux
  - DB2 Server for VM and VSE
  - DB2 for iSeries servers
- Mainframe non-relational data (CICS, IMS, VSAM, MQ etc.)
- Non-DB2 relational databases: Oracle, Sybase, Microsoft, Informix
- Other non-relational data (e.g. XML, MQ etc.)

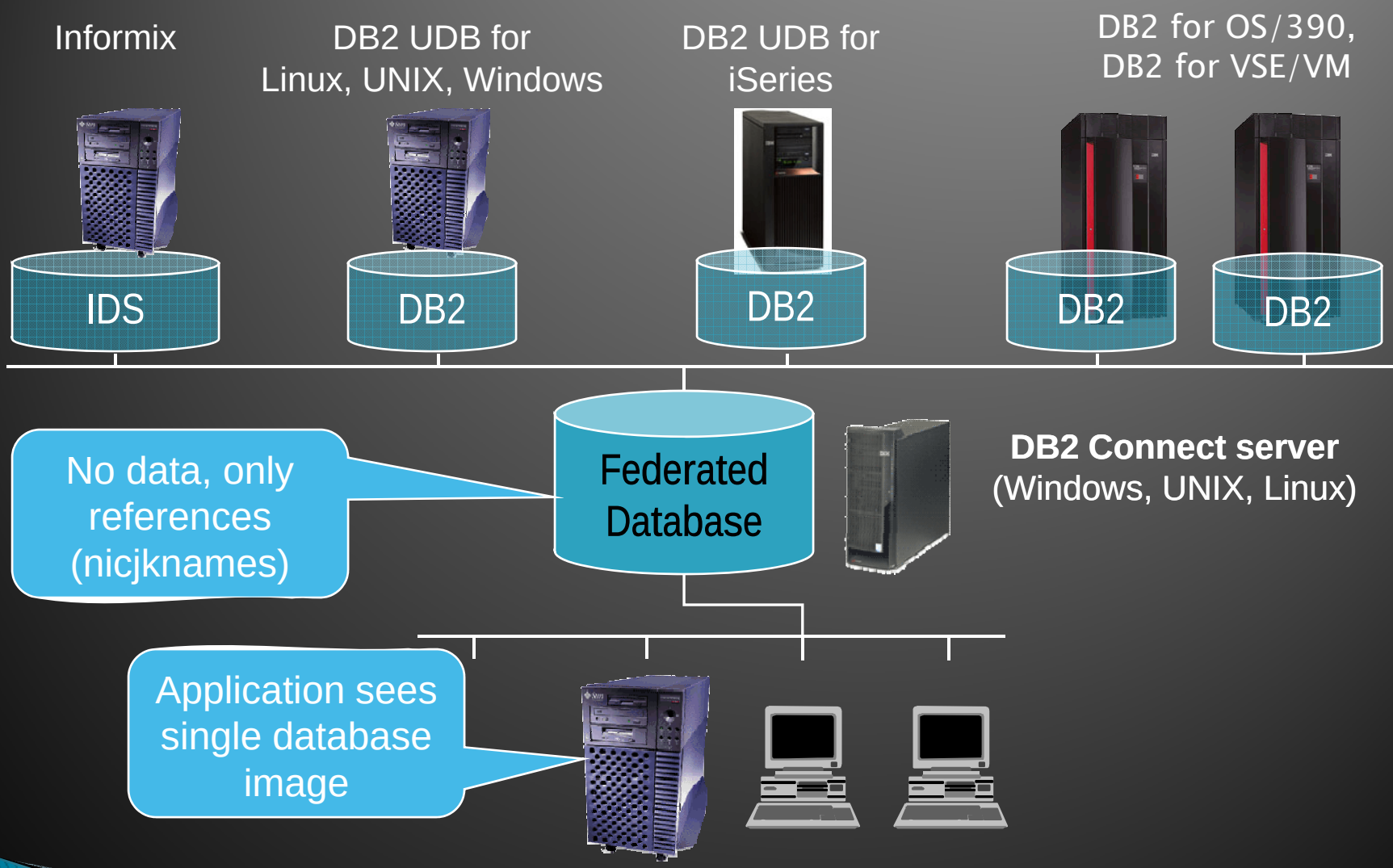


Methods for accessing non-DB2 data through DB2 Connect

- **Federation**
  - Create federated database on a DB2 Connect server and point application to this database
  - Use WebSphere Information Integrator to extend a range of available data sources
- **Stored Procedures**
  - DB2 for z/OS SPs are programs written in 3GL languages (C, C++, Java, Procedural SQL, COBOL). You can access any data source accessible from these languages
- **SQL Functions**
  - OLE DB
  - MQ
  - Web Services
  - XML

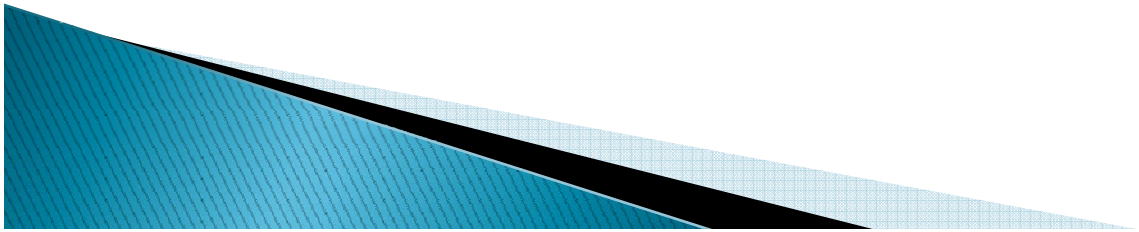


DB2 Connect Federation

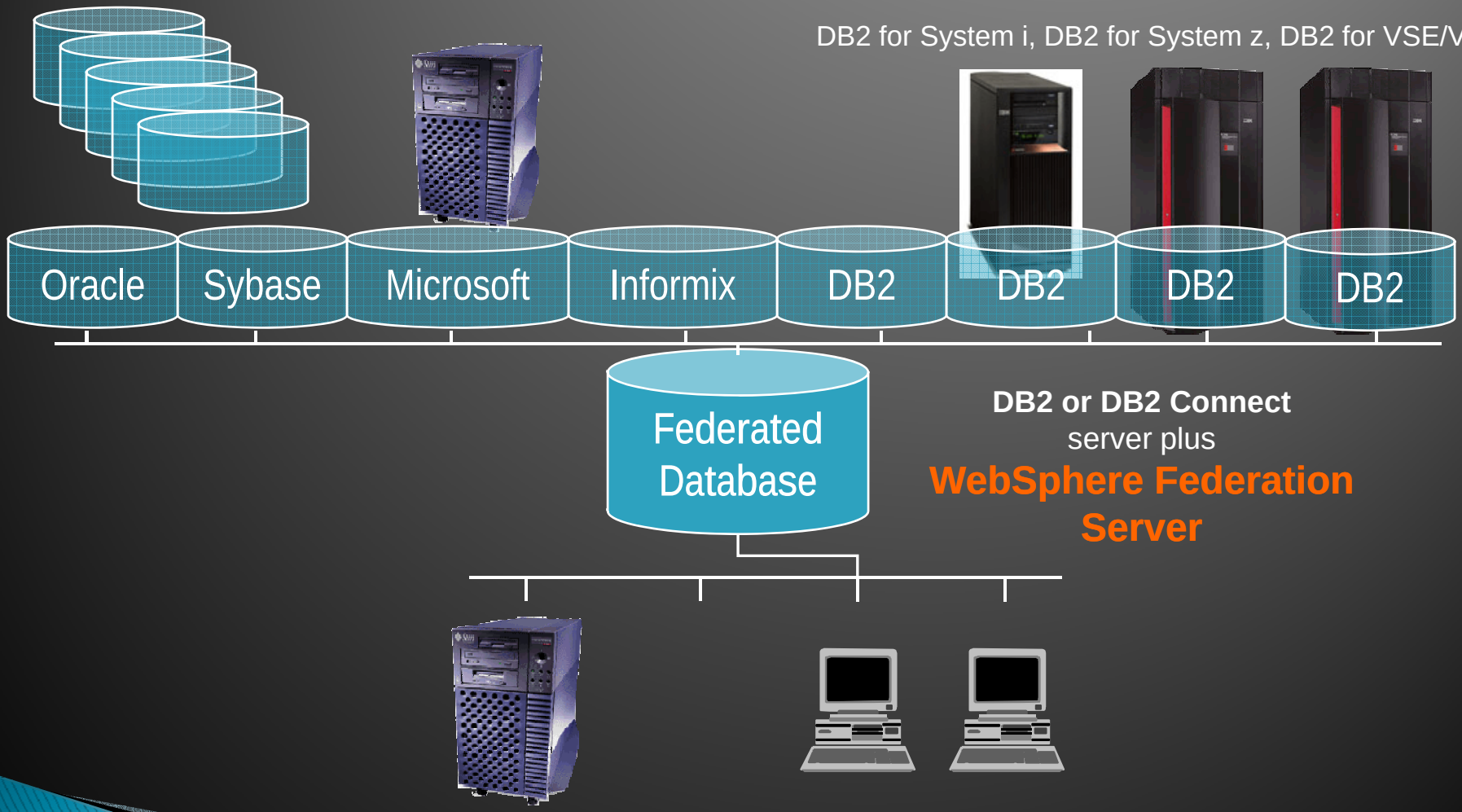


DB2 Connect
Value of Federation

- Application programmer works with a single database image and is unaware of the physical database location.
  - `CONNECT TO DB1` where `DB1` is an alias for the federated database.
- Programmer is able to join data from multiple locations as if the data was in a single database:
  - `SELECT * FROM T1, T2` where `T1` and `T2` are in different databases potentially on different servers.
- Data architect has complete freedom to change data placement strategies without impacting the application.



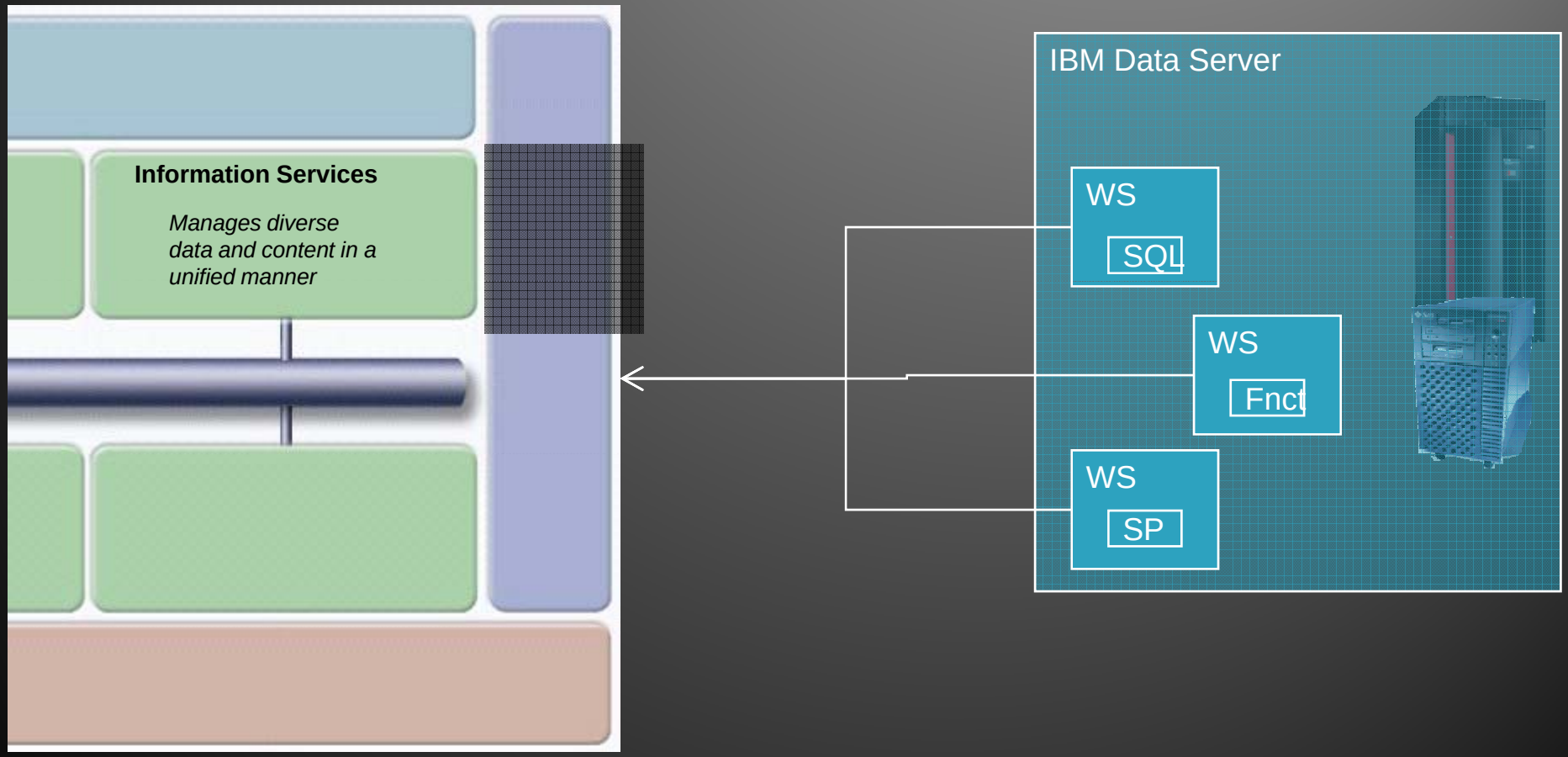
Broaden the choice of data sources



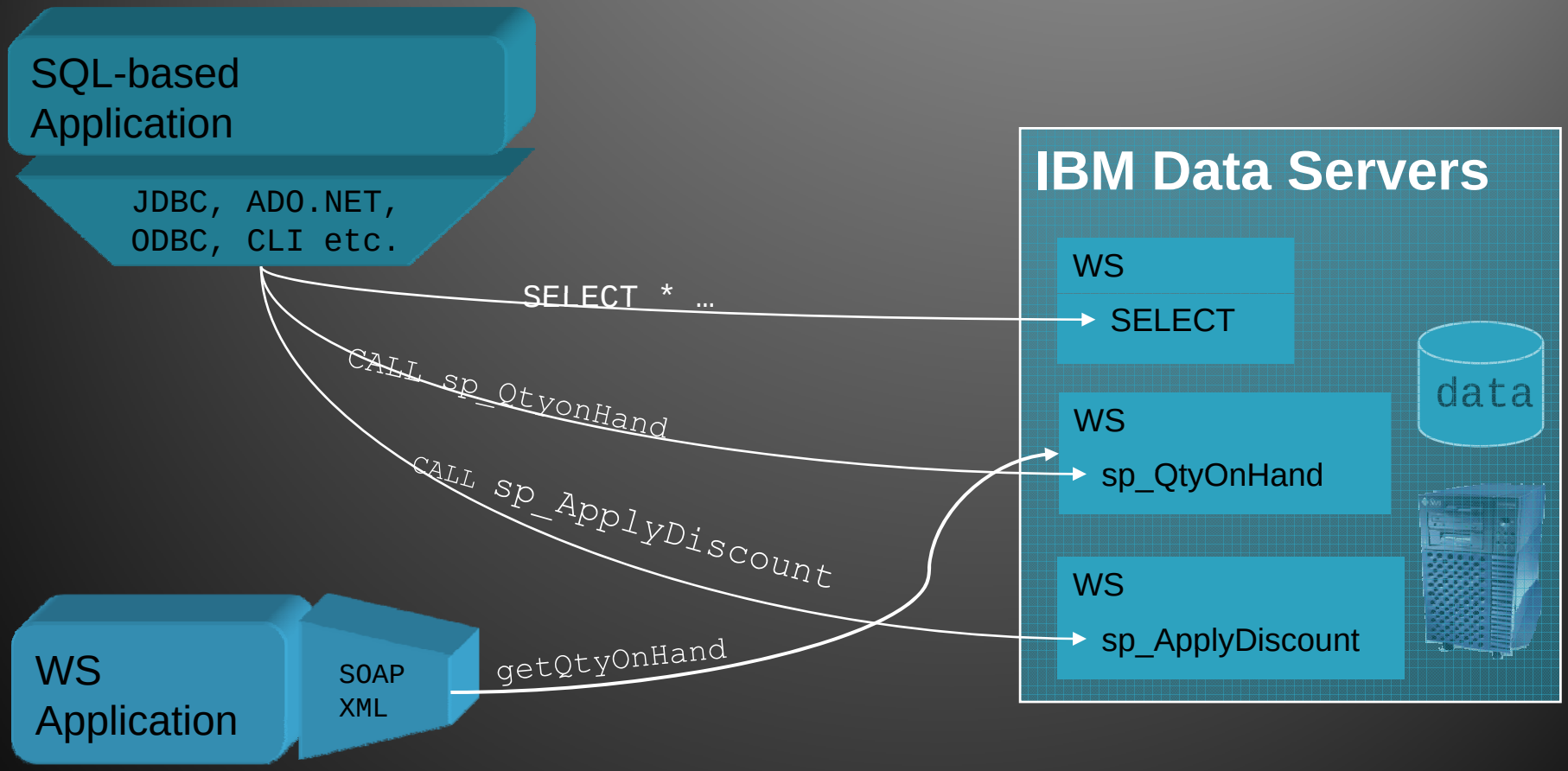
Make your DB2 for z/OS speak SOA architecture and Web Services

Enabling access to DB2 for z/OS via industry standard Web Services.

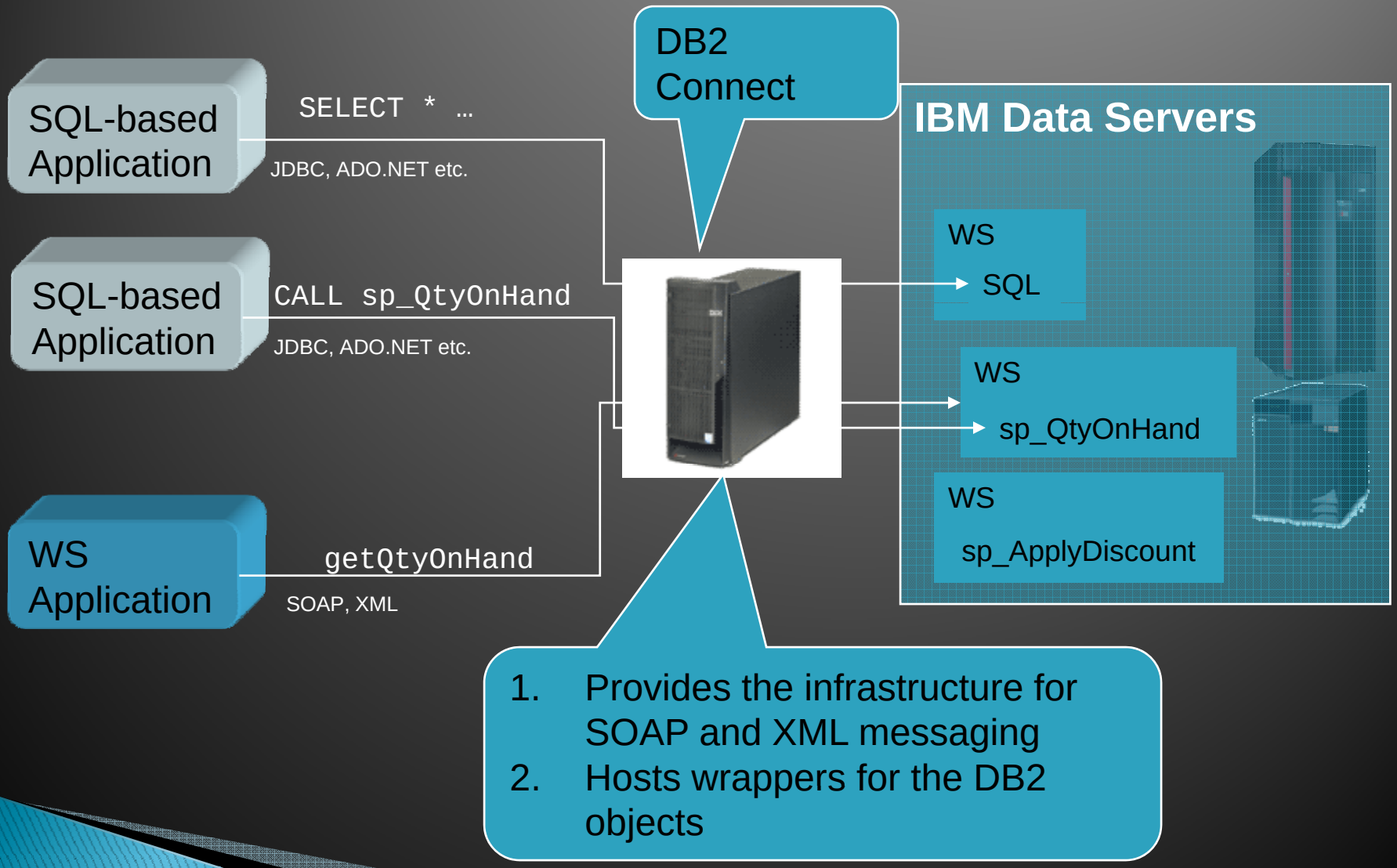
Information as a Service
Exposing IBM Data Server Objects as Services rather then data



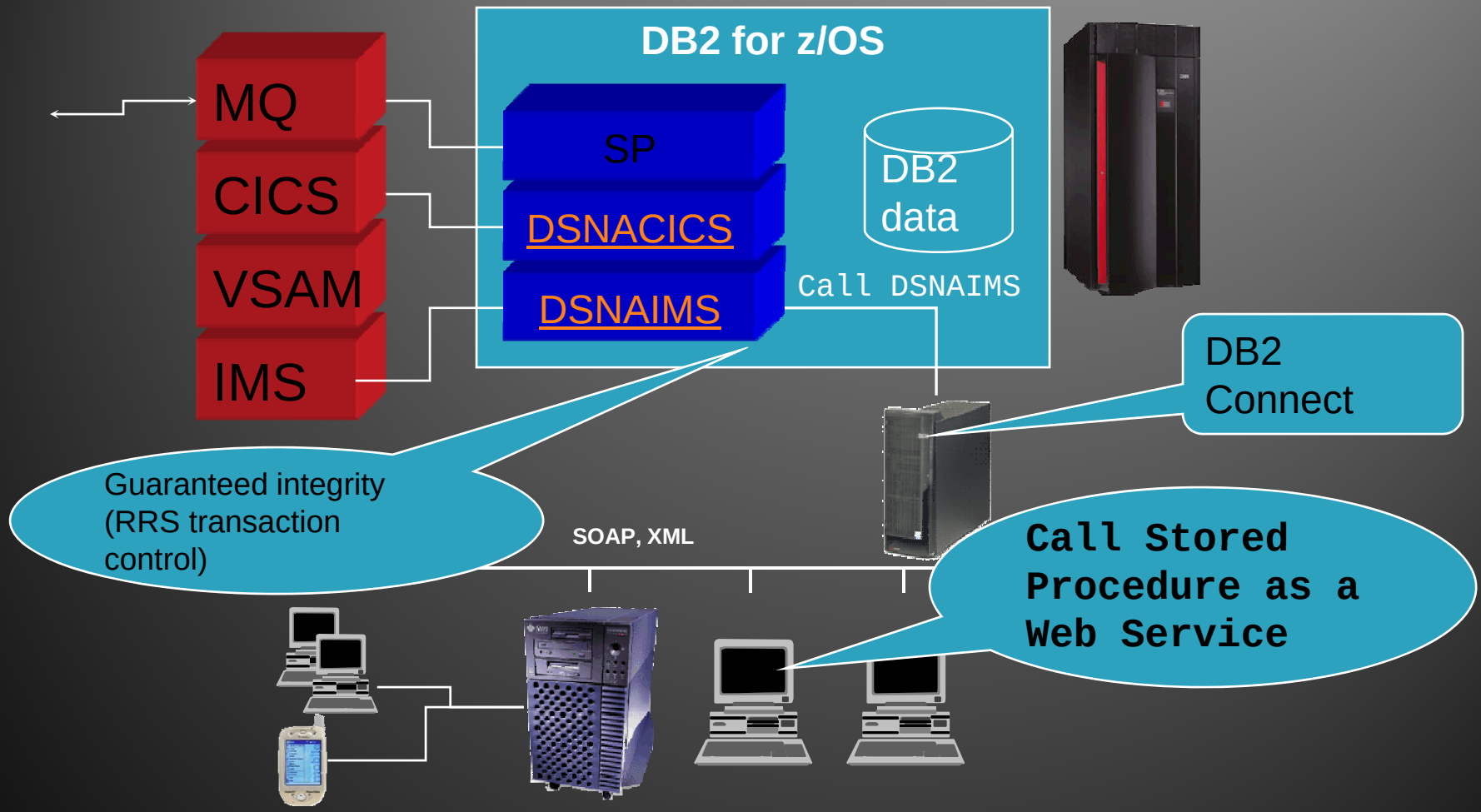
Information as a Service
Exposing IBM Data Servers objects as Web Services



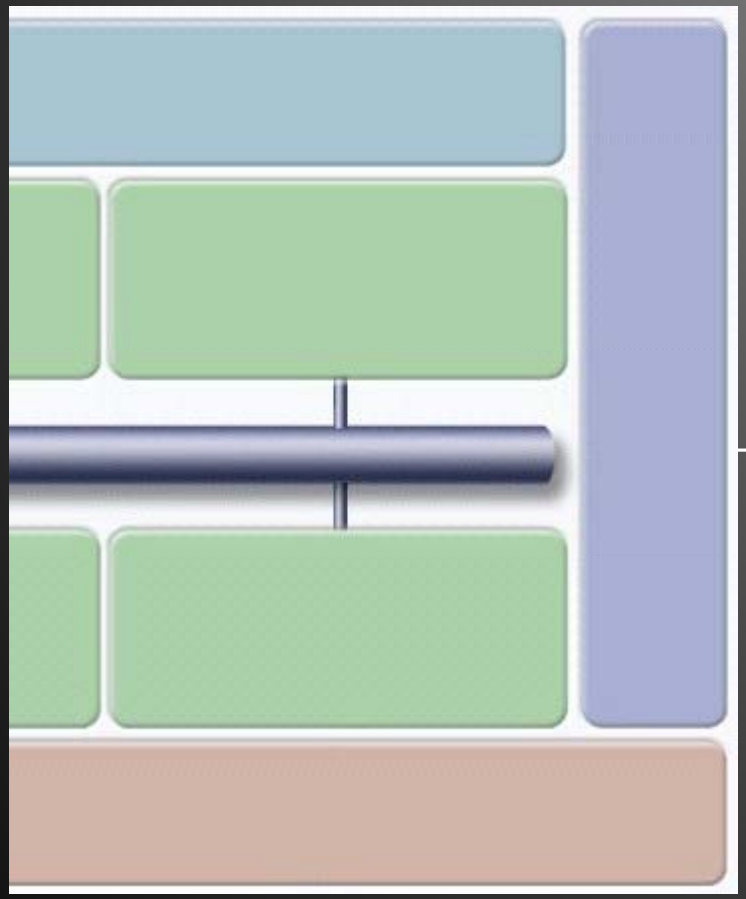
Exposing IBM Data Server Objects as Web Services
This applies to System z and Series I DB2

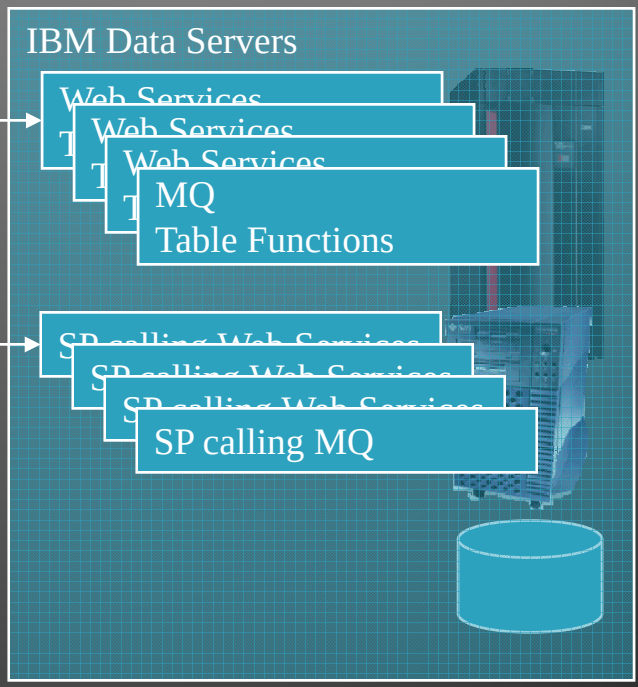


SOA Enable mainframe non-DB2 data

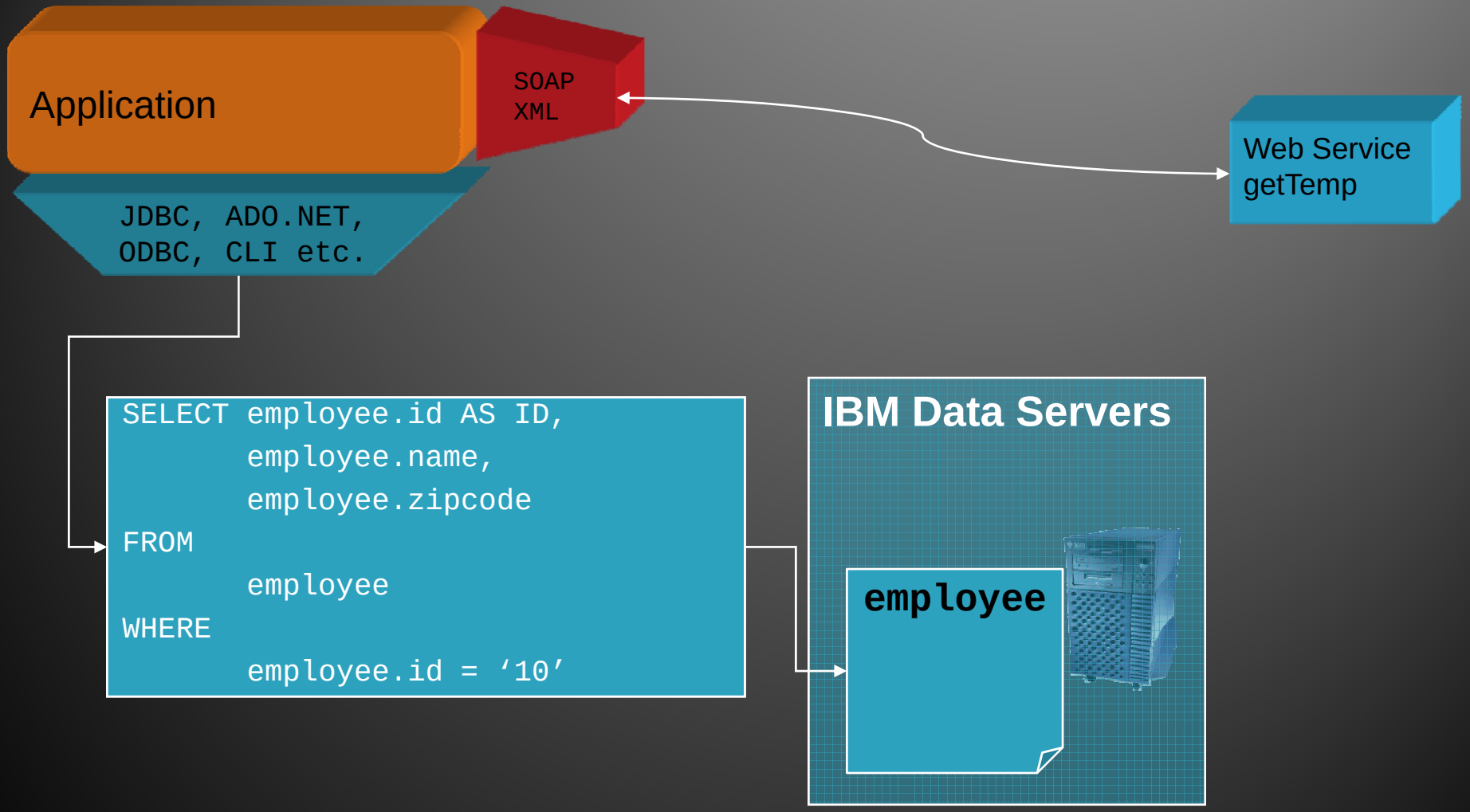


Information as a Service
Consuming Web Services to get real time data

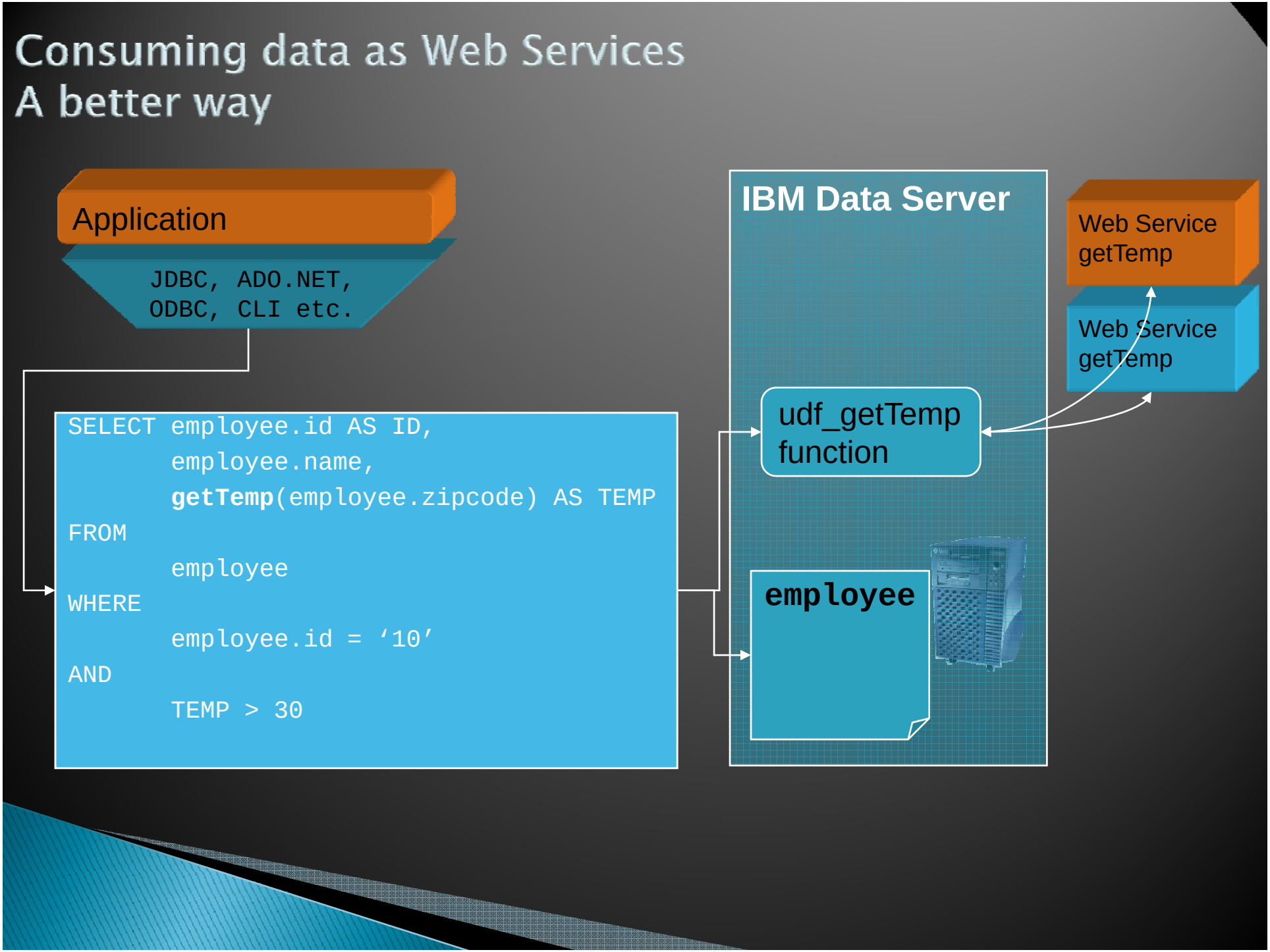




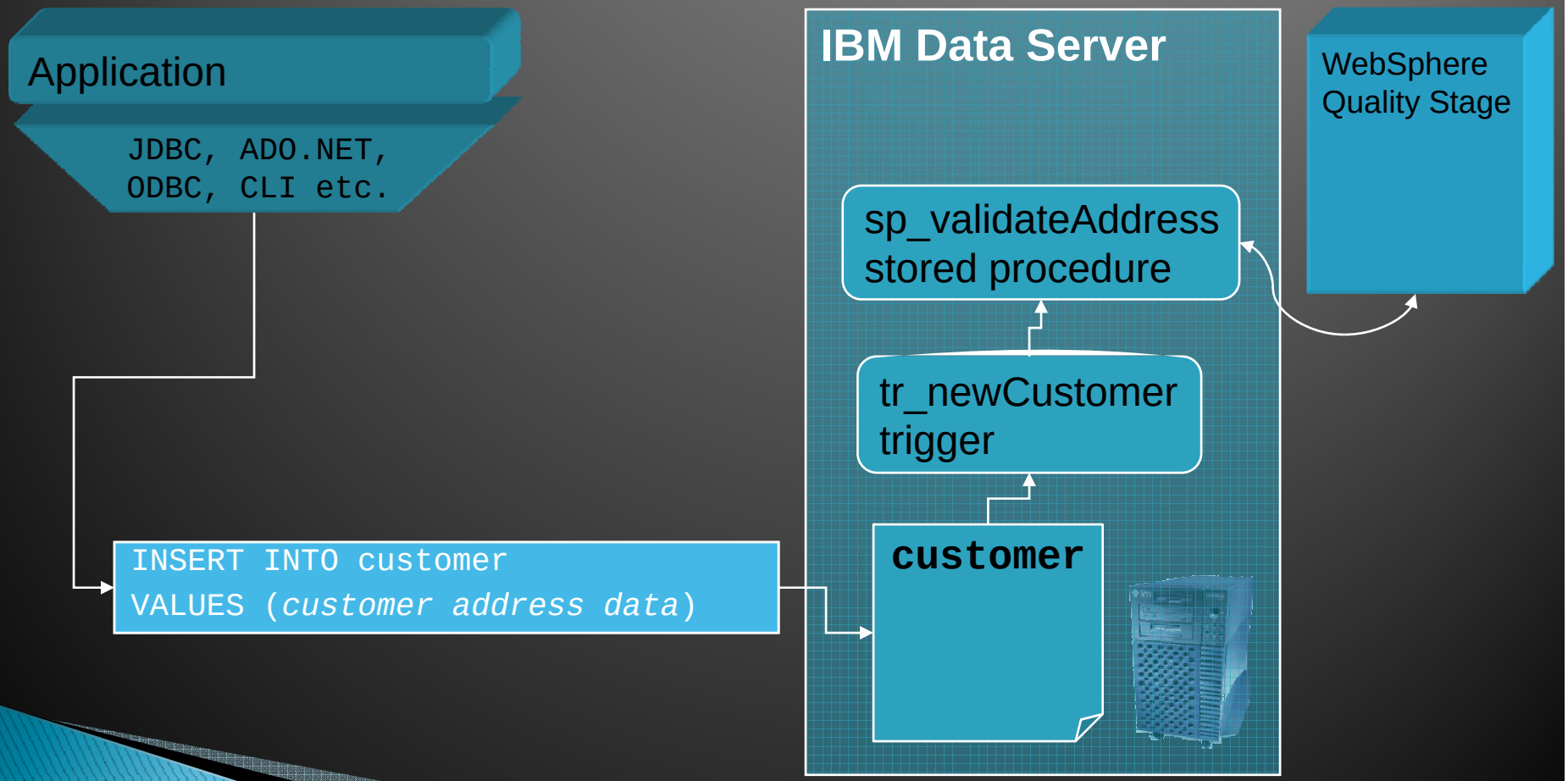
Consuming data from Web Services



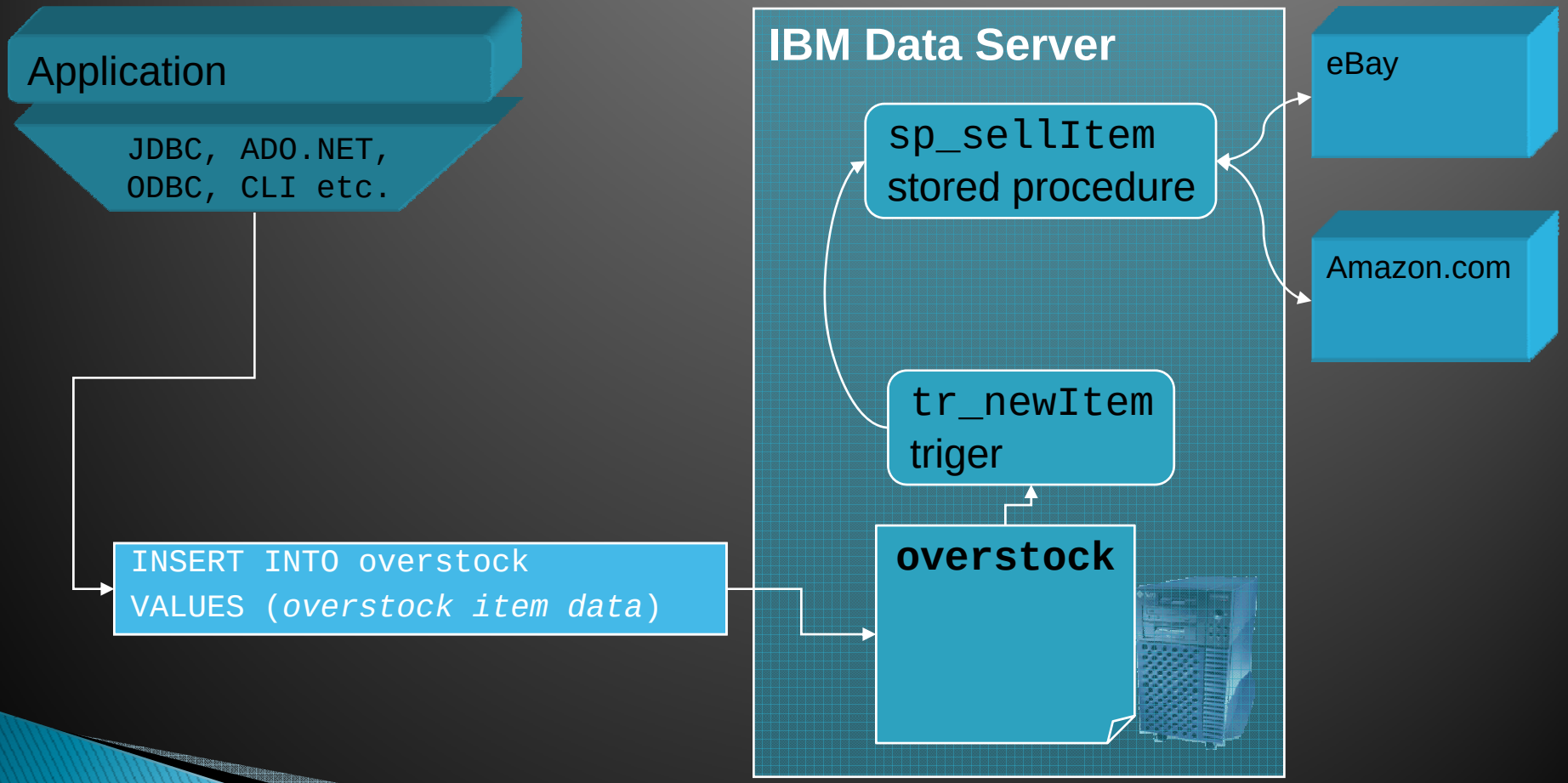
Consuming data as Web Services
A better way



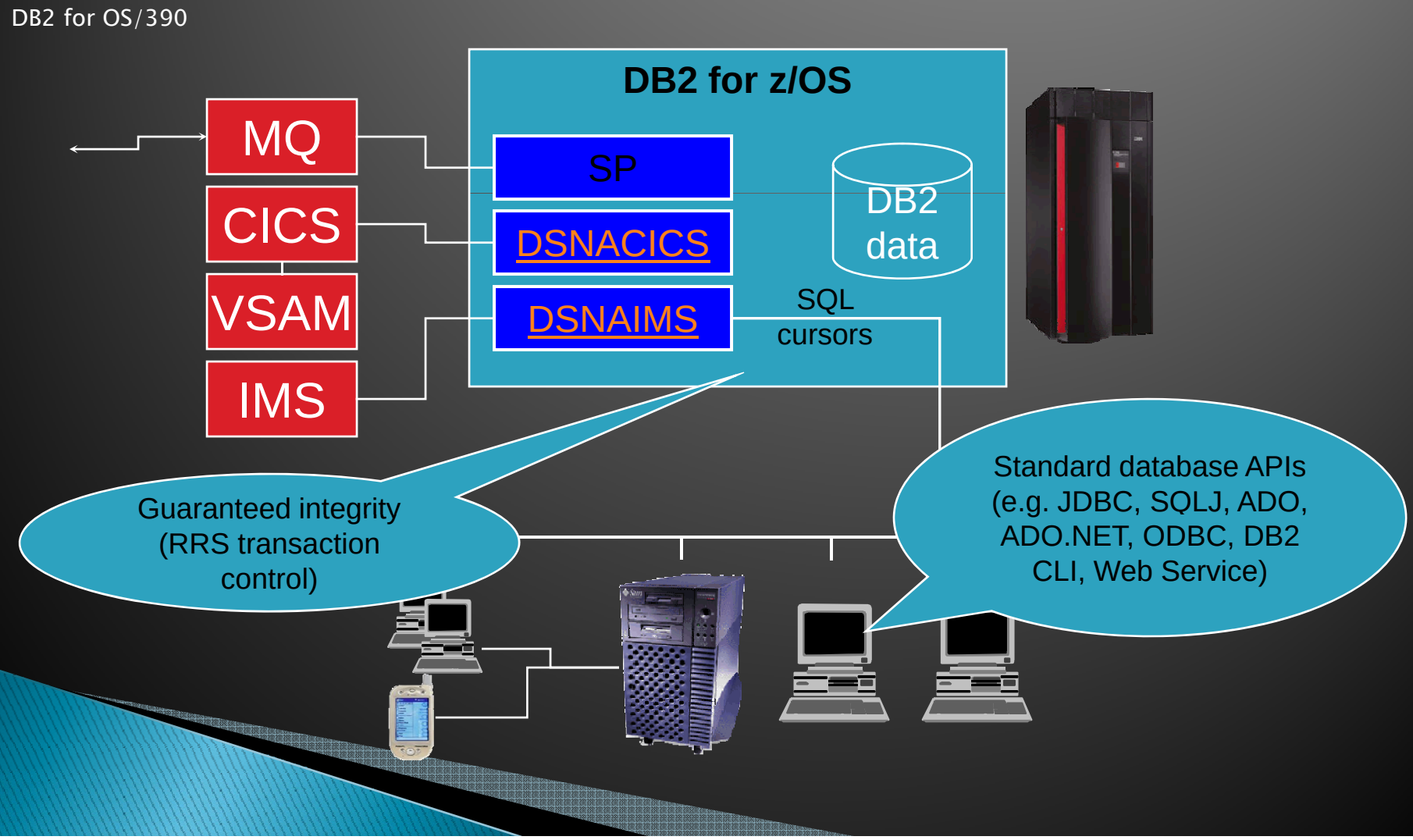
Examples …
Verify addresses in real time



Examples …
Develop new sales channel

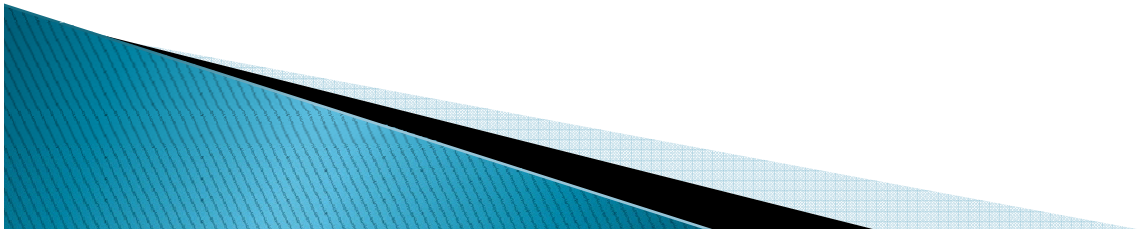


DB2 Stored Procedures to access to non-DB2 Mainframe Data/Apps



Web Services Summary

- Encapsulate discrete pieces of business logic
- Implementation is language/technology neutral
- SOAP and XML used for data encoding
- Used with HTTP or with other transports
- No problems associated with DCOM and RMI
- Provides an excellent structure for both B2B and intranet application integration
- DB2 industry leading support for Web Services:
  - Present Stored Procedures, SQL statements as Web Services
  - Given WSDL (Web Service Description Language) DB2 can generate servers side logic (SP, UDF) to implement required service
- Offer 2 deployment models:
  - Using DB2 Embedded Application Server
  - Using Microsoft IIS and .NET architecture



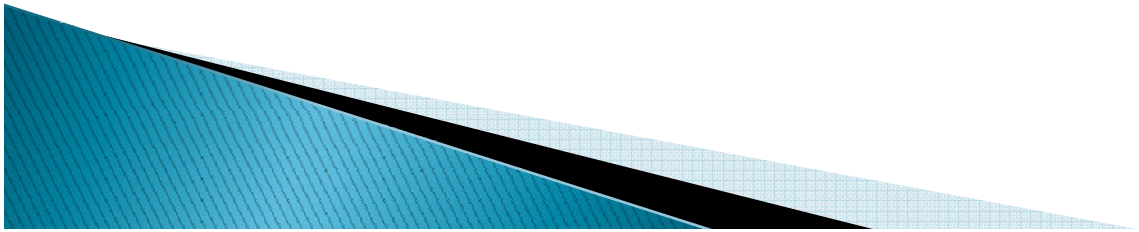
Extending DB2 for z/OS data and applications to mobile devices

Making dinosaurs play with cool gadgets.

Types of mobile applications

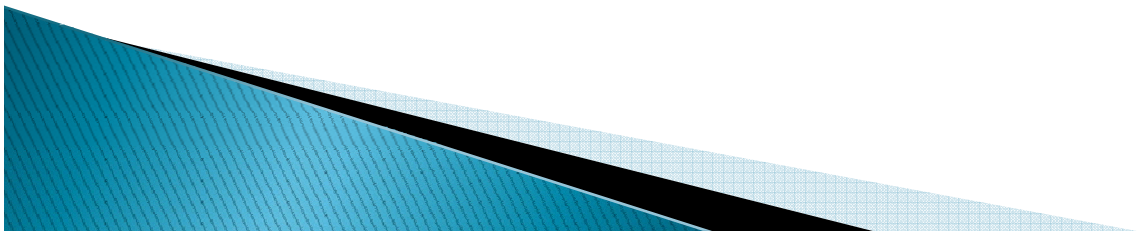
- Occasionally connected:
  - Device has local data store for data to be used in the application
  - Connectivity to DB2 for z/OS is infrequent (eg. once a day)
  - Connectivity may take form of sync process once the device is in a cradle or within range of available communication infrastructure (eg. WiFi, cellular etc.)

- Always connected:
  - Device is network enabled and within range of network infrastructure (eg. WiFi, cellular etc.)
  - Device can be:
    - simply a host for the application user interface. User interface created by an application server such as WebSphere Application Server or Microsoft IIS
    - Have local business logic that obtains data from DB2 for z/OS via SQL or Web Services



DB2 Mobility on Demand

- **DB2 database for mobile and embedded platforms**
  - Very small: ~200KB on the device
  - Rich relational capabilities – SQL92/99 compliant subset
  - Per table data encryption
  - Extensive device support
  - Easy Application: .Net, C/C++, VB, Java
- **Synchronization Server:**
  - Multi-platform: Windows, Linux, AIX, Solaris
  - Multi-data source: DB2 Family, MS SQL Server, Oracle, Informix, Sybase, Domino DB



Broad Platform Support

- Pocket PC 2000/2002, Windows Mobile 2003
- Windows CE 2.11/3.0, WinCE .Net 4.2
- Windows 95/98/ME/NT/2K/XP/Tablet/Media/Embedded
- Palm OS 3.5+, Palm OS 5.0+
- Symbian V6+
- Linux
- QNX Neutrino
- Sync client for J2ME/RIM
- DB2 Everyplace Sync Server Platforms
  - Windows NT/2000/XP/2003
  - AIX
  - Linux and Solaris

- Replication data sources
  - DB2 UDB for Windows, Linux, UNIX, OS/390 & zSeries, and AS/400 & iSeries
  - Oracle, Microsoft SQL Server, Informix, Sybase, Other JDBC-based sources, and Domino Databases

DB2 Mobility on Demand and .NET

App

ADO.NET

DB2e .NET Data Provider
IBM.Data.DB2.DB2e.CF

DB2e

http

DB2e Sync Server

Oracle

SQLServer

Other

DB2

App

ADO.NET

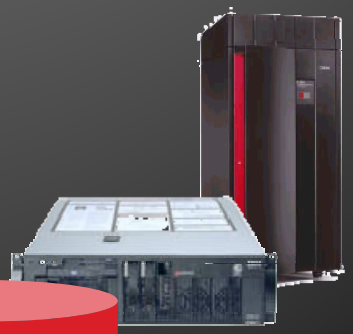
DB2e .NET Data Provider
IBM.Data.DB2.DB2e.CF

DB2e

Call
SP

DB2e Sync Server

DB2

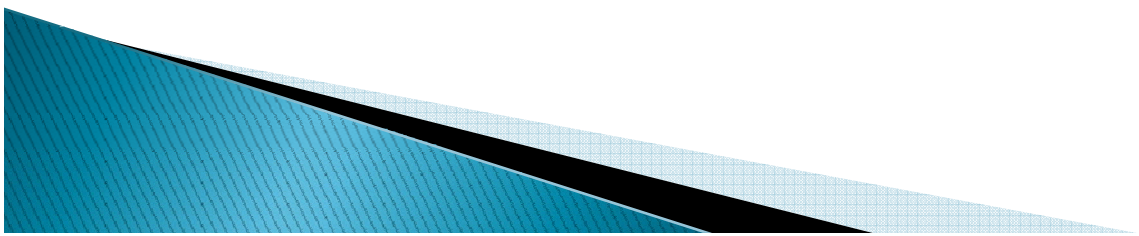


Deploying DB2 Connect solutions

Key considerations when going to large scale production

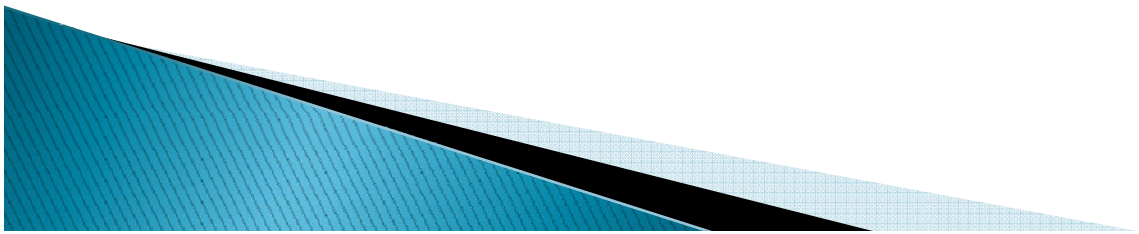
Rolling out DB2 Connect infrastructure

- Deciding on DB2 Connect server platforms
  - Windows vs UNIX vs zLinux
- Distributing application enabling code i.e. drivers:
  - JDBC Type 4
  - Run-Time Client Light



Planning for DB2 Connect Server Hardware Platform Dilemmas

- Choices:
  - Windows
  - UNIX: AIX, HP-UX, SUN 32 and 64-bit
  - Linux Intel and AMD
  - Linux on zSeries
- Questions:
  - Is UNIX better than Windows?
  - Is 64-bit good?
  - Is Linux on zSeries a good idea?
  - How much memory should I plan for?
  - What should we spend money on and what is not worth it?



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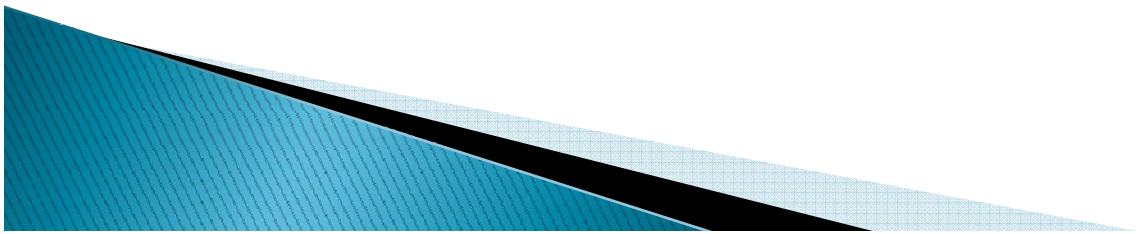


DB2 Connect Server Planning Choosing UNIX vs. Windows

UNIX

- Not necessarily faster than Windows
- Better balanced system
- Great vertical scalability (big SMPs)
- Good TCP/IP
- Not cheap

Windows

- Good CPU performance
- Scalability is getting better but UNIX is better. Horizontal scalability (more boxes) is the solution
- Commodity hardware
- Not so great TCP/IP

DB2 Connect Server Planning Choosing LINUX vs. Windows

LINUX

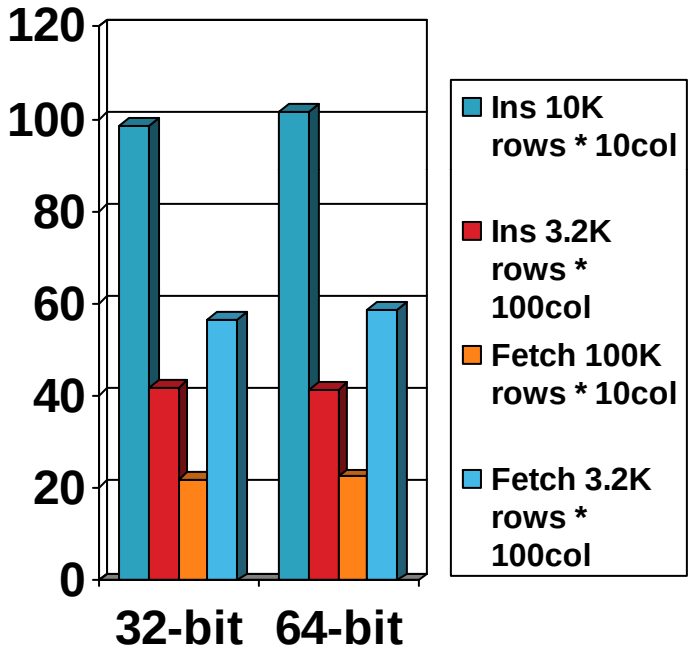
- Same commodity hardware
- Significantly lower OS cost
- Not great vertical scalability (4 CPU)
- Good TCP/IP
- Support and comfort level?

Windows

- Commodity hardware
- Expensive OS license
- More applications to share the box with
- TCP/IP not as good
- Bad reputation on security and cost of care and feeding

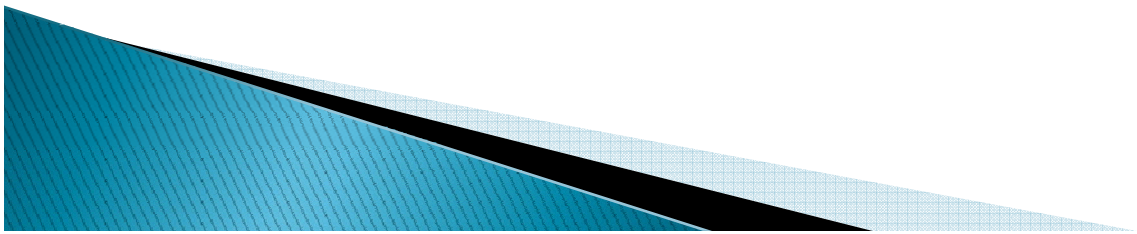
DB2 Connect Server Planning Choosing 32 vs. 64-bit

- DB2 Connect server is available in both 32 and 64-bit
- Can create 32 and 64-bit instances on the same machine
- Don't run 32-bit on Itanium 2 hardware
- Have not observed significant performance advantage on 64-bit
- 64-bit does deliver scalability benefits



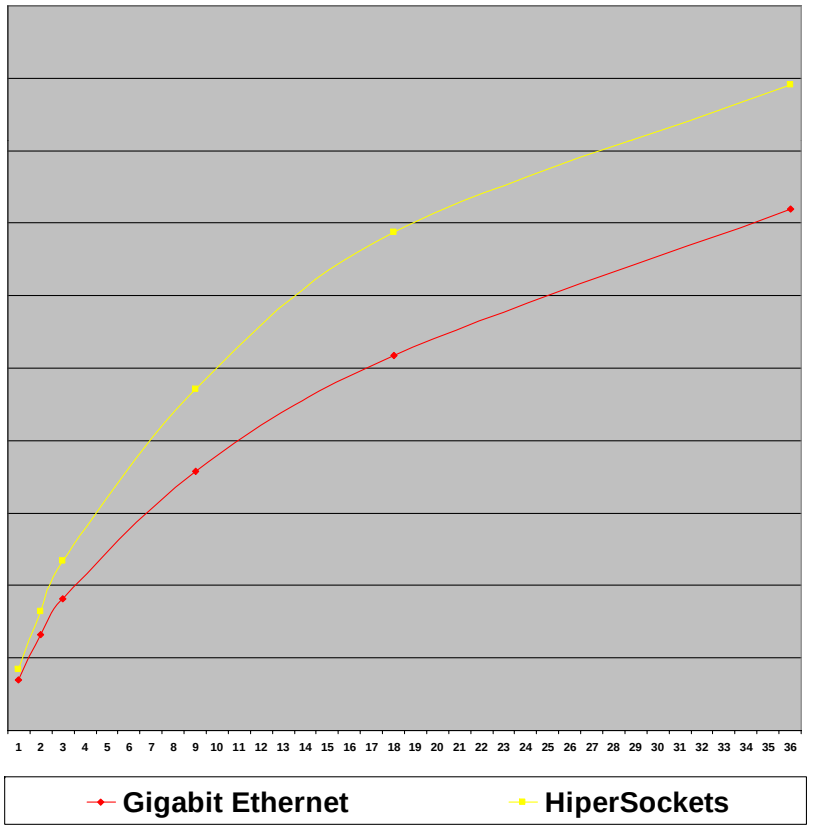
Planning for DB2 Connect Server Is Linux on zSeries a good idea?

- Runs on the same hardware as the DB2 itself.
- Very flexible:
  - Allocate unused capacity to DB2 Connect.
  - Easy to do capacity on demand.
- IFL hardware is significantly cheaper than z/OS CPUs
- HiperSockets are great: <1ms latency and very high throughput
- Good choice for server consolidation (especially older UNIX boxes) and when looking for flexible capacity allocations



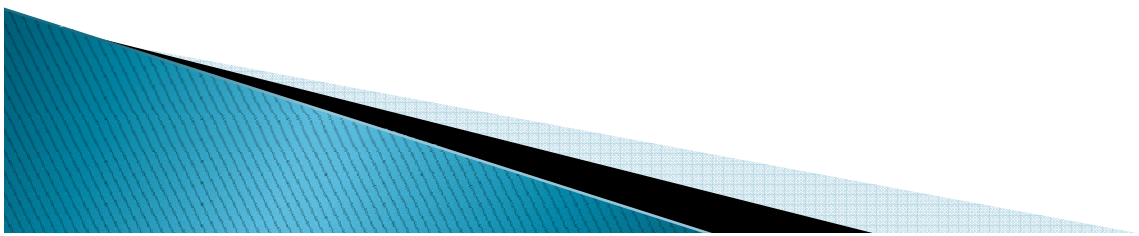
DB2 Connect Server on zLinux zSeries and HiperSockets

- In-memory TCP/IP
- Very low latency
- High throughput
- Reduces locking contention
- Good performance especially for latency sensitive workload



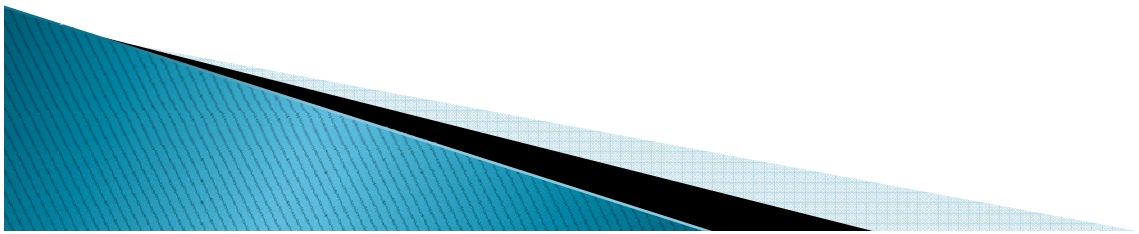
DB2 Connect Server Planning Criteria for Choosing Hardware

- Choose CPU by looking at SpecInt numbers
- Make sure that you have enough memory:
  - Windows: 250K per connection
  - UNIX: 750K per connection
- Strive for a balanced system (Intel servers)
- Take care of network connectivity:
  - Gigabit Ethernet is great and relatively inexpensive (watch out for latency issues on Windows)
  - 100BT Ethernet is inexpensive and extra capacity and fault tolerance can be gained by combining up to 4 adapters
  - Some adapters will off-load IPSec encryption to hardware
- Don't worry about anything else, it does not matter



DB2 Connect Planning
Check your network connection!

- **Simple tools:**
  - PING: simple response time measurement. Vary packet sizes (-l parameter)
  - TRACERT: tells you about network hops
  - ROUTE PRINT: see how your TCP/IP routing table
- **Qcheck (free from http://www.ixiacom.com/products/performance_applications/pa_display.php?skey=pa_q_check)**
- **DB2PING command**
  - Like ping but helps you see both network + DDF time
- **Check that DDF has sufficient priority**



DB2 Connect
Getting More Value

- Greatly improve programmer productivity with provided Java, .NET, PHP and database object development tools
- Make DB2 for z/OS in to an enterprise database server for ADO.NET, ODBC, OLE DB, JDBC, SQLJ, DB2 CLI and Embedded SQL Applications
- Deliver continuous application availability
- Manage and balance the workload in a SYSPLEX
- Reduce mainframe resource consumption
- Provide transparent access via SQL and standard APIs to CICS, IMS, MQ, VSAM and other data sources
- Extend applications and data to mobile devices
- Make DB2 for z/OS participate in SOA architectures and enable it for Web Services