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Portal Application Deployment Scripting

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- What is a portal application?
- Portal application components
- Applying deployment tools
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- Portal application release approaches
- Customer example
- Planned enhancements in WebSphere Portal 6.1

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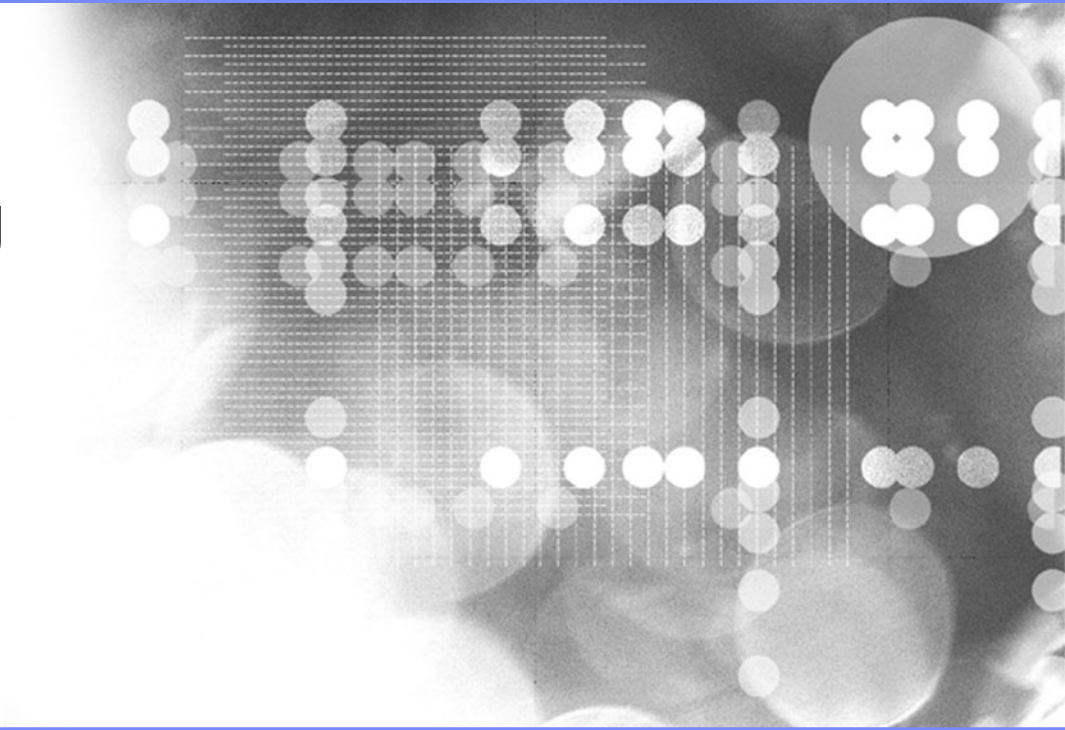

Deployment scripting in context

What is deployment scripting?

- **Automated (or partially automated) deployment of new or updated *custom portal applications* or solutions onto an existing infrastructure**

- **Also referred to as *staging* or *application release***

What deployment scripting is not…

- **Product *installation***
  - prior installation of WebSphere Portal etc. is assumed
- **Product *configuration***
  - not discussing migration of databases or directories or other such configuration tasks
  - some tasks are included which some might think of as configuration (creation of pages etc.), but they are
    - *logically associated to a business solution*
    - *usually performed more than once*

What deployment scripting is *also* not…

- **Product version *migration***
  - updating installations to new versions of the product, including any required updates to content

- **Content *publishing***
  - web content that is published to a site is typically not treated as an application release and proceeds through an approval workflow and syndication process instead

What is a portal application?

Classic J2EE application structure

- **Single enterprise application containing**
  - one or more web applications
  - EJBs
  - some server configuration dependencies, such as
    - data sources
    - shared libraries

- **Can usually be deployed as a single EAR in a single step, if dependencies are met**

Portal application characteristics

- **Relies on the portal server for more context and services than a standalone J2EE application**
  - e.g. aggregation, security, etc.
- **Not usually a single portlet**
- **Has components that need to exist outside a single deployment unit (not everything is in one EAR)**
- **Has components that require the use of portal-specific deployment tools**
  - e.g. portal pages

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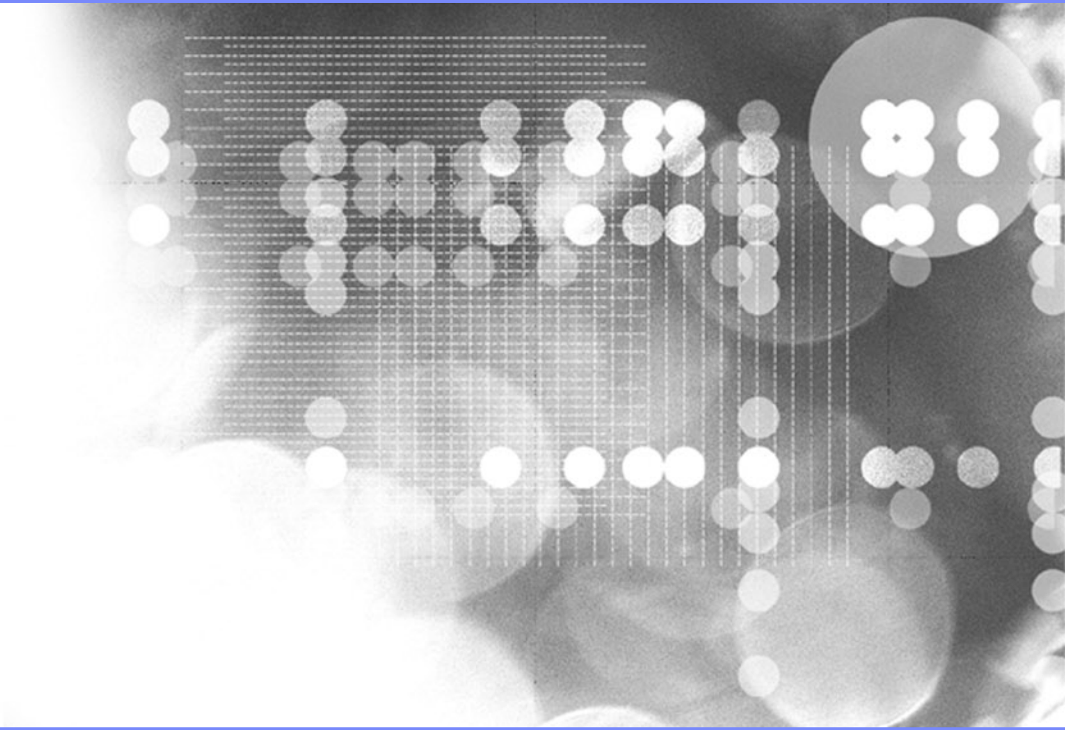
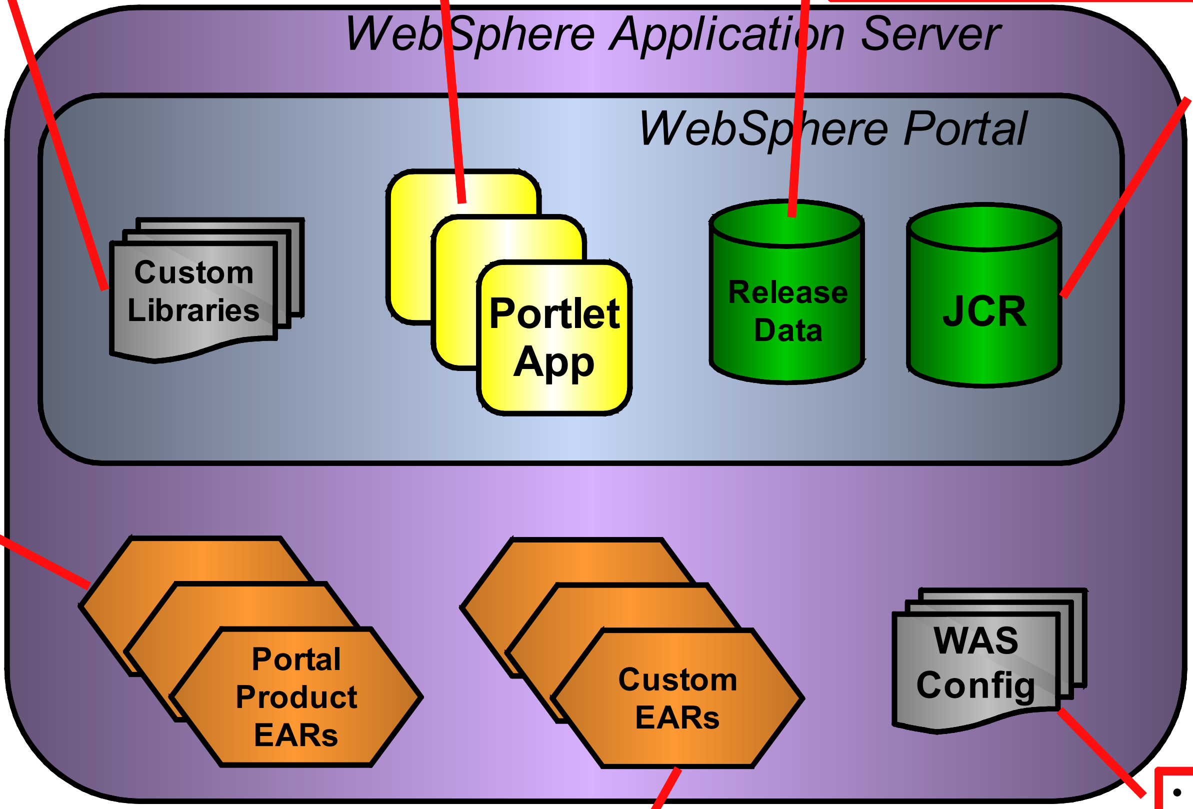
Portal application components



- Common libraries
- Portlet services
- Resource bundles
- Config files

- Product portlet apps
- Custom portlet apps

- Pages
- Portlet configuration
- Theme configuration
- …



- WCM components
- WCM content
- PDM documents
- PZN rules

- Theme files
- Skin files
- Screens
- WCM custom JSPs

- Custom EJB apps
- Custom web apps

- Data sources
- Authentication aliases
- …

Applying deployment tools

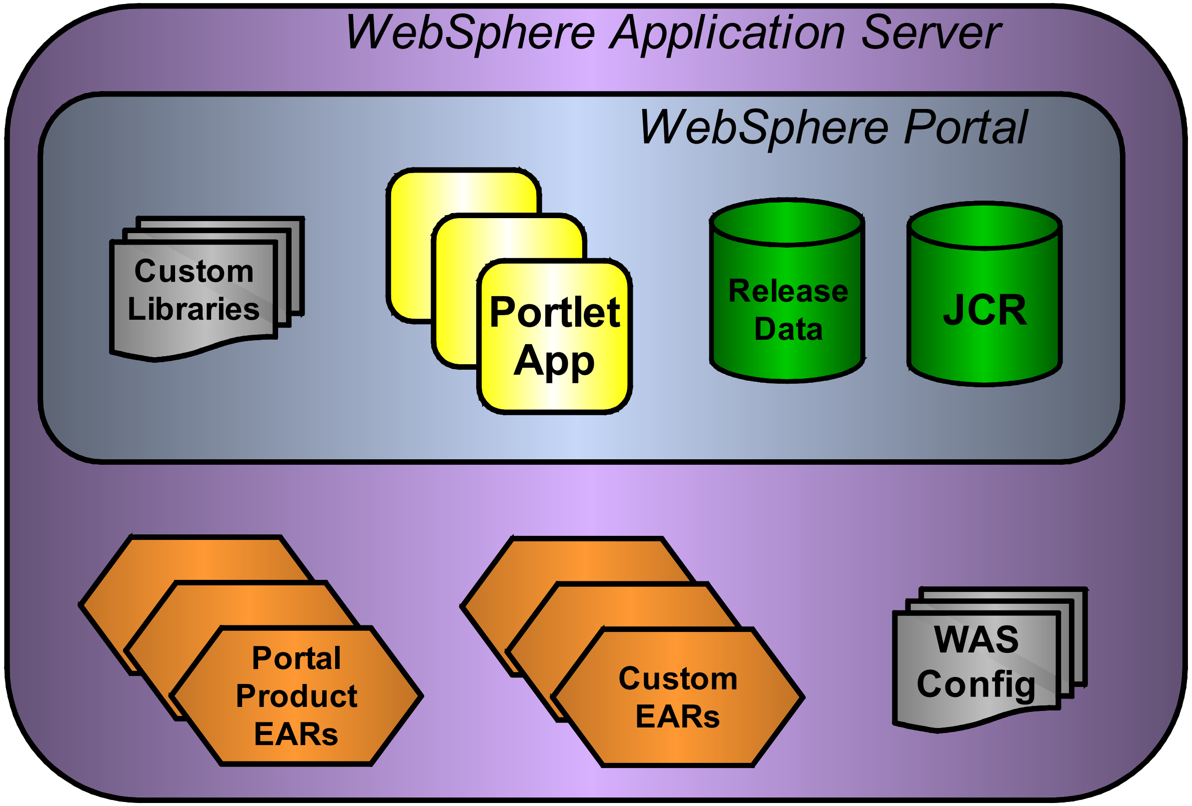
Applying deployment tools

- Deployment requirements and tooling options
- Deployment tool features
- Incremental deployment support
- Deploying to a clustered environment

Applying deployment tools

- **Deployment requirements and tooling options**
- Deployment tool features
- Incremental deployment support
- Deploying to a clustered environment

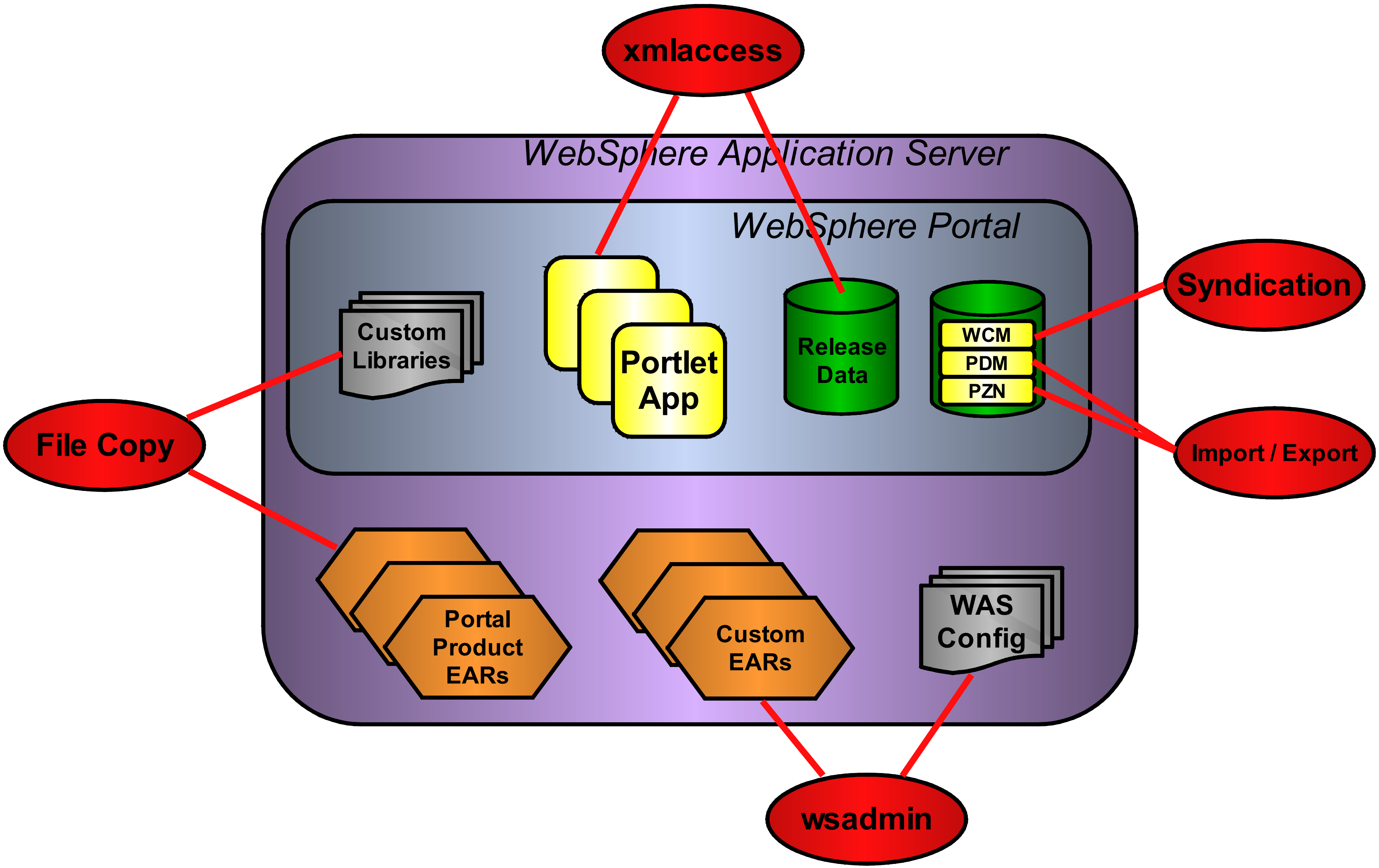
Components that may need to be deployed…



Available deployment tools

- **WebSphere Portal tools**
  - xmlaccess
  - Portal Scripting Interface (wpscript)
  - ReleaseBuilder (incremental)
  - WCM import / export and syndication
- **WebSphere Application Server (WAS) tools**
  - WebSphere administrative scripting program (wsadmin)
- **Other tools**
  - OS-level file copy, Ant, remote file transfer, …

Deployment tools (unclustered environment)



Applying deployment tools

- Deployment requirements and tooling options
- **Deployment tool features**
- Incremental deployment support
- Deploying to a clustered environment

WebSphere administrative scripting program (wsadmin)

- **Scripting is performed in JACL (a version of TCL) or Jython (a version of Python)**

- **Allows scripting of most WAS deployment and configuration tasks, including management of**
  - portal product enterprise applications
    - e.g. redeploy with new themes and skins
  - custom enterprise applications
    - e.g. deploy application-specific EJBs
  - J2EE data sources

xmlaccess

- **Used to import or export portal configuration artefacts as XML**
  - portal artefacts only
  - configuration only, not files
- **No programming language associated**
  - XML import and export only
- **In real deployments XML files can get very large**
  - complex to understand and maintain manually
  - often best to assemble or generate with other tools

Portal Scripting Interface (wpscript)

- **Extension to WebSphere administrative scripting program (wsadmin)**
- **Scripting is performed in JACL (version of TCL)**
- **Limited to a subset of the portal configuration artefacts supported by xmlaccess**
  - pages
  - portlet preferences
  - access control settings
  - ***cannot*** currently install or update portlets

Import / export

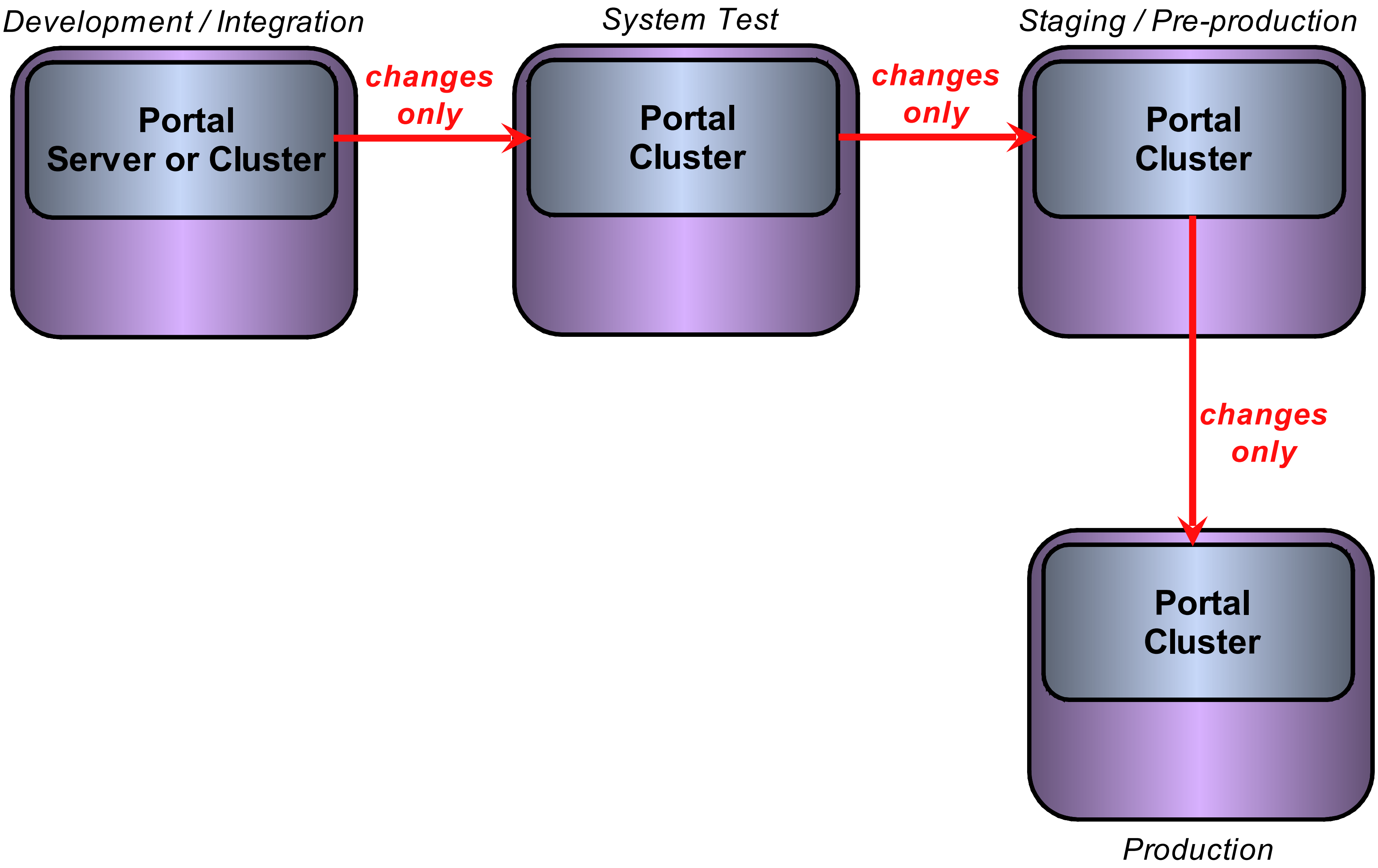
- **WCM**
  - Takes a snapshot of an entire library
  - Could be used for deployment but not ongoing publishing
- **PDM and Personalization**
  - Not currently scriptable; requires use of the portal administration user interface

WCM syndication

- **Manual or scheduled**
- **All or live-only items included**
- **Incremental synchronization of changes**
  - Can force a rebuild on manual syndication
- **Single or bi-directional**
- **All libraries on which the desired library is dependent must be included in the syndicator**

Applying deployment tools

- Deployment requirements and tooling options
- Deployment tool features
- **Incremental deployment support**
- Deploying to a clustered environment


Development / Integration
Portal
Server or Cluster
changes
only
System Test
Portal
Cluster
changes
only
Staging / Pre-production
Portal
Cluster
changes
only
Portal
Cluster
Production

ReleaseBuilder features

- **Compares xmlaccess exports from**
  - two different portal environments
  - (better) the same portal environment at two different dates
- **Produces a file of differences usable by xmlaccess**
- **Application of the file makes one environment "the same" as the other *(but see later)***
- **Handles deletions as well as additions and updates**
- **Can create differences files for each direction to make process reversible**

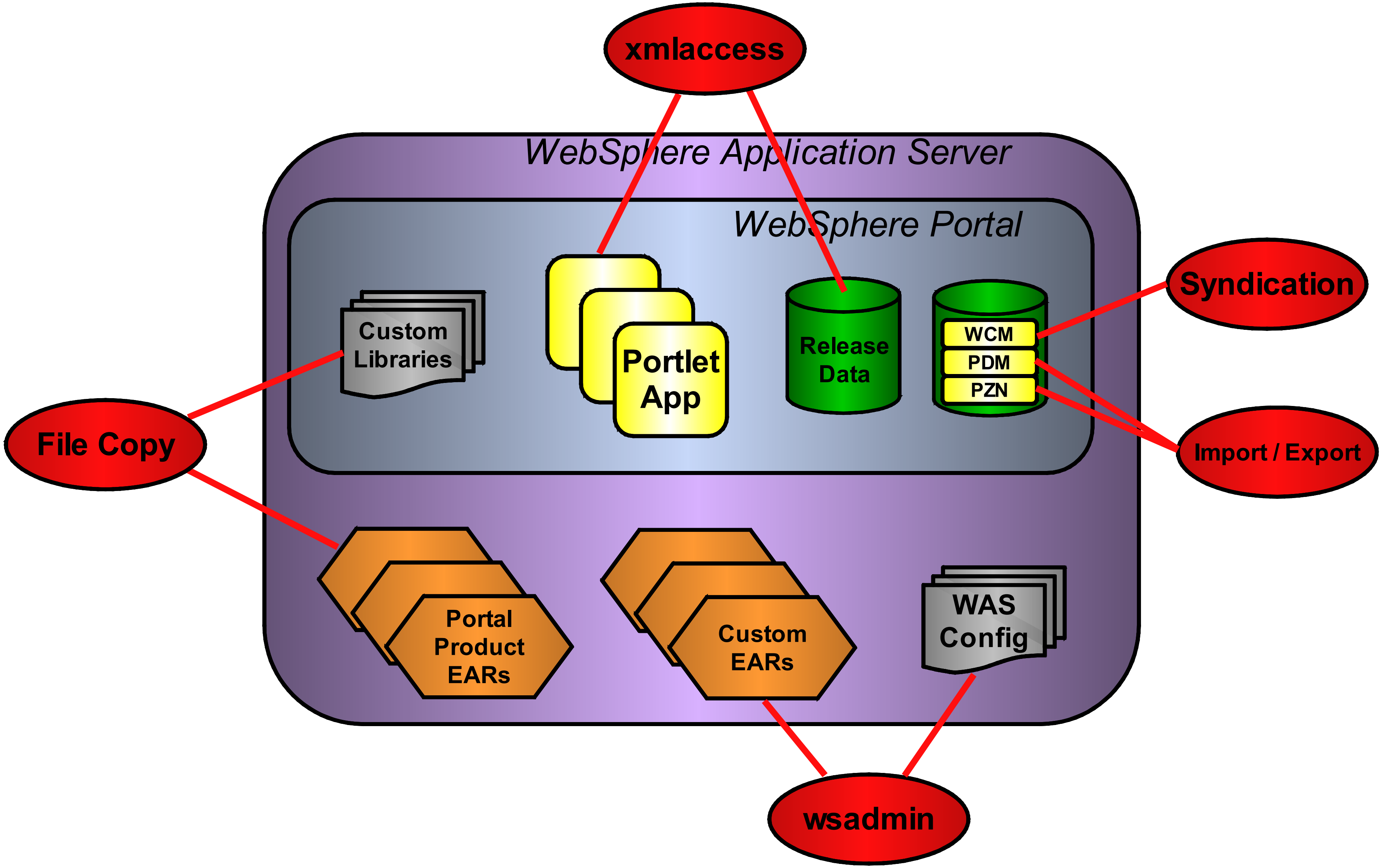
ReleaseBuilder considerations

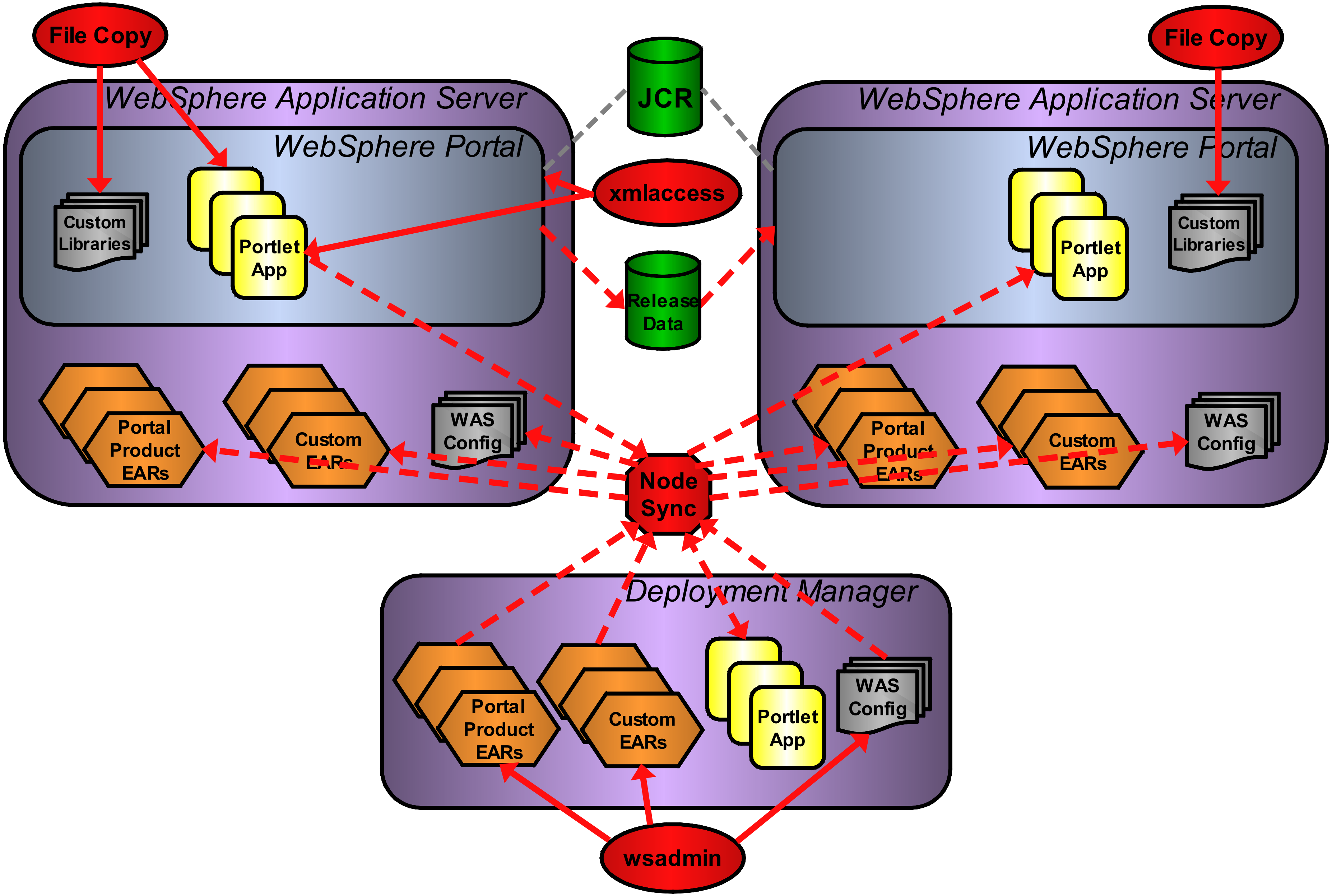
- **Can deploy portlets, but only if WAR files already transferred to specific directory structure in target environment**
- **Only for portal configuration artefacts and does not include**
  - theme and skin files
  - shared libraries and portal services
  - WAS configuration artefacts
  - WCM design and content
- **May deploy configuration from preceding environment that is not wanted**
  - test pages, debugging portlets etc.

Applying deployment tools

- Deployment requirements and tooling options
- Deployment tool features
- Incremental deployment support
- **Deploying to a clustered environment**

Deployment tools (~~un~~clustered environment)




File Copy
File Copy
JCR
WebSphere Application Server
WebSphere Portal
Custom Libraries
Portlet App
xmlaccess
Release Data
WebSphere Application Server
WebSphere Portal
Portlet App
Custom Libraries
Portal Product EARs
Custom EARs
WAS Config
Node Sync
Portal Product EARs
Custom EARs
WAS Config
Deployment Manager
Portal Product EARs
Custom EARs
Portlet App
WAS Config
wsadmin

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End-to-end deployment

End-to-end deployment

- **Determining a suitable level of automation**
  - Automation decision factors
- **Considerations when creating a deployment suite**
  - Tooling
  - Repeatability and rollback
  - Service availability
  - Testing and validation
  - Restrictions on automation

End-to-end deployment

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Determining a suitable level of automation

- **Varies for each organisation and sometimes for each environment**

- **Can usually increase the level of automation over time**
  - no need to do everything for the first deployment

- **A number of factors to consider...**

Automation decision factors

- Need for repeatability or rollback
- Restriction on manual changes in production environment
- Cost of developing automation processes versus cost of manual deployment over time
- Complexity and number of applications to be deployed
- Complexity and number of environments
- Environmental restrictions on automation (e.g. firewalls)

End-to-end deployment

- **Determining a suitable level of automation**
  - Automation decision factors

- **Considerations when creating a deployment suite**
  - Tooling
  - Repeatability and rollback
  - Service availability
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Deployment suite tooling - components

- **May need to include build and test tools**
  - Ant, jUnit, …
- **Will likely need remote execution and/or file transfer tools**
  - preferably platform-independent (FTP, SCP, …)
- **Further miscellaneous tools may need to be incorporated**
  - EARExpander, zip, etc.

Deployment suite tooling - frameworks

- **Need to chain together the deployment tools and other utilities**
- **Often need to cater for differences in environments**
  - platforms (e.g. dev is on Linux, production on AIX)
  - different product configurations (e.g. clustered vs. unclustered)
- **Tools exist to do this**
  - a version of Ant ships with WAS and has some custom tasks for WAS and portal operations

Repeatability and rollback

- **Automation allows repeatability in deployments**

- **Can also allow rollback**
  - if scripts are coded to be transactional or partially reversible in case of failures
    - much greater effort to create in this way
  - or if previous builds can be reapplied over the top of partial deployments
    - requires a “full” rather than incremental deployment approach

Service availability

- **Some deployments may require portal to be restarted**
  - e.g. theme / skin deployment
- **Deployments may mean certain components are temporarily unavailable**
  - e.g. portlet updates in a cluster
- **Multiple clusters can stop users being affected if load balancers are aware**
- **A “fallback” site or “sorry” page can be brought online during deployments**

Testing and validation

- **Automated component testing can be incorporated in a build process (e.g. jUnit)**
- **Logging is important**
  - consolidated logs ease checking
  - can automate checks somewhat with searches for specific strings
- **Final check of site / application most important**
  - manual test plan is typically most complete approach
  - automated hits on specific test pages and validation of content returned is a possibility

Restrictions on automation

- **Security-based restrictions are the most common**
  - firewalls and other blocks on particular protocols prevent remote operations
    - necessitates copying and execution of deployment kits locally on multiple servers
  - even transfer of files may need manual intervention
    - greater need for manual orchestration of the deployment process in this case
  - consider whether / where passwords are stored!
- **Difficulties in detecting completion of asynchronous tasks**

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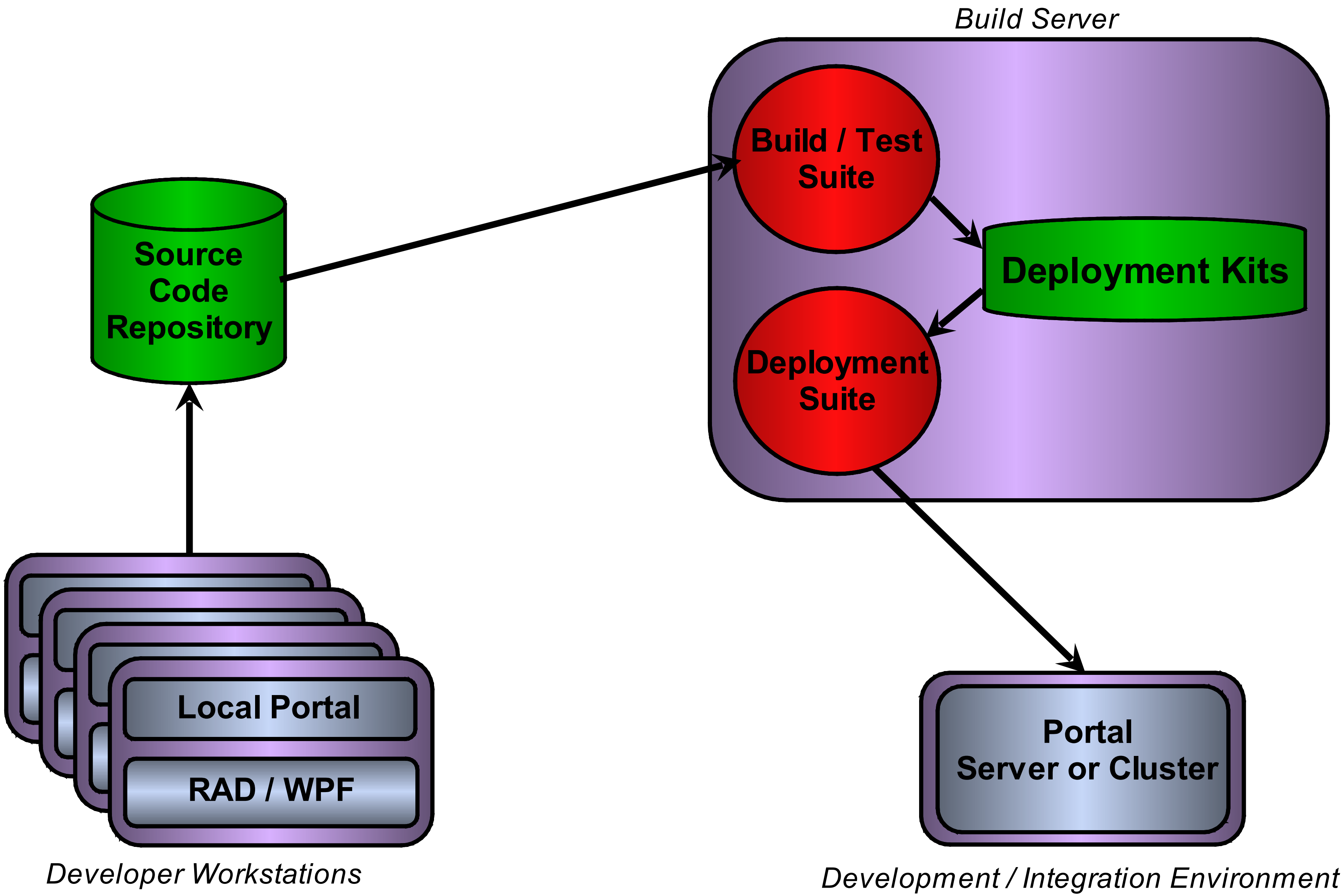
Portal application release approaches

Portal application release approaches

- **Continuous integration in development**
- **Environment gatekeepers**
- **Deployment from central repository vs. preceding environment**

Portal application release approaches

- **Continuous integration in development**
- **Environment gatekeepers**
- **Deployment from central repository vs. preceding environment**

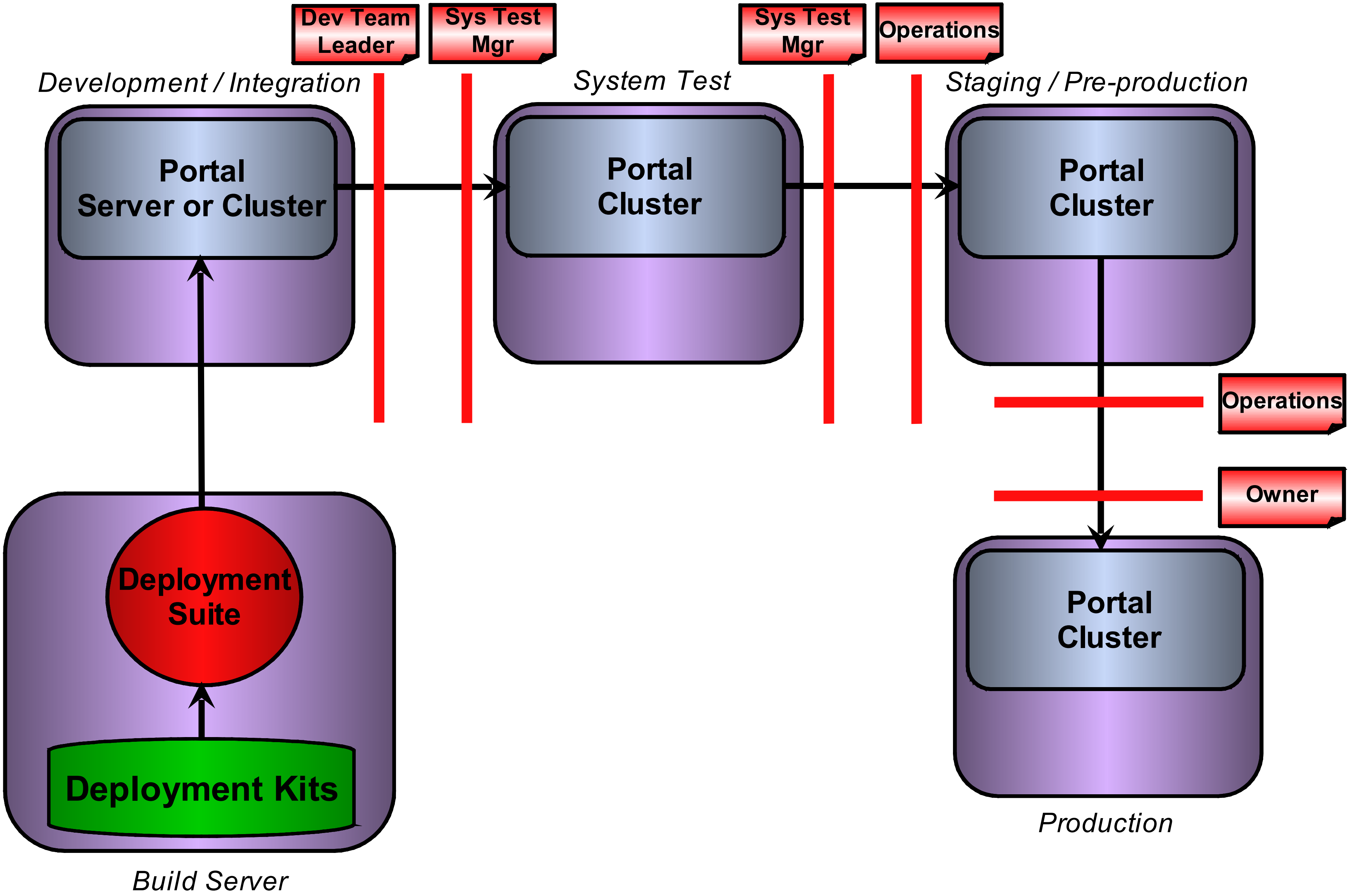

Build Server
Build / Test Suite
Deployment Kits
Deployment Suite
Source Code Repository
Local Portal
RAD / WPF
Developer Workstations
Portal Server or Cluster
Development / Integration Environment

Continuous integration benefits

- **Interface issues surfaced early**
- **Automated tests are run regularly**
- **Test coverage can be checked**
- **Team leader can monitor current progress of application as a whole**
- **Reduces “surprises” in system test**

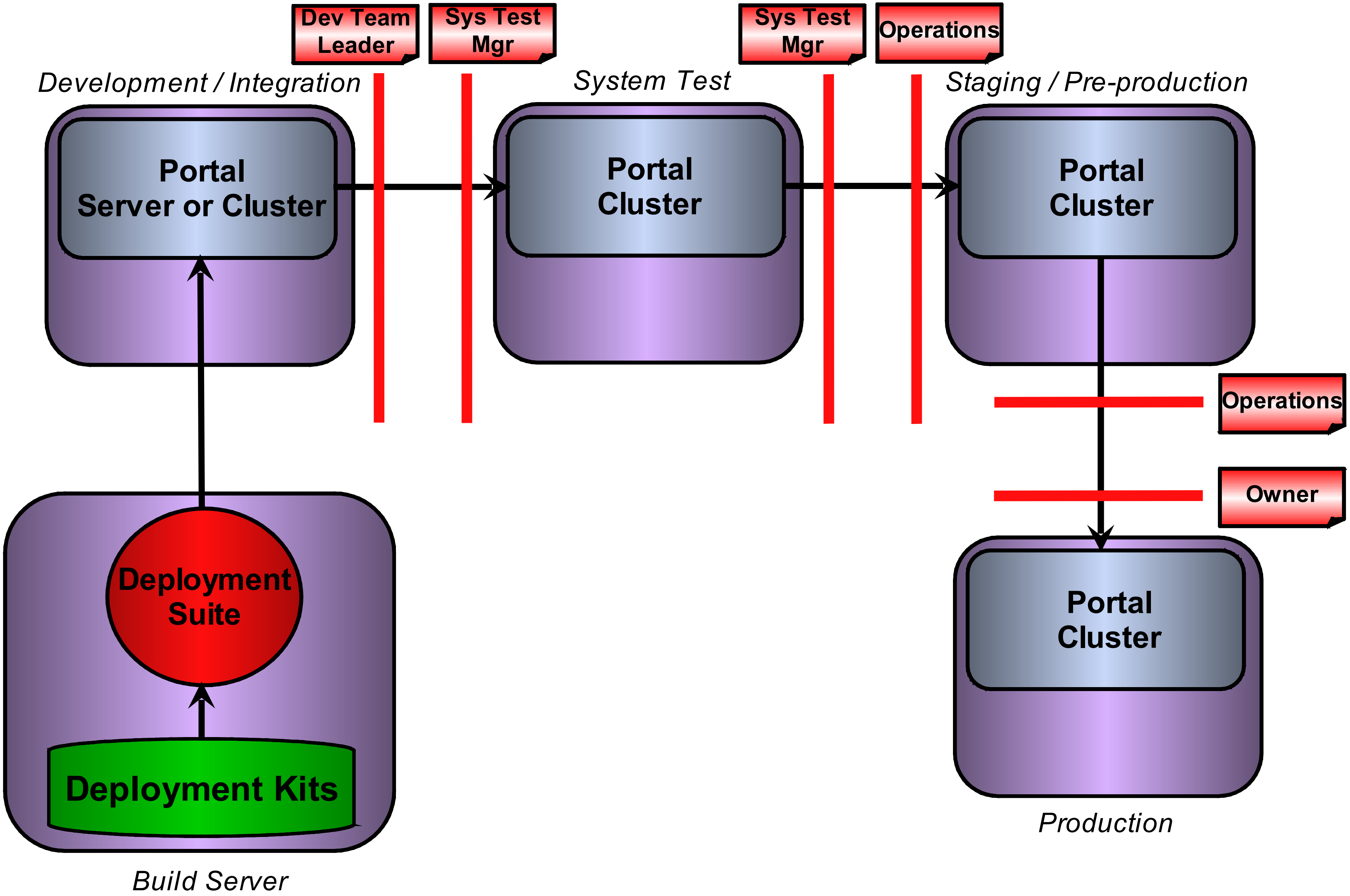
Portal application release approaches

- Continuous integration in development
- **Environment gatekeepers**
- Deployment from central repository vs. preceding environment


Dev Team Leader
Sys Test Mgr
Sys Test Mgr
Operations
Development / Integration
System Test
Staging / Pre-production
Portal Server or Cluster
Portal Cluster
Portal Cluster
Operations
Owner
Deployment Suite
Deployment Kits
Portal Cluster
Production
Build Server

Portal application release approaches

- Continuous integration in development
- Environment gatekeepers
- **Deployment from central repository vs. preceding environment**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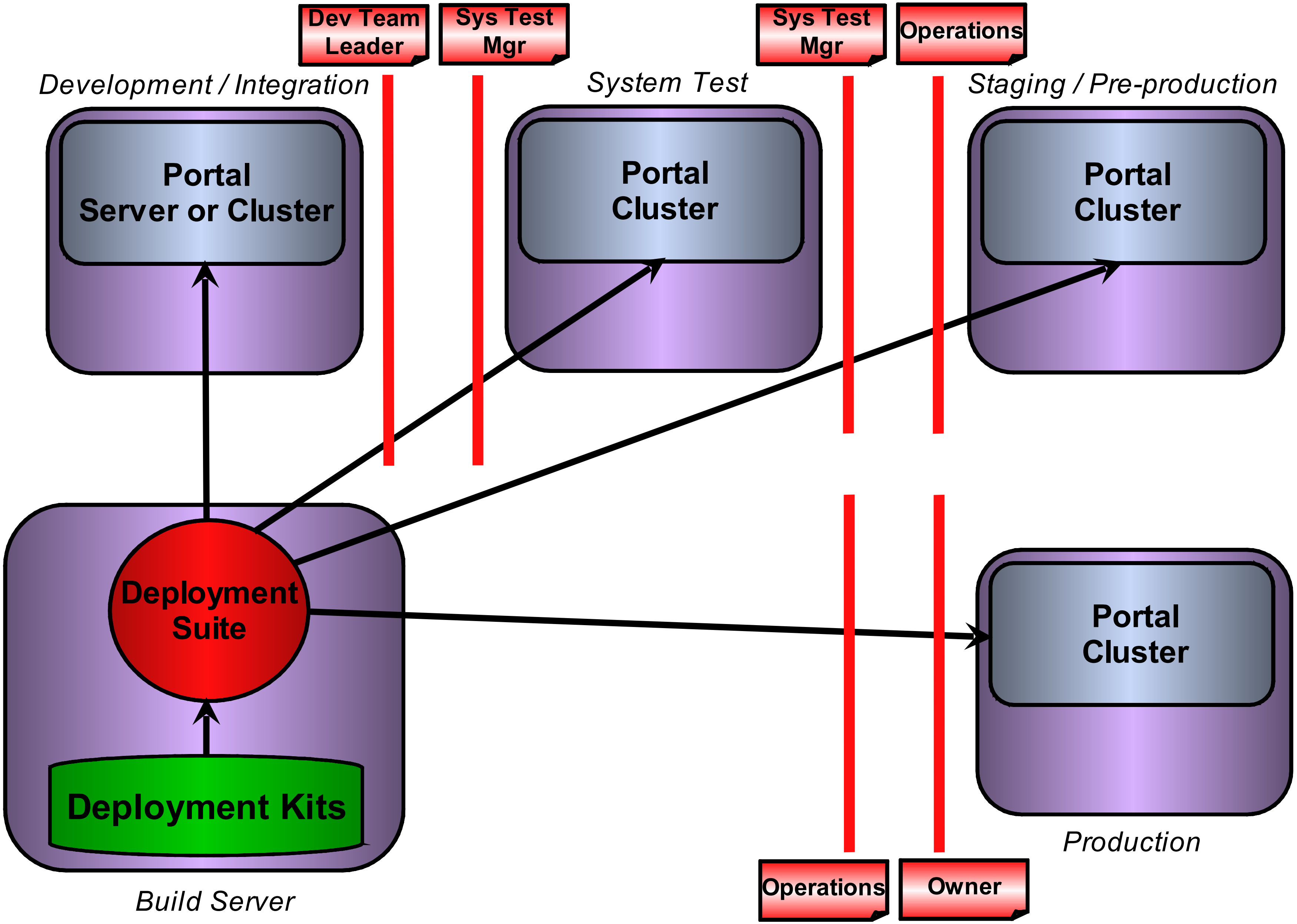
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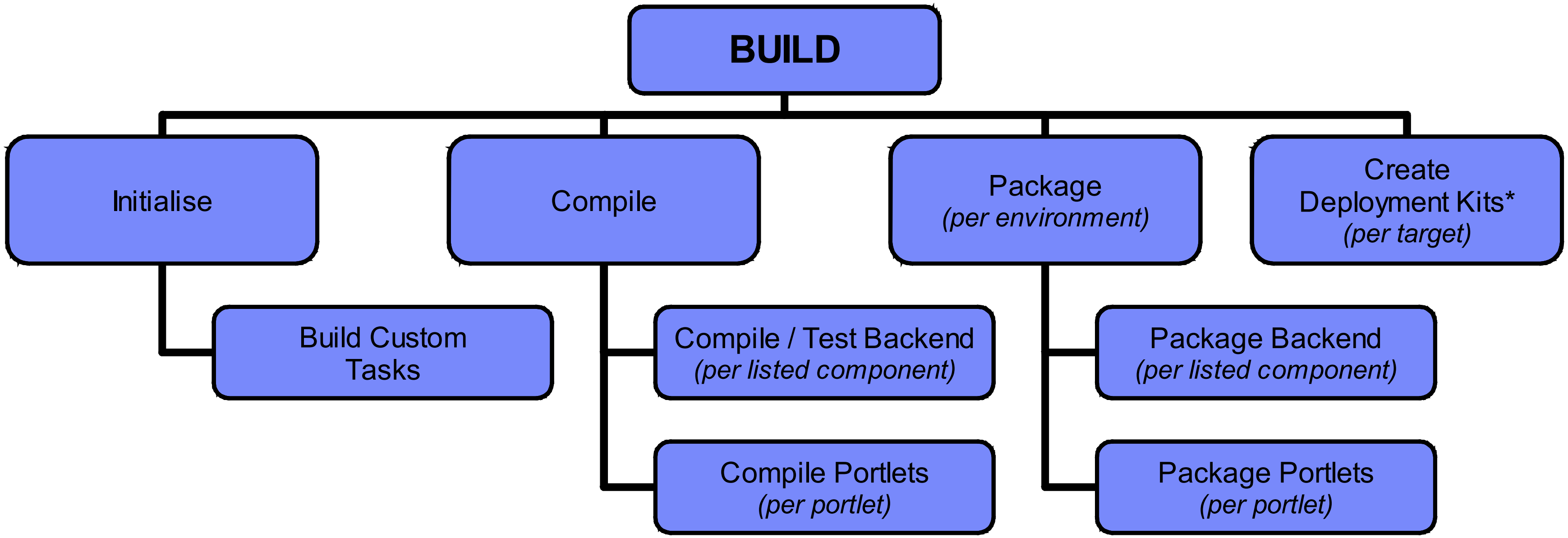
Customer example

Customer example

- Build automated as well as deployment
- Multiple environments, some clustered some not
- Multiple platforms (Windows and AIX)
- Site included a substantial WCM component, including custom JSPs
- Deployment scripts generated dynamically from configuration in source code control system
- Automated via Apache Ant with custom tasks

Build process
- Top level



BUILD

Initialise

Build Custom Tasks

Compile

Compile / Test Backend *(per listed component)*

Compile Portlets *(per portlet)*

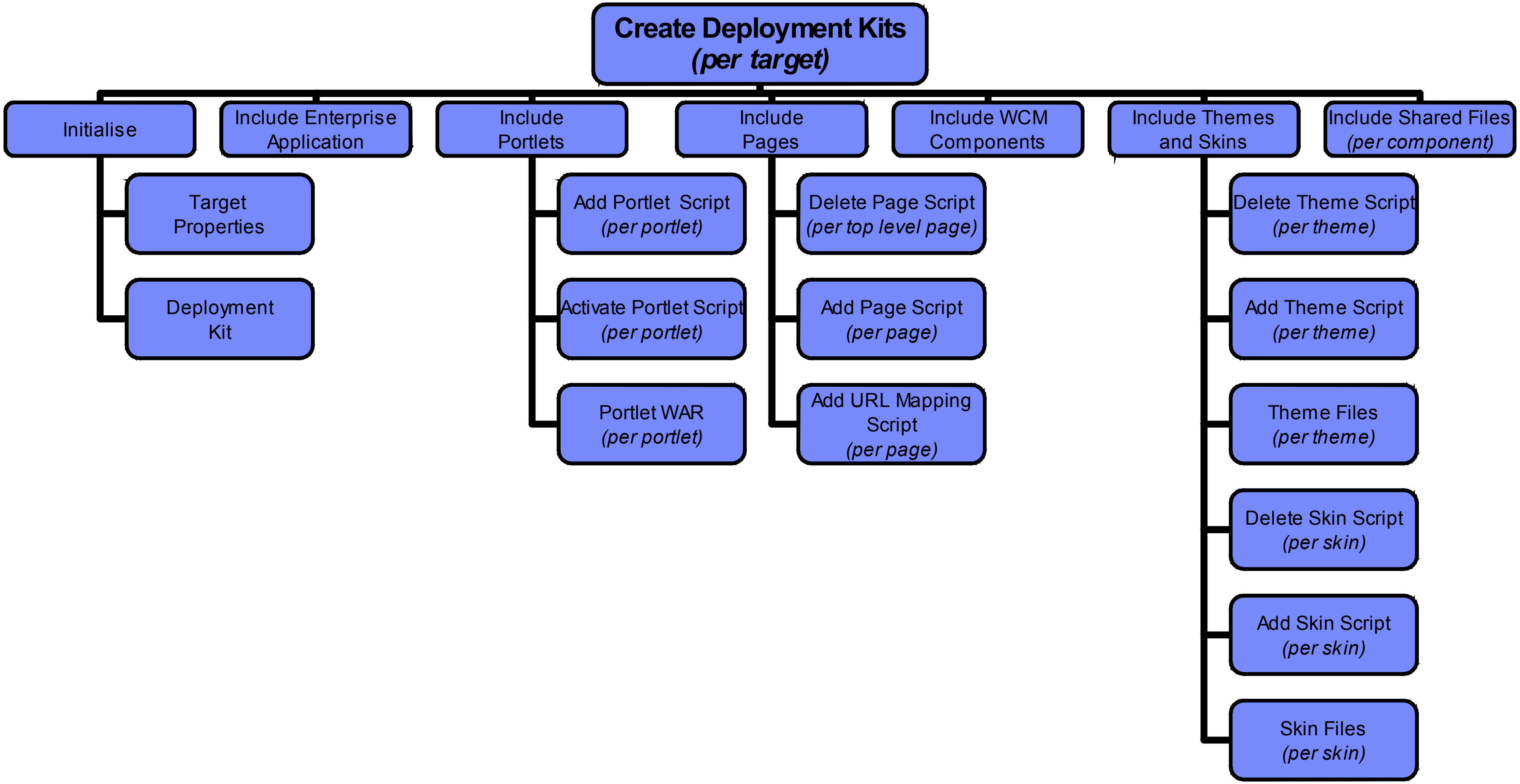
Package *(per environment)*

Package Backend *(per listed component)*

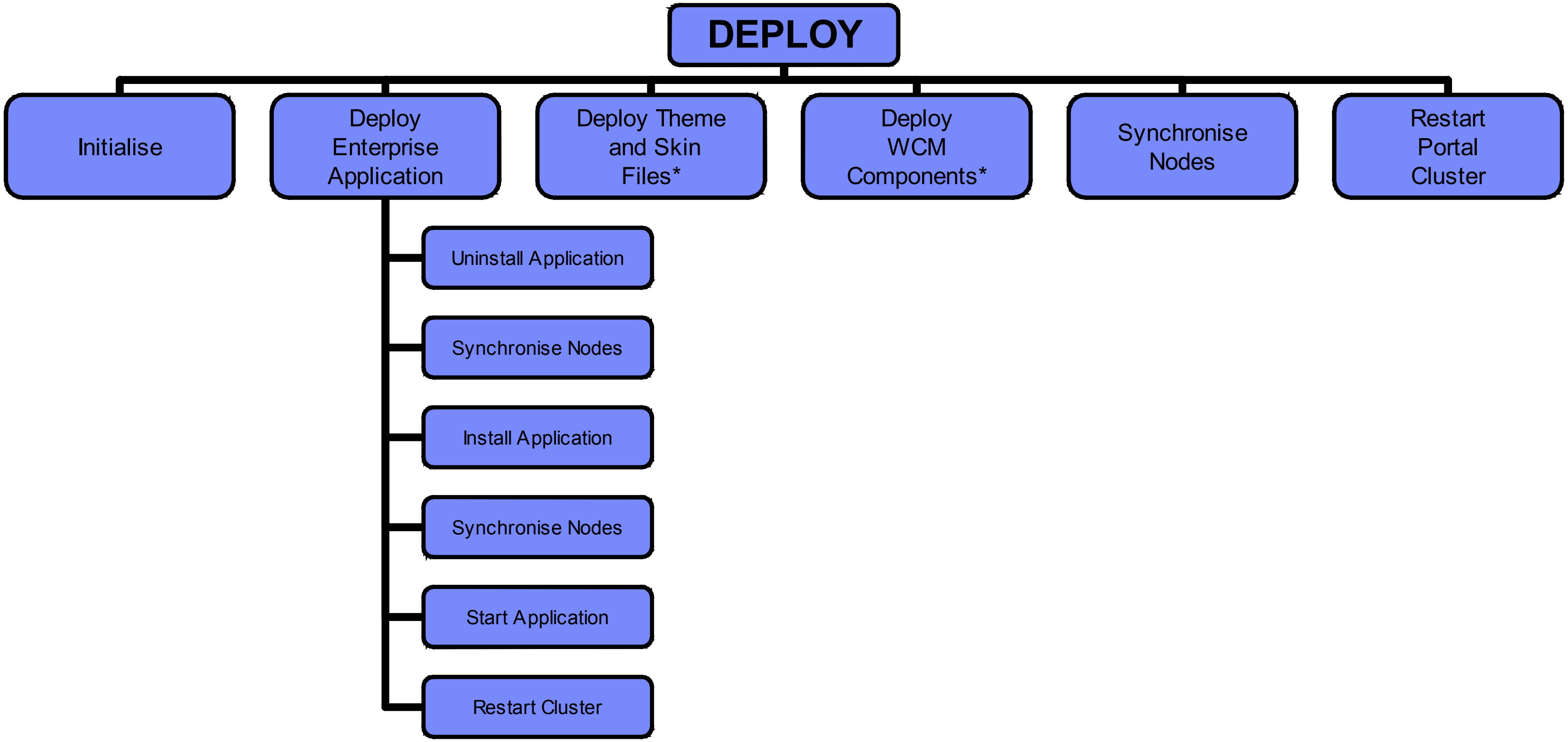
Package Portlets *(per portlet)*

Create Deployment Kits* *(per target)*

Build process
- *Create deployment kits*


Create Deployment Kits
(per target)
Initialise
Target Properties
Deployment Kit
Include Enterprise Application
Include Portlets
Add Portlet Script *(per portlet)*
Activate Portlet Script *(per portlet)*
Portlet WAR *(per portlet)*
Include Pages
Delete Page Script *(per top level page)*
Add Page Script *(per page)*
Add URL Mapping Script *(per page)*
Include WCM Components
Include Themes and Skins
Delete Theme Script *(per theme)*
Add Theme Script *(per theme)*
Theme Files *(per theme)*
Delete Skin Script *(per skin)*
Add Skin Script *(per skin)*
Skin Files *(per skin)*
Include Shared Files *(per component)*

Deployment process (clustered environment)
- Deployment manager target



DEPLOY

Initialise

Deploy Enterprise Application

- Uninstall Application
- Synchronise Nodes
- Install Application
- Synchronise Nodes
- Start Application
- Restart Cluster

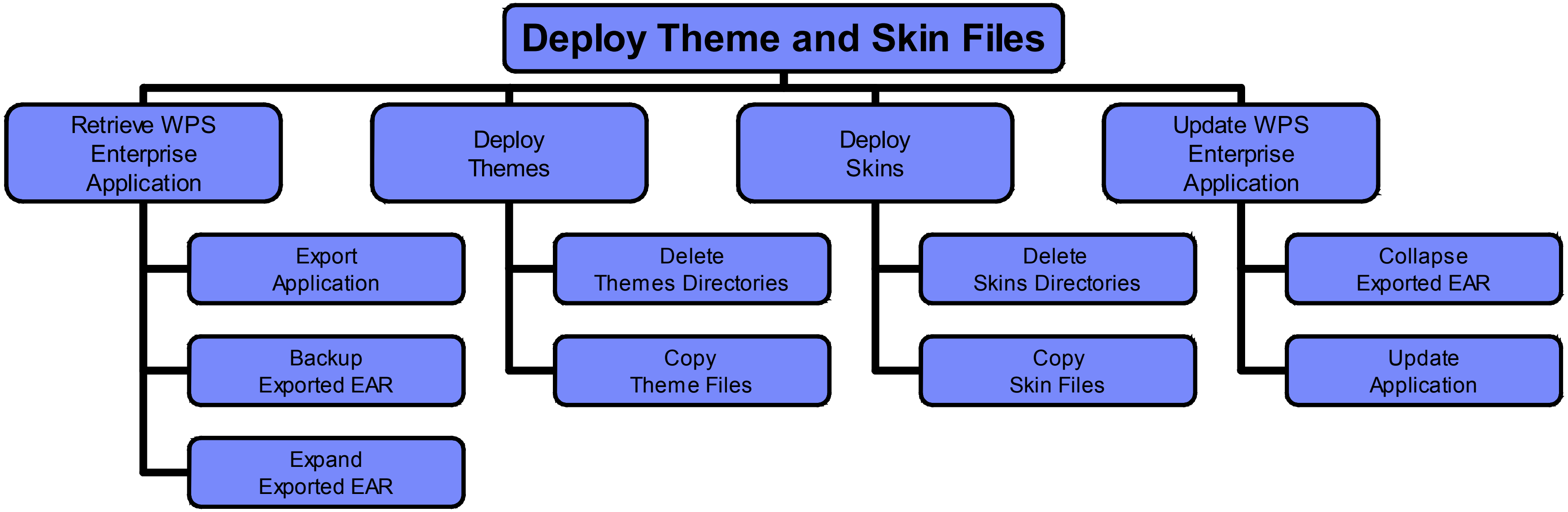
Deploy Theme and Skin Files*

Deploy WCM Components*

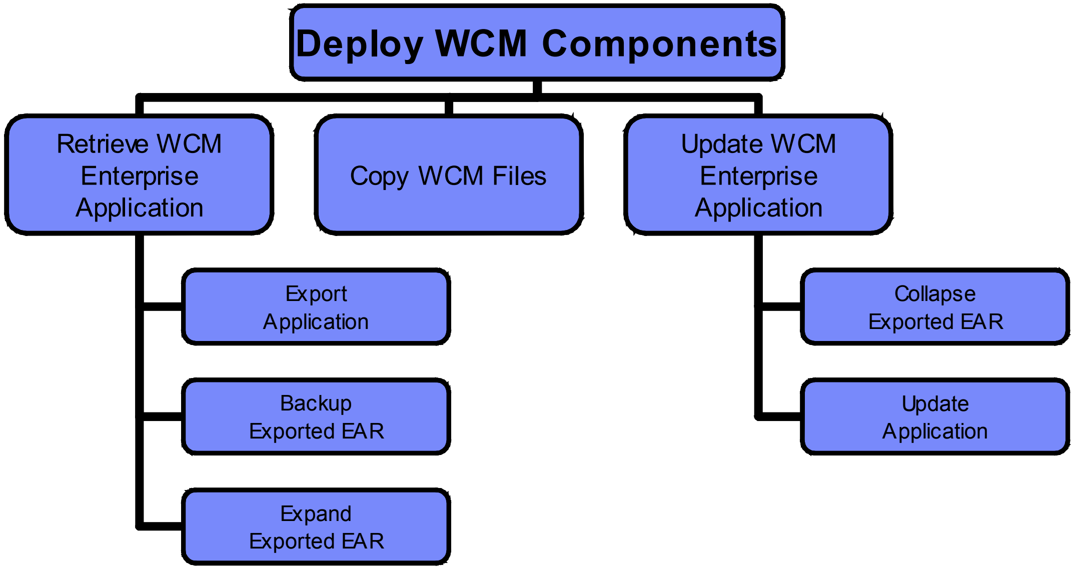
Synchronise Nodes

Restart Portal Cluster

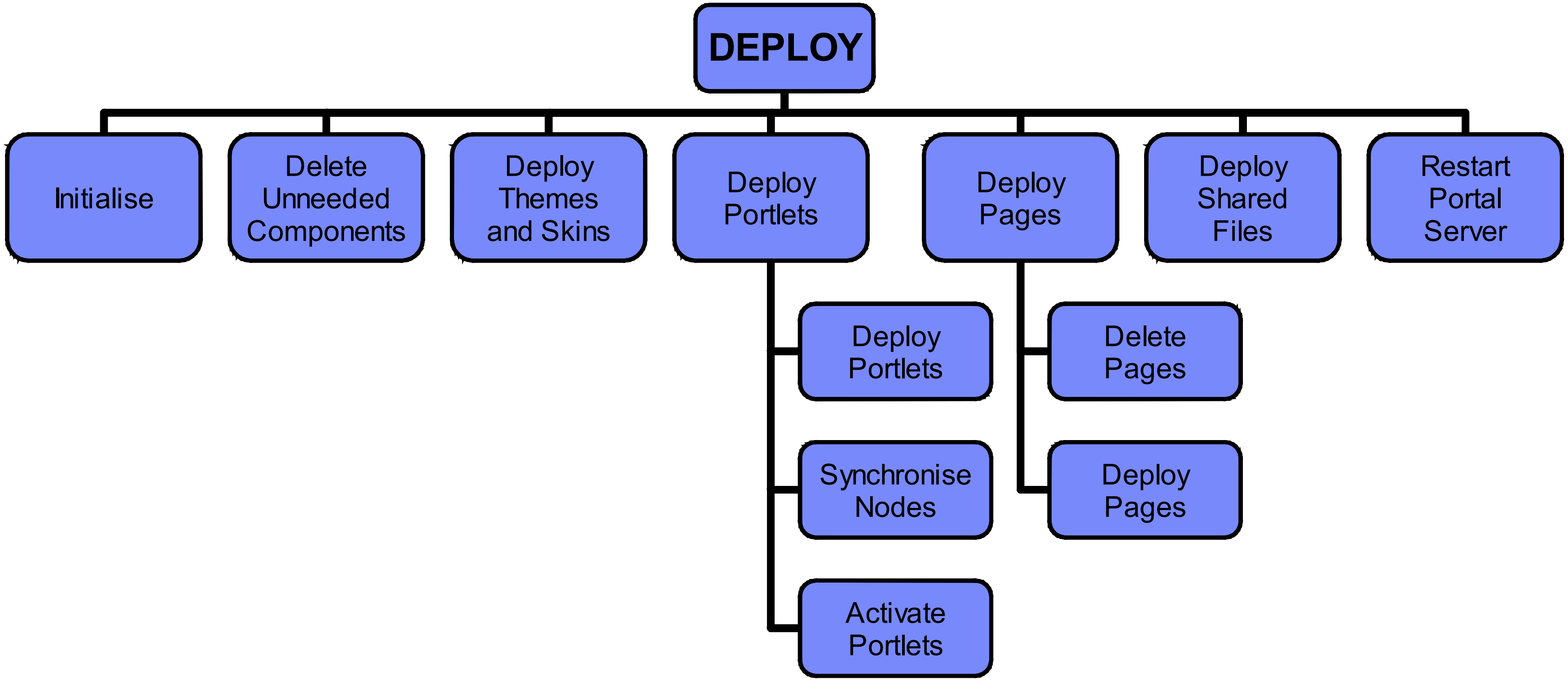
Deployment process (clustered environment) - *Deploy theme and skin files*



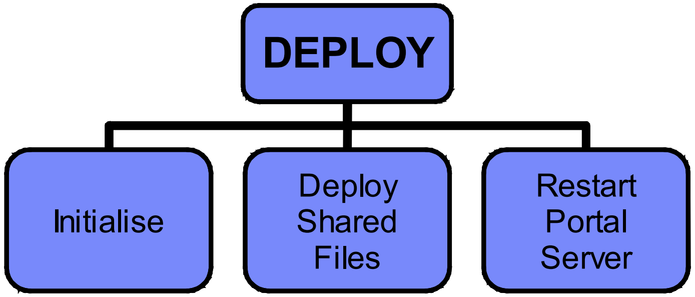
Deployment process (clustered environment) - *Deploy WCM components*



Deployment process (clustered environment)
- Main portal node target



Deployment process (clustered environment)
- Subsidiary portal node target

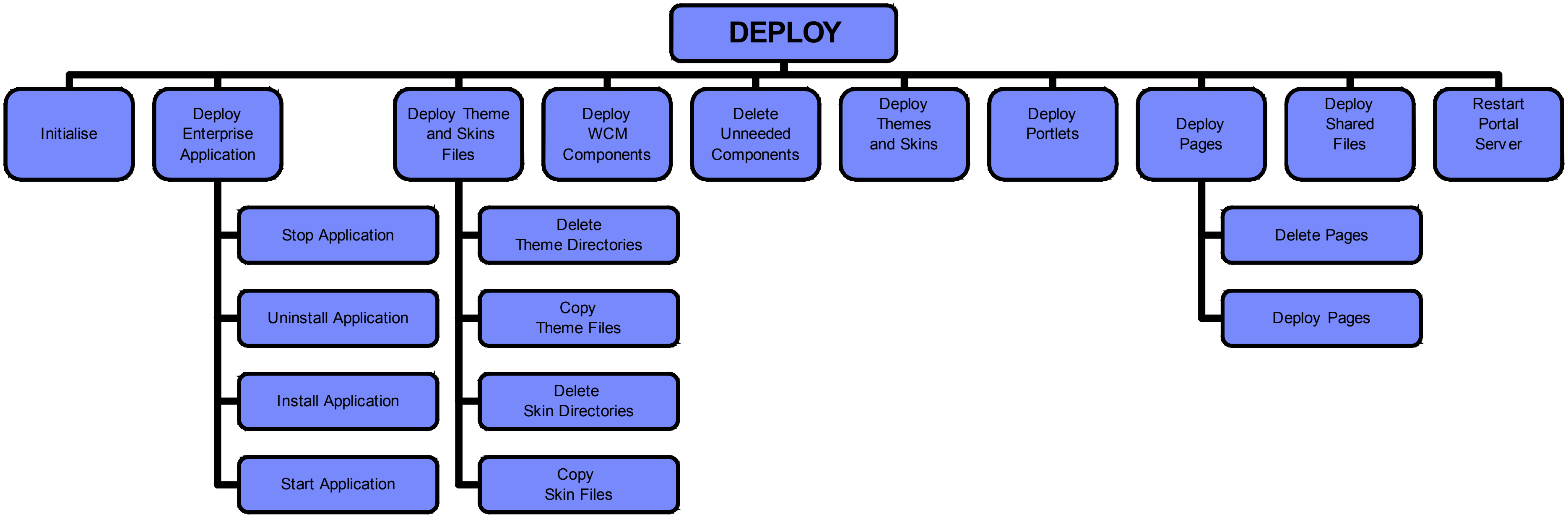

DEPLOY

Initialise

Deploy Shared Files

Restart Portal Server

Deployment process (unclustered environment)



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Planned enhancements in WebSphere Portal 6.1

Theme deployment

- **Themes can be packaged – and hence deployed and updated – as separate web applications**
- **Theme configuration in Portal specifies a context path**
- **Allows simplified management in a cluster via wsadmin**

Site management

- Page definitions treated as “content” (but not WCM content)
- Publish / promote / demote process
- Newly published version available for preview
- Visibility controlled by rules
- Previous version kept for rollback (demote)
- Resource Manager portlet provided as UI
- Scriptable via Java or JACL

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Questions?