



IBM System p

AIX 6 Preview

Introducing AIX 6

*The Next Step in the
Evolution of UNIX*



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Introducing AIX 6

AIX 6 is **binary compatible*** with AIX 5L™
It is *named* to reflect unity with POWER6™



The POWER of SIX – AIX 6 and POWER6

- Workload Partitions
- Live Application Mobility
- Live Partition Mobility
- Storage Keys
- Hardware Decimal Floating-Point
- Dynamic Variable Page Size

AIX 6

POWER 6

IBM System p Innovation and
Advanced POWER™ Virtualization
Provide Unique Features for ISV and
Customer Exploitation

AIX 6: The Next Step in the Evolution of UNIX

Manageability

System Director for AIX

WPAR manageability

Integrated Filesystem Snapshot

Graphical Install

POWER6 and AIX 6 New Functionality

Feature	Licensed Via			Supported OS			Supported Hardware			GA Date*
	Firm Ware	APV	AIX V6.1	AIX V5.3	AIX V6.1	Linux	POWER4™	POWER5™	POWER6	
Dedicated processor sharing		✓		✓	✓	✓			✓	6/07
Hardware Decimal FP	✓			✓	✓	✓			✓	6/07
Integrated Virtual Ethernet	✓			✓	✓	✓			✓	6/07
Storage keys - application	✓			✓	✓				✓	6/07
Storage keys – kernel*			✓		✓				✓	4Q07
Live Partition Mobility*		✓		✓	✓	✓			✓	4Q07
Multiple virtual shared pools*		✓		✓	✓	✓			✓	4Q07
WPARs*			✓		✓		✓	✓	✓	4Q07
Live Application Mobility*			✓		✓		✓	✓	✓	4Q07

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AIX V6 New Features/Function

- **RBAC (Role Based Access Control)**
- **AIX Expert (additional hardening/functionality)**
- **WPAR Manager/Application Mobility**
- **Trusted AIX**
 - (labels -> TOP SECRET, CONFIDENTIAL, etc...)
 - More than likely aimed at Government installations
 - MLS (Multi-Level Security)

- **WPARs (Workload Partitions)**
- **Encrypted Filesystems (efs/efsenable)**
- **Trusted Execution (trustchk)**
- **File Permissions Manager (fpm)**
- **JFS2 Snapshots**
- **Systems Director for AIX**

Planned AIX Workload Partitions

Workload Partitions provide even more capability

Improved administrative efficiency by reducing the number of AIX images to maintain

Software partitioned system capacity

- Each Workload Partition obtains a regulated share of system resources
- Each Workload Partition can have unique network, filesystems and security

Two types of Workload Partitions

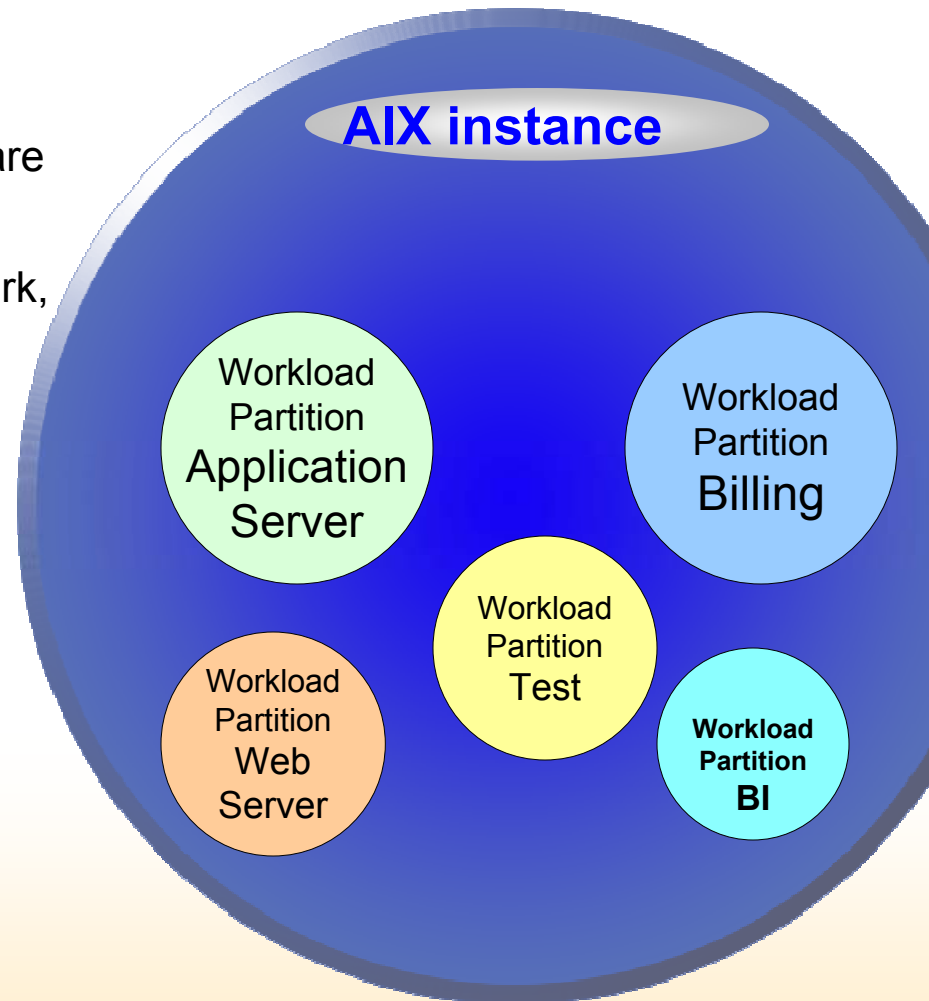
- System Partitions
- Application Partitions

Separate administrative control

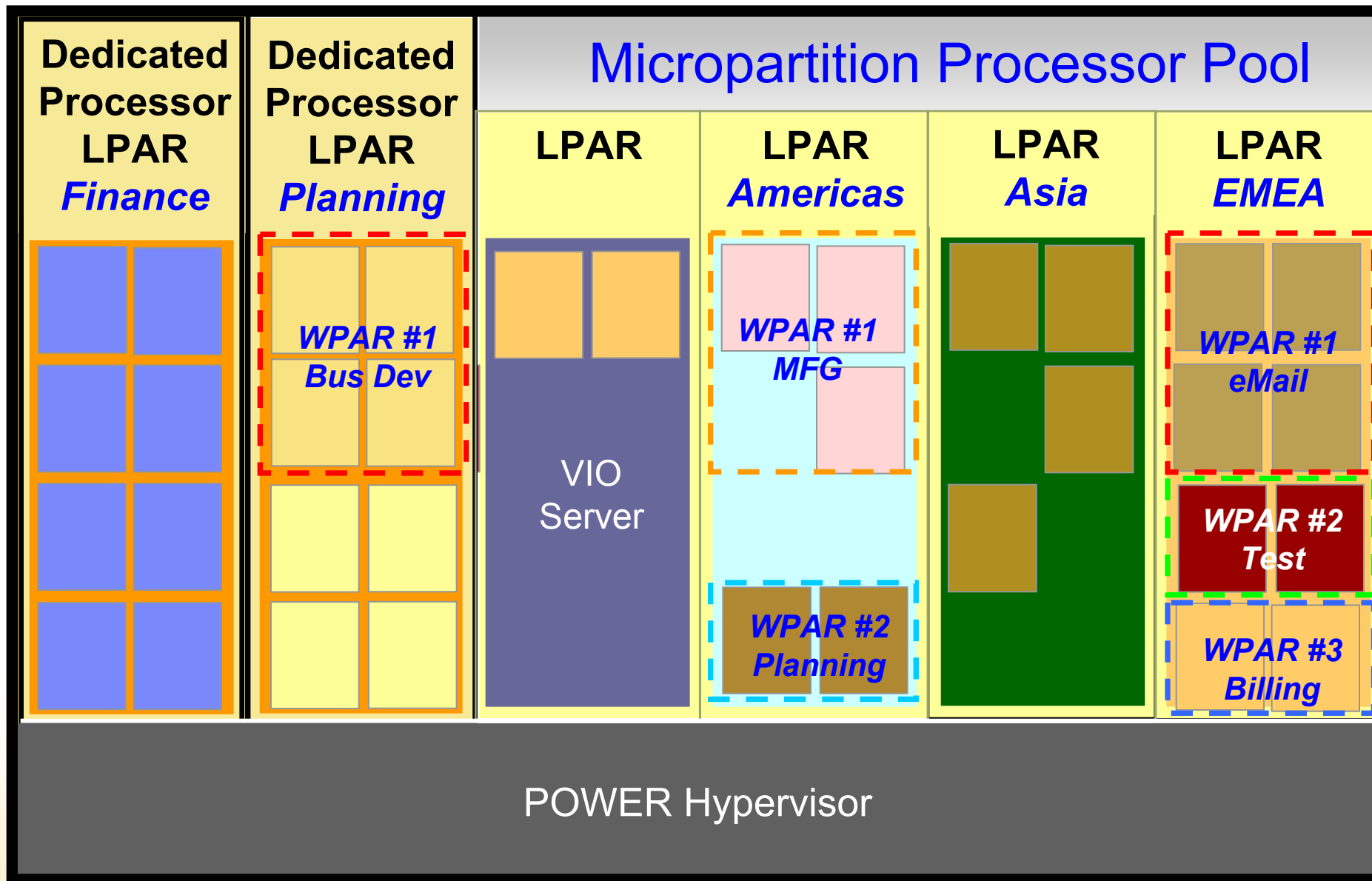
- Each System Workload partition is a separate administrative and security domain

Shared system resources

- Operating System, I/O, Processor, Memory

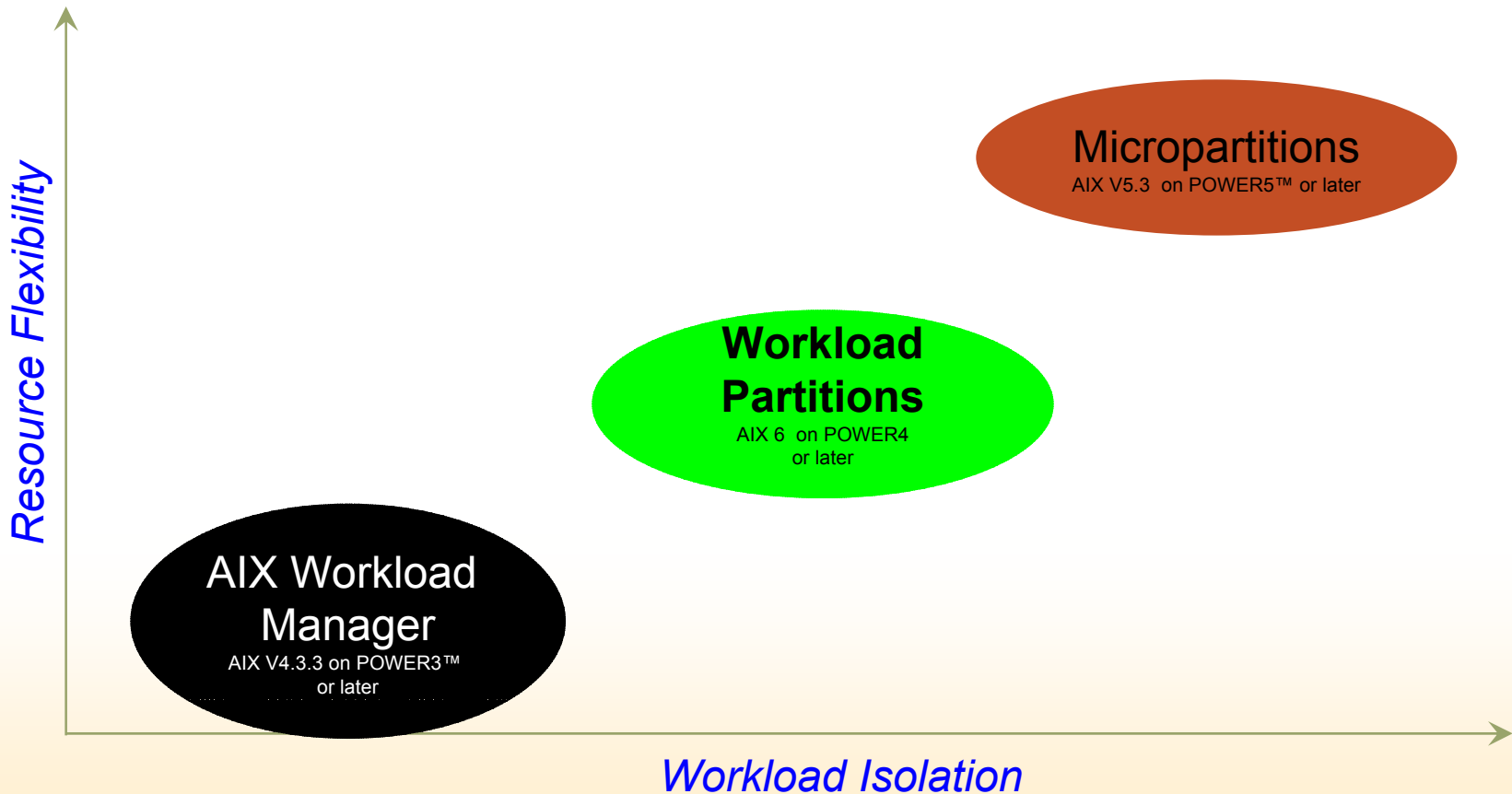


AIX Workload Partitions can be Used in LPARs

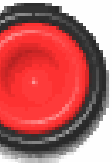


Planned IBM System p Flexible Resource Management

AIX Workload Partitions Complement System p Logical Partitions

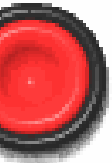


Workload Partitions provide Simplified System Management



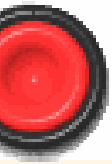
One button install and configuration

- *Installs in minutes*
- *Highly configurable and flexible*
- *Command line, SMIT interface, or template*



One button startup/boot

- *Workload Partition boots in seconds*



One button stop/shutdown



VPAR (Workload Partitions)

- **Let's look at wpars!**

VPAR creation/deletion

- **mkwpar**

- d (Directory structure)

- n (wpar name)

- g (volume group) **default** is always **rootvg**

- r (keep resource structure – **/etc/resolv.conf**, gateway)

- N (Network parameters **interface, address, netmask**)

- h (hostname)

- **startwpar** *<wparname>* / **stopwpar** *<wparname>*

- **cllogin** (run a command on a wpar or login to w wpar)

- # cllogin** *<wparname>* *<command to run on wpar>*

- **lswpar**

- # lswpar**

- Name State Type Hostname Directory

-

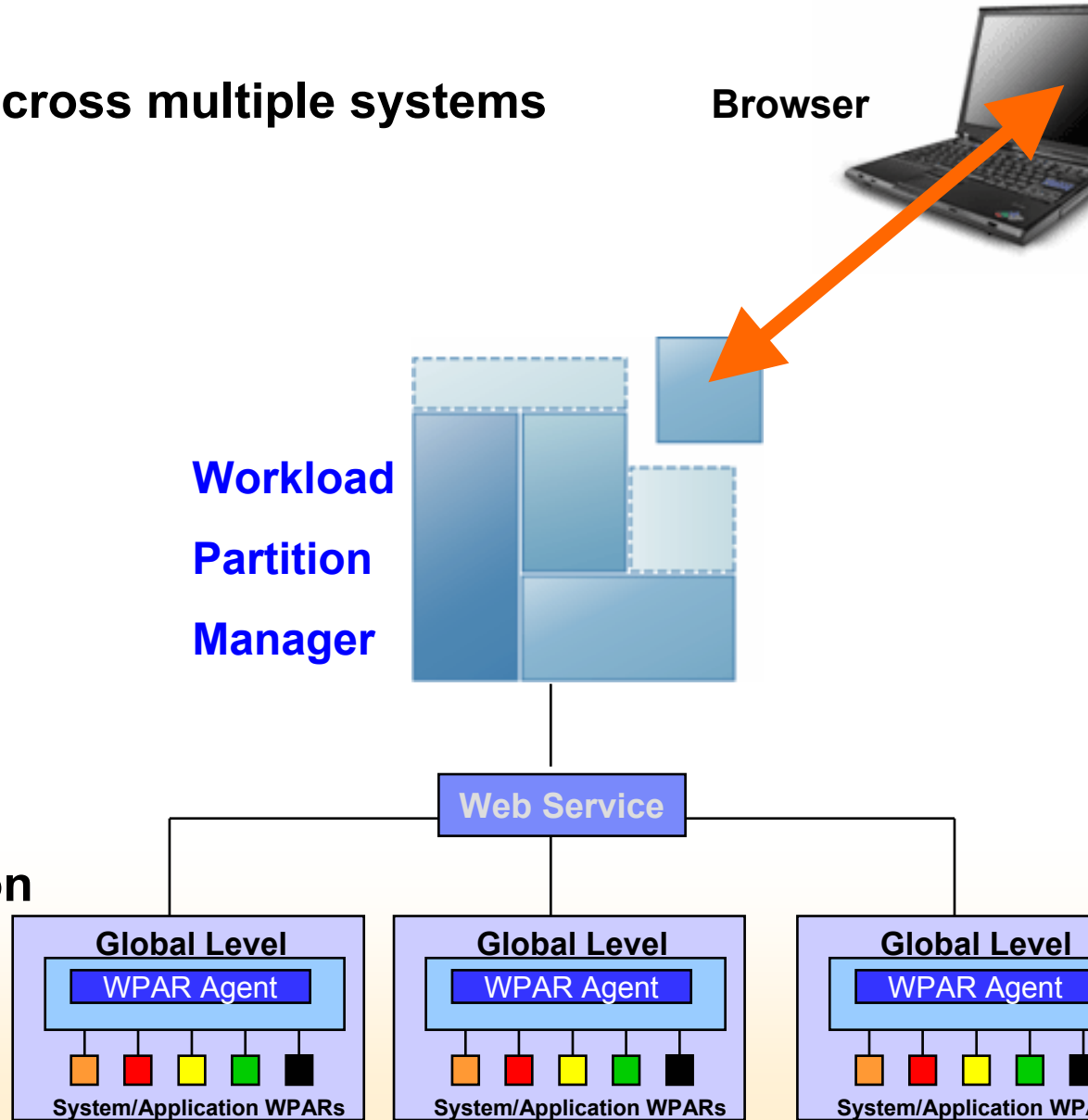
- DemoWpar **D** S DemoWpar /wparfs/DemoWpar

- **rmwpar** (**-s** to **STOP** wpar first)

- **wparexec** **-n** *<wparname>* *<fullpath>/MyApp* (**application wpar**)

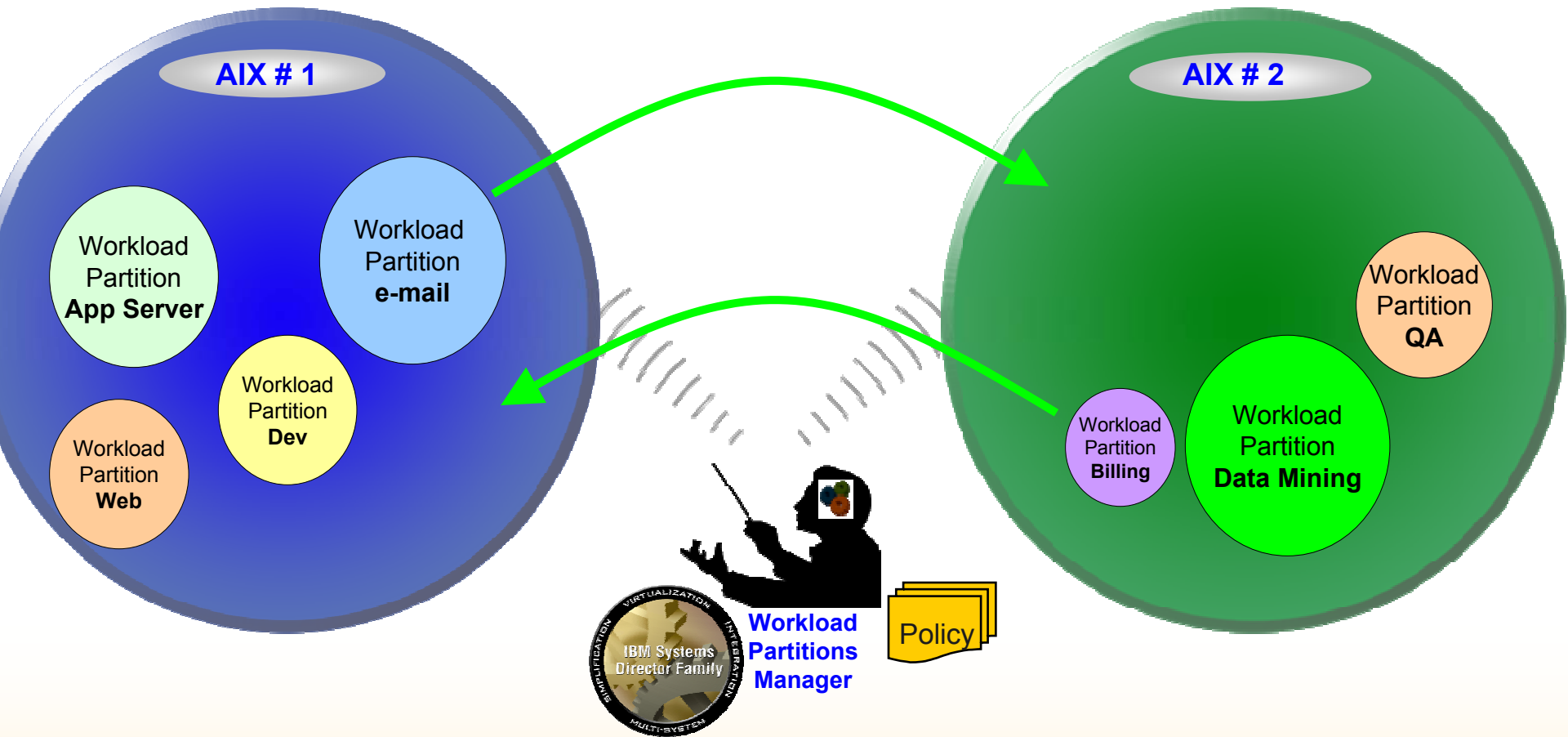
Workload Partitions Manager (additional software/license)

- **Management of WPARs across multiple systems**
- **Lifecycle operations**
- **Single Console for:**
 - Graphical Interface
 - Create & Remove
 - Start & stop
 - Checkpoint & Restart
 - Monitoring & Reporting
 - Manual Relocation
 - Automated Relocation
 - Policy driven change
- **Infrastructure Optimization**
- **Load Balancing**



Planned AIX Live Application Mobility

Move a running Workload Partition from one server to another for outage avoidance and multi-system workload balancing



Works on any hardware supported by AIX 6, including POWER5

VPARs -- Further reading

IBM

SG24-7431-00

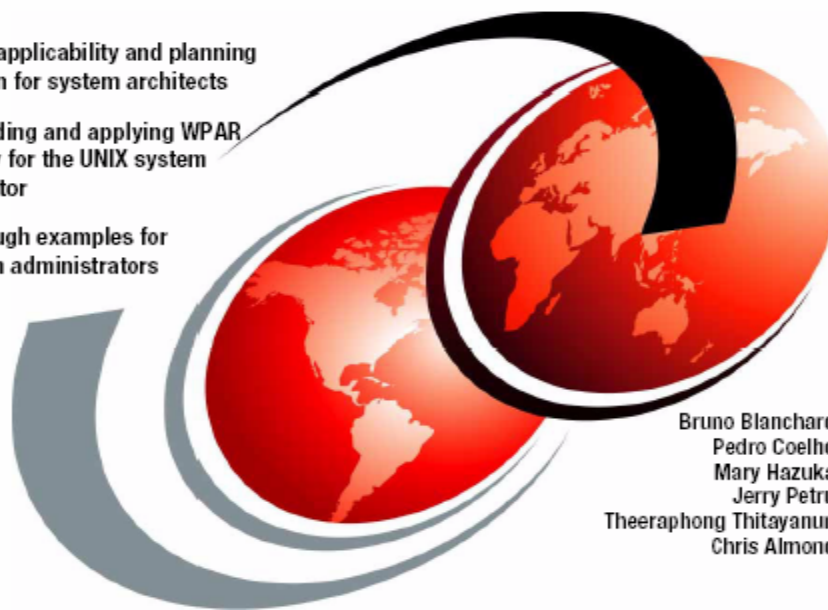
Draft Document for Review August 6, 2007 12:52 pm

Introduction to Workload Partition Management in IBM AIX

Overview, applicability and planning
information for system architects

Understanding and applying WPAR
technology for the UNIX system
administrator

Walk-through examples for
AIX system administrators



Bruno Blanchard
Pedro Coelho
Mary Hazuka
Jerry Petru
Theeraphong Thitayanun
Chris Almond

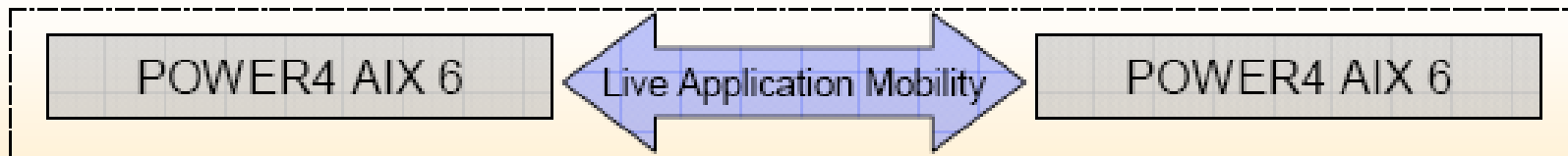
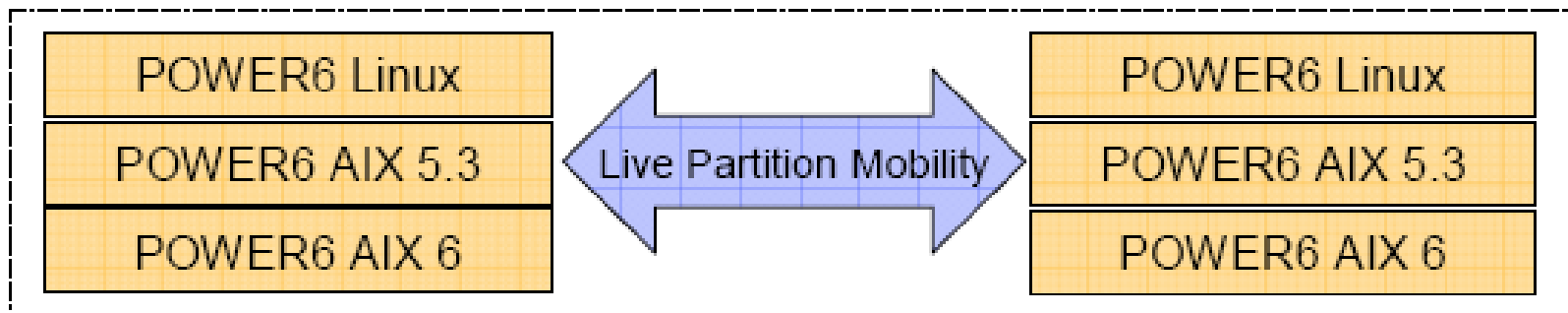
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Application Mobility \neq Partition Mobility

“The M & M’s”

*Live Partition Mobility and Live Application Mobility**

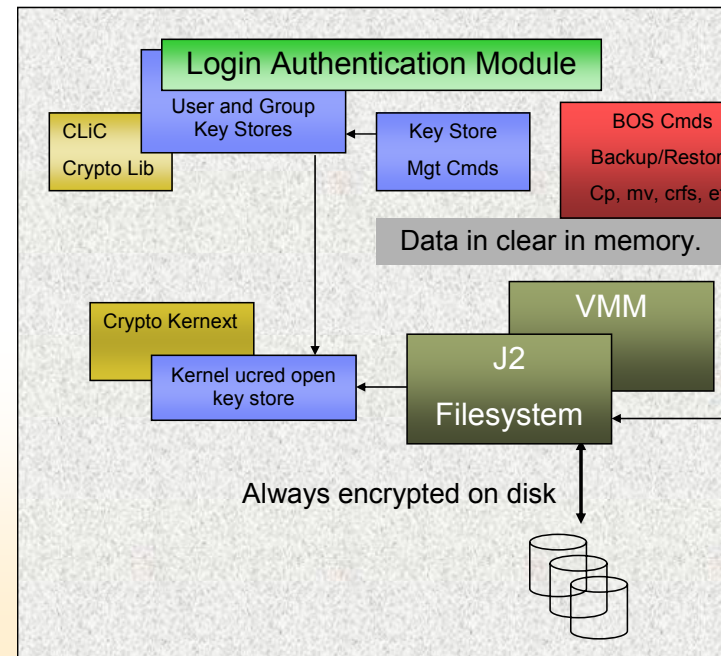


WPARS

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Encrypted File System

- Backup in encrypted or clear formats
- Can be protected from root access to encrypted data
- Integrated into user and group administration
- Automatic key store creation on user creation
- Key store open on login, integrated into AIX security Loadable Authentication Module
- Each file encrypted with unique key
- No keys stored in clear in kernel memory
- Key stores in PKCS12 format.
- AES, and RSA Cryptography



Encrypted Filesystems

▪ Must have CliC library installed

```
cllc.rte.includes      4.3.0.0  C   F   CryptoLite for C Library
cllc.rte.kernext      4.3.0.0  C   F   CryptoLite for C Kernel
cllc.rte.lib          4.3.0.0  C   F   CryptoLite for C Library
cllc.rte.pkcs11       4.3.0.0  C   F   PKCS11 Software Token Support
```

- Contained on AIX V6 Expansion/Bonus Pak
- DO NOT use Expansion from AIX 5.3 version, it will not work
- Must load kernel extension before ‘enabling’ efs
- Use ‘**genkex**’ to determine if extension has been loaded

▪ Must ‘enable’ encryption with ‘efsenable’ command

```
# efsenable -a
```

```
Enter password to protect your initial keystore: *****
```

```
Enter password again: *****
```

```
This creates the /var/efs directory structure
```

```
drwx-----  2 root  system      256 Nov 26 09:43 efs_admin
-rw-r--r--   1 root  system       0 Nov 26 09:44 efsenabled
drwx-----  3 root  system      256 Nov 26 09:43 groups
drwx-----  4 root  system      256 Nov 26 17:23 users
```

Encrypted Filesystems (continued)

- **Create an EFS-enabled filesystem** (with `-a efs=yes` option)

```
# crfs -m /efstest -A yes -a efs=yes -v jfs2 -g rootvg -a size=100000
```

- **After mounting of EFS-enabled filesystem, turn on cryptographic inheritance with `efsmgr` command**

```
# efsmgr -s -E </filesystem>
```

- **See `chfs`, `efskeymgr`, `efsmgr`**

- **See redpaper**

AIX6 Advanced Security Features, Configuration and Installation

AIX Security – more information

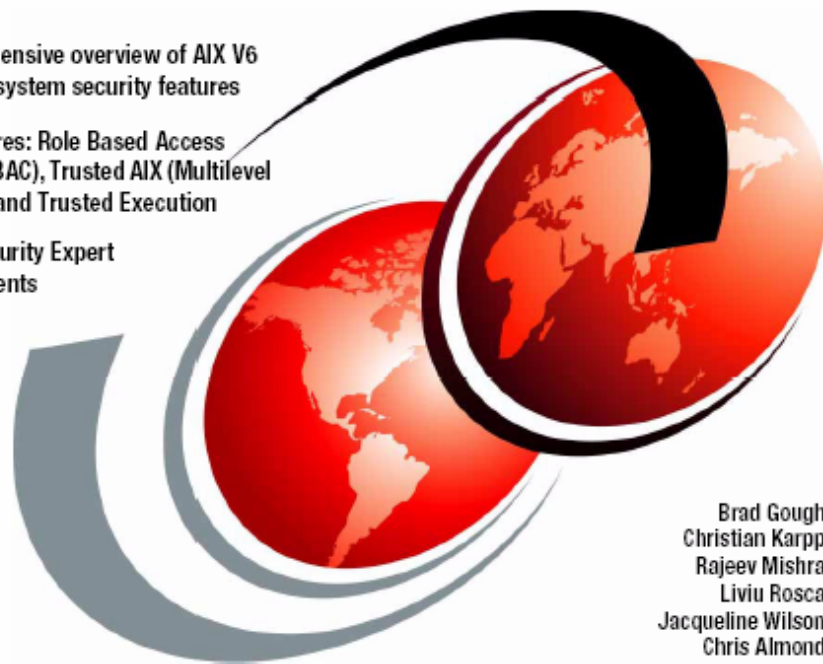
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AIX V6 Advanced Security Features Introduction and Configuration

A comprehensive overview of AIX V6 operating system security features

New features: Role Based Access Control (RBAC), Trusted AIX (Multilevel Security), and Trusted Execution

AIX V6 Security Expert enhancements



Brad Gough
Christian Karpp
Rajeev Mishra
Livi Rosca
Jacqueline Wilson
Chris Almond

ibm.com/redbooks

Redbooks

Trusted Execution

- **New to AIX V6**
- **Not TCB**
- **Can be used or not used (unlike TCB, which is install-time decision)**
- **Requires Cryptographic Library/kernel extension (CliC)**
- **Uses `trustchk` command in conjunction with Trusted Signature Database (TSD) in `/etc/security/tsd`**
- **The `trustchk` command is used in the following situations:**
 - * **Managing the Trusted Signature Database (add/delete files)**
 - * **Auditing the security state of the system (could use cron)**
 - * **Enabling the Trusted Execution Mechanism**
 - * **Configuring different policies for Trusted Execution**

Trusted Execution

- **Let's try some stuff!**

File Permissions Manager (fpm)

- **New to AIX V6**
- **Command to manage permission on shell scripts/daemons that are SETUID and/or SETGID**
- **Keeps track of all changes in /var/security/fpm directory**
- **Can run in 'preview' mode (-p)**
- **Three (four) levels (low, medium, high, DEFAULT)**
- **Wrapper written will be on Alphaworks or other external site soon (fpm_wrapper.ksh)**

File Permissions Manager (fpm)

- **# fpm -p -l low (186 files)**
- **# fpm -p -l medium (200 files)**
- **# fpm -p -l high (237 files)**
- **Let's try some commands!**

FS2 Snapshots

- Can create either **EXTERNAL** or **INTERNAL** snapshots
- Internal snapshots exist in `<fsname>/.snapshot/snapshotname` directory systems (hidden file)
- Must create a JFS2 filesystem that is 'snapshot' capable
- Can alter existing jfs2 filesystems with `-a isnAPSHOT=yes` attribute
- Uses `/usr/sbin/snapshot` command
- `snapshot -q <filesystem name>` to query snapshots

fs2 snapshots

- **Run some snapshots/queries on an existing filesystem**

Planned Systems Director Console for AIX

Integrated Solutions Console - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Integrated Solutions Console

Welcome root

Help | Logout

--Select a Page Action--

Welcome
My Startup Pages

Console Settings

OS Management

- Software Installation and Maintenance
- Software License Management
- Devices
- System Storage Management
- Security & Users
- Communications Applications and Services
- Workload Partition Administration
- Print Spooling
- Advanced Accounting
- Problem Determination
- Performance & Scheduling
- System Environments
- Processes & Subsystems
- Installation Assistant
- Cluster Systems Management

SMIT

- Classic View
- Fastpath View
- DCEM
- Role Based Access Control

Classic View X

Classic View

System Management

System Management

[Software Installation and Maintenance](#)

[Software License Management](#)

[Devices](#)

[System Storage Management \(Physical & Logical Storage\)](#)

[Security & Users](#)

[Communications Applications and Services](#)

[Workload Partition Administration](#)

[Print Spooling](#)

[Advanced Accounting](#)

[Problem Determination](#)

[Performance & Scheduling](#)

[System Environments](#)

[Processes & Subsystems](#)

[Installation Assistant](#)

[Cluster Systems Management](#)

- Included with AIX
- Web access to SMIT
- Fast performance
- Integrated with IBM Systems Director

Systems Director Console for AIX

- **Requires Systems Management Client fileset(s)**

 - sysmgt.psonsole fileset

 - ([sysmgt.pconsole.rte](#) 6.1.0.0 C F System P Console Runtime)

 - Was installed by default with AIX 610 Gold

- **Browser-based**

 - <https://<hostname>:5663/ibm/console>

