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Deployment Planning and Automation Tools for Service Management

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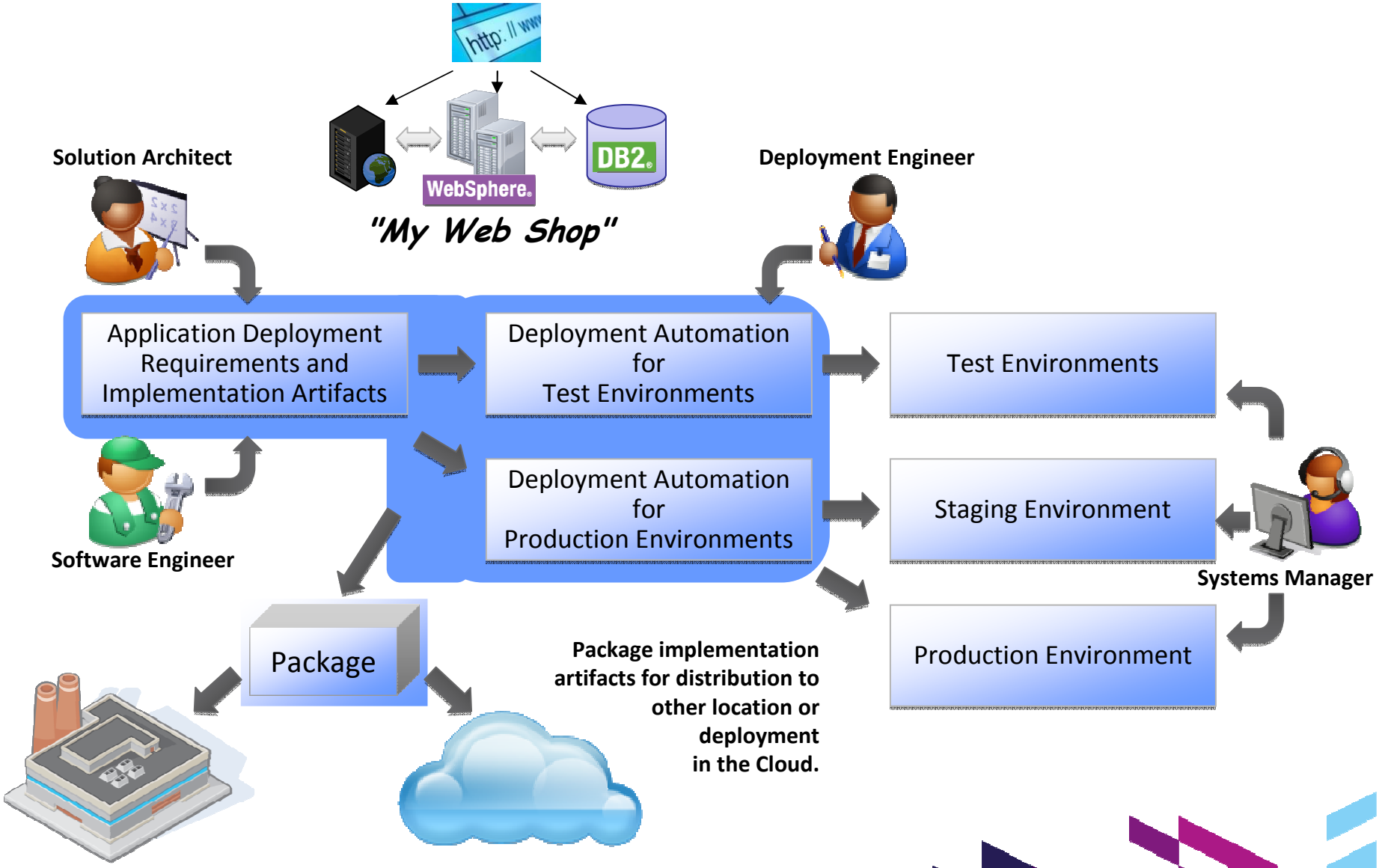
Agenda

- The Problem
- The IBM Solution
- Demo
- Summary

Example Scenario



Deployment is a Complex Problem

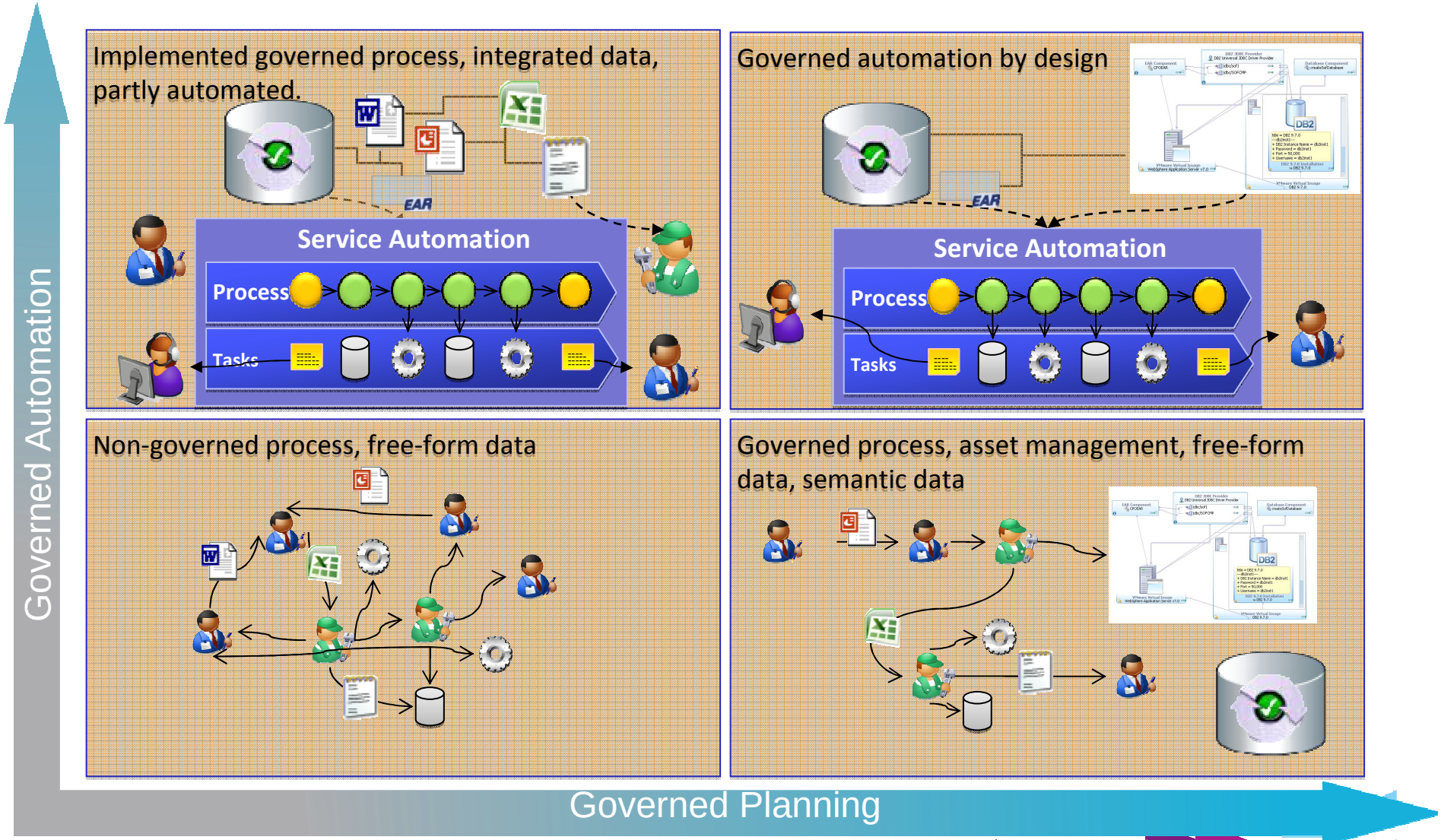
- **Development and Operations teams collaboration challenges**
  - Hand-off from development teams is inconsistent and manual
  - Application component requirements do not match IT infrastructure
- **Deployment requirements are difficult to validate**
  - Enterprise, Software & IT architects all use different formats
  - No standardization or templates for reuse
- **Complex series of steps**
  - Deployment engineers often execute manual steps
  - Not repeatable, prone to error
  - Automations are hard to build, maintain and reuse
  - Hard to tell what if the right things were installed

✓ 50% of applications put into production are later rolled back *(Gartner)*
✓ 60% - 80% of an average company's IT budget is spent on maintaining existing applications *(Intelligent Enterprise.com)*
✓ Software related downtime cost industries almost $300 billion annually *(CENTS - Comparative Economic Normalization Technology Study)*

The IBM Solution

Integrated Rational and Tivoli tools

Introduction of Service Automation is an Evolutionary Process



IBM Deployment Planning and Automation

Improving collaboration between Development and Operations teams

Plan your desired deployment using discovered resources and standard configuration templates

Plan

Govern, *catalog, and share* application artifacts, standard templates and deployment plans

Automate infrastructure provisioning, middleware configuration, and application installation

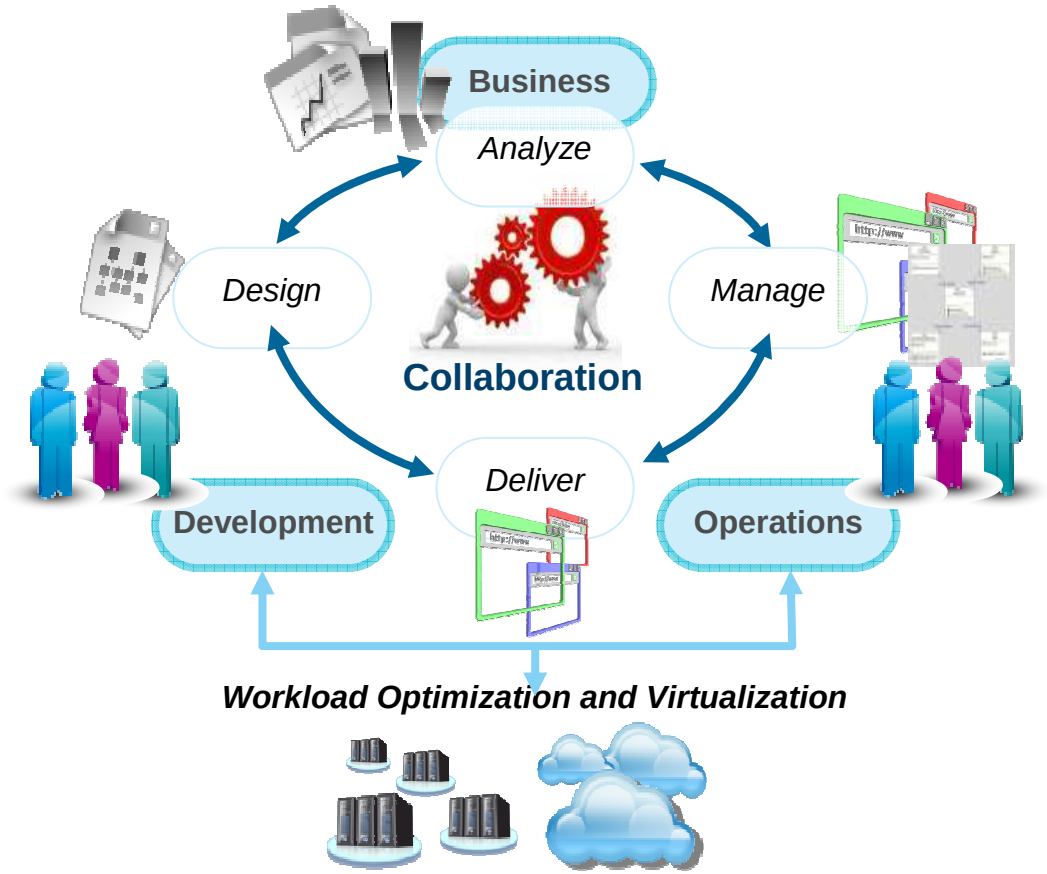
Govern

Automate

Speed the delivery of high quality applications to physical, virtual, and cloud environments

9

Deployment Planning & Automation



- Integrate and automate development-operations lifecycle
- Collaborative Incident Management
- Accelerate release cycles and speed defect resolution

Capabilities

Deployment Planning and Automation

Collaborative Lifecycle Management

IBM Offerings

Rational Software Architect

Tivoli Service Automation

Tivoli Provisioning

Rational Automation Framework

Rational Asset Manager

IBM Collaborative Development and Operations enables Smarter Products and Services

- **Optimize** application performance in production
- **Trace** problems from operations into development
- Link & **synchronize** development and operational data
- Utilize operational data to **validate** new architecture
- **Automate** solution lifecycle process and testing

Software Development Processes

Managing the lifecycle of software assets

DEVELOPMENT OPERATIONS

Service Delivery, Support and Operations Processes

Managing the lifecycle of operational assets

Design & Development Platform

Service Management Platform

STRATEGY DESIGN DELIVER MANAGE METRICS

CONTINUAL SERVICE IMPROVEMENT

Scenario

Solution Architect

Describe the topology that captures the deployment requirements for a composite application.

Would love to
-Reuse known good plans and assets
-Discover existing resources vs guess

Deployment Plan

Application Artifacts and Templates

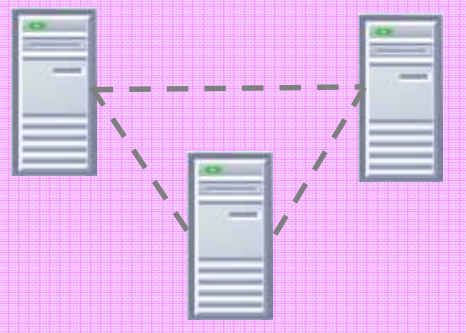
Plan and create workflows

Provision platform and install/configure application

Deployment Engineer

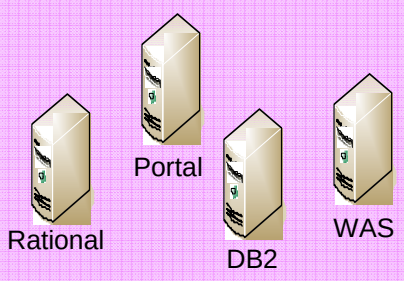
Defines environment media, creates building block workflows, creates service definition and associated management plans

Deployment Environments



Physical Hosts

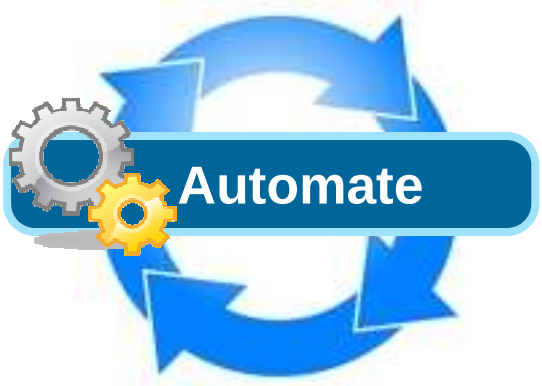
Or

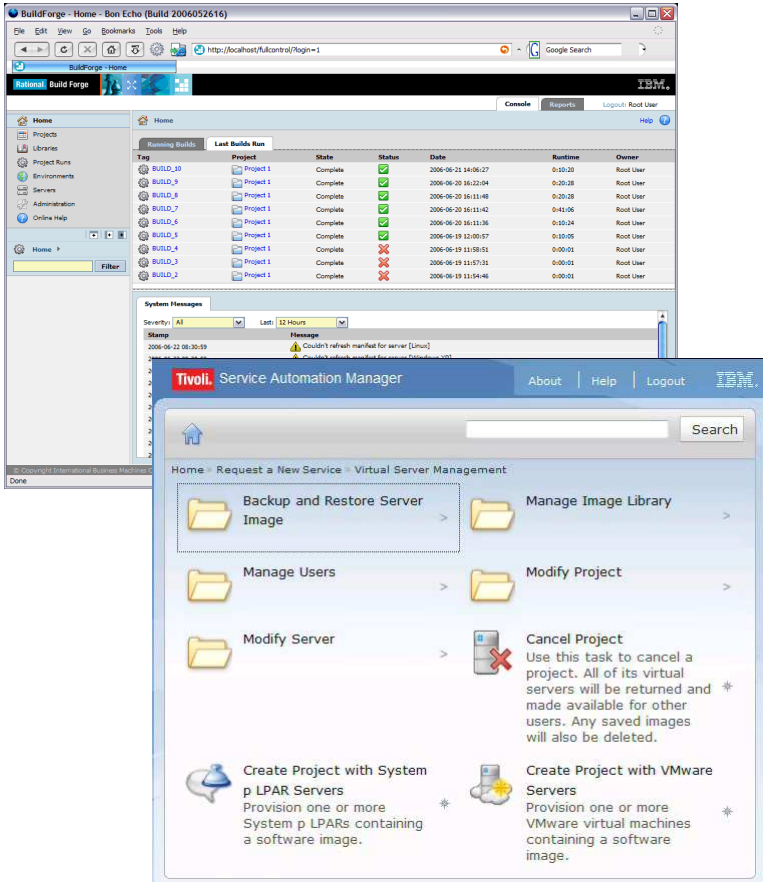


Virtual Host

Or

Cloud


Automate

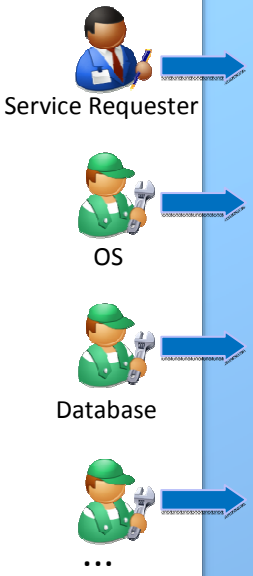

BuildForge - Home - Bon Echo (Build 2006052616)
Tivoli. Service Automation Manager
About
Help
Logout
Search
Home
Request a New Service
Virtual Server Management
Backup and Restore Server Image
Manage Image Library
Manage Users
Modify Project
Modify Server
Cancel Project
Use this task to cancel a project. All of its virtual servers will be returned and made available for other users. Any saved images will also be deleted.
Create Project with System p LPAR Servers
Provision one or more System p LPARs containing a software image.
Create Project with VMware Servers
Provision one or more VMware virtual machines containing a software image.

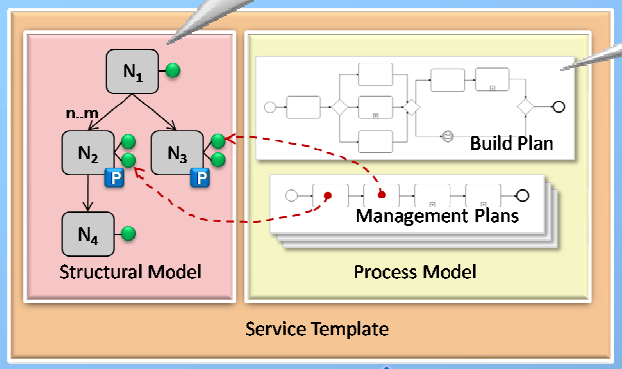
Tivoli Service Automation Manager's Approach for IT- and Cloud Service Management

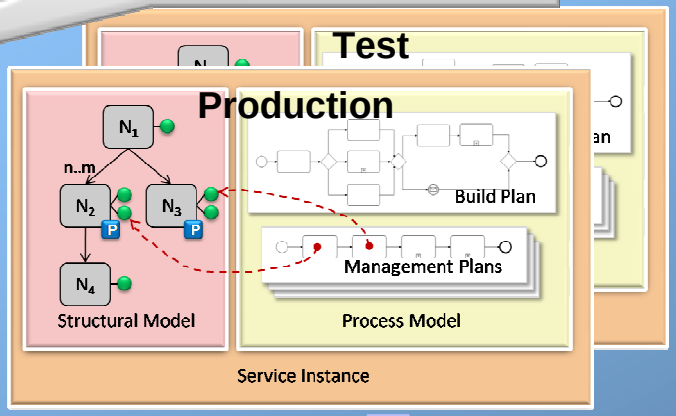
Roles and Responsibilities
- Role-based access to model
- Role-based tasks

Service Templates
- Structural model and management process model
- Including points of variability

Management Plans
- Best-practices process model for instantiating, managing and terminating services
- Defines process and data flow
- Adapts to variability of service

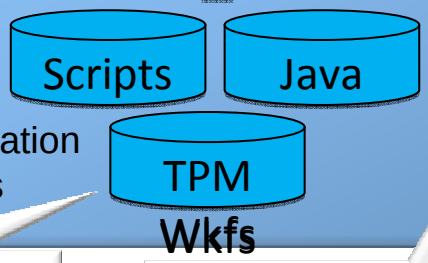




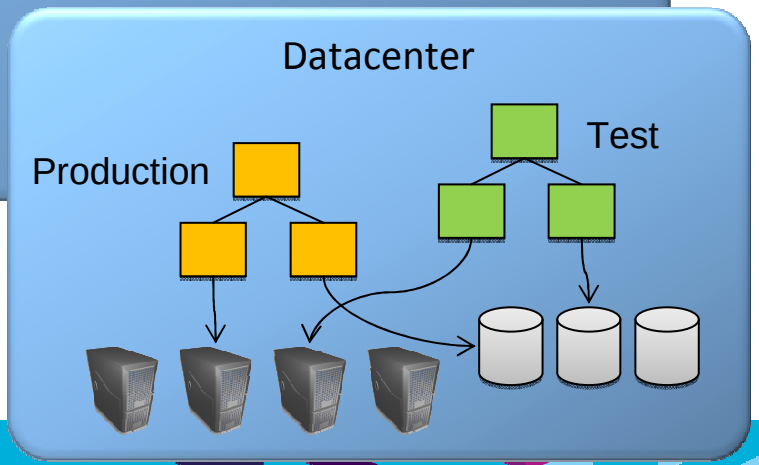


instantiate

manage



Automation Assets



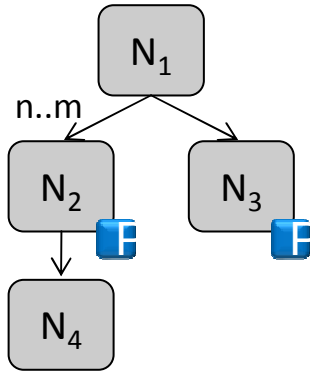
Automation Assets
- Plugged into management plans
- Integration with TPAe-internal automation tools (e.g. TPM)
- Integration of custom scripts

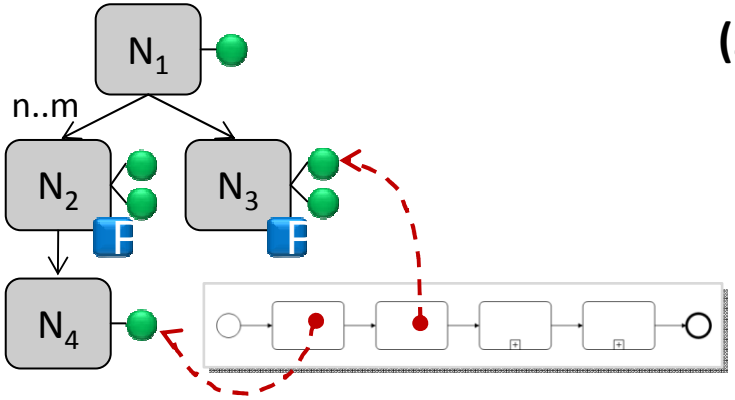
Parameterized Instantiation
- Fill in points of variability
- Select options
- Bind to concrete resources

Tivoli Service Automation Manager implements a holistic Model for Service Lifecycle Management

(1) Service topology templates capture IT- and Cloud Service reference architectures

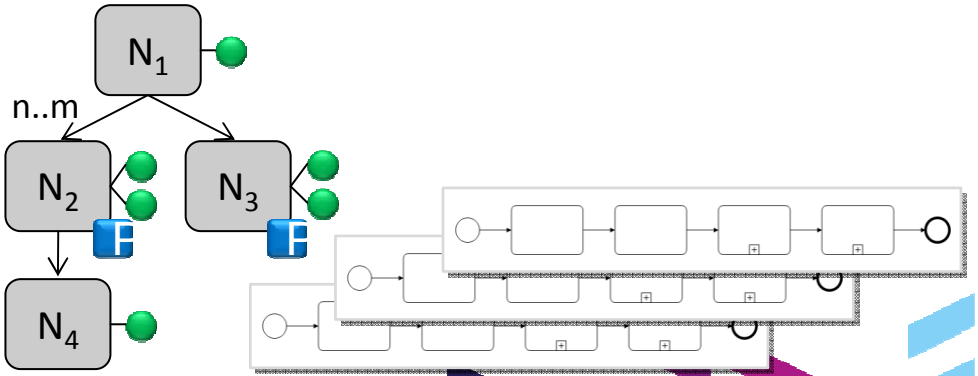
- Service as a composition of its components, and their relationships and dependencies
- Configuration templates and allowed variations
- Including non-functional aspects and policies





(2) Integrate structural and management process models enable architecture-compliant automation

- Management processes as an orchestration over service components, invoking operations on service components
- Including integration into surrounding enterprise processes



(3) Service lifecycle management

- Initial deployment of services
- Operational management of services
- Termination of services

Rational Automation Framework for WebSphere (RAFW)

Customizable and extensible framework that delivers…

- Configuration management automation
- Application deployment automation
- Product installation & patching automation

Core Strengths…

Accuracy	***"Data Driven" - Maintains normalized configuration data***
Reliability	***Apply right data to the right target environment***
Consistency	***Apply data in repeatable manner to target environments***

What goes into RAFW?

Rational Automation Framework

+

WebSphere Module (WAS, IHS, Portal, WPS, WSRR, WESB, WVE)

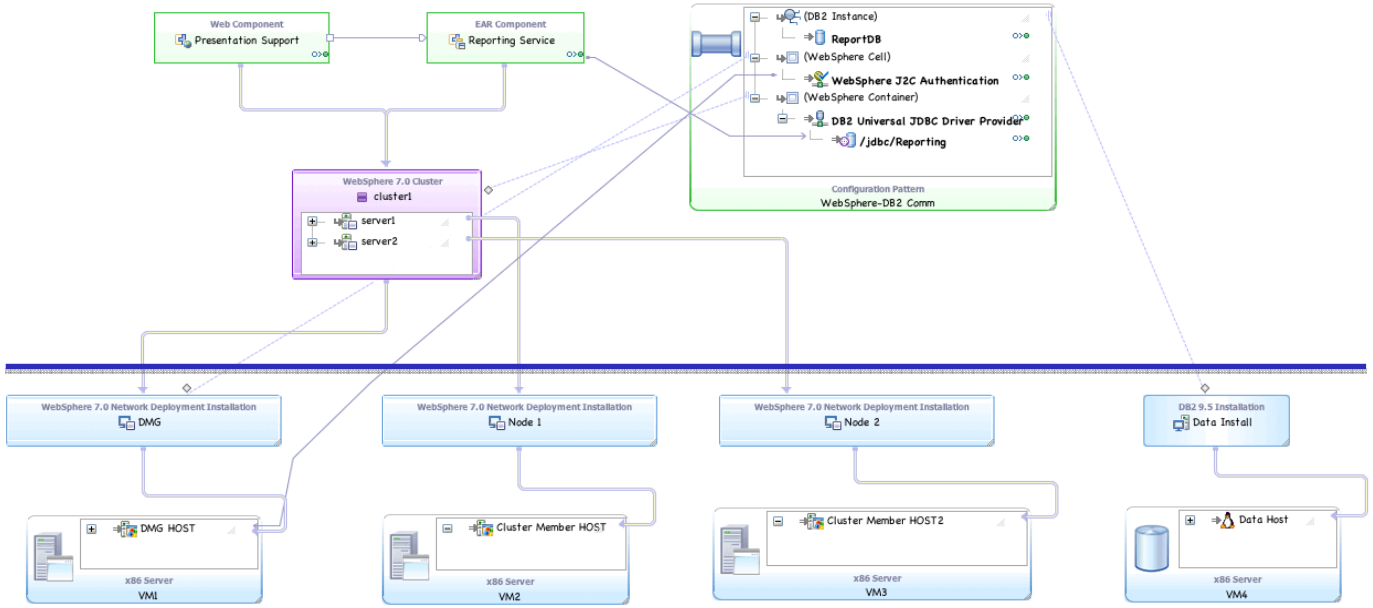
- ***Automates Tasks***
- ***Scheduling***
- ***Notifications***
- ***Auditability***
- ***Visibility***
- ***Consolidation & standardization***
- ***Role-based Security***

- ***Library of 750+ commonly used tasks to administer WebSphere family products***
- ***Environment Generation Wizard***
- ***Extensive help information***
- ***Preset integration with IBM Workload Deployer***
- ***Predefined automation library elements***

Tivoli Provisioning Manager and Rational Automation Framework Positioning

Rational Automation Framework

Tivoli Provisioning Manager

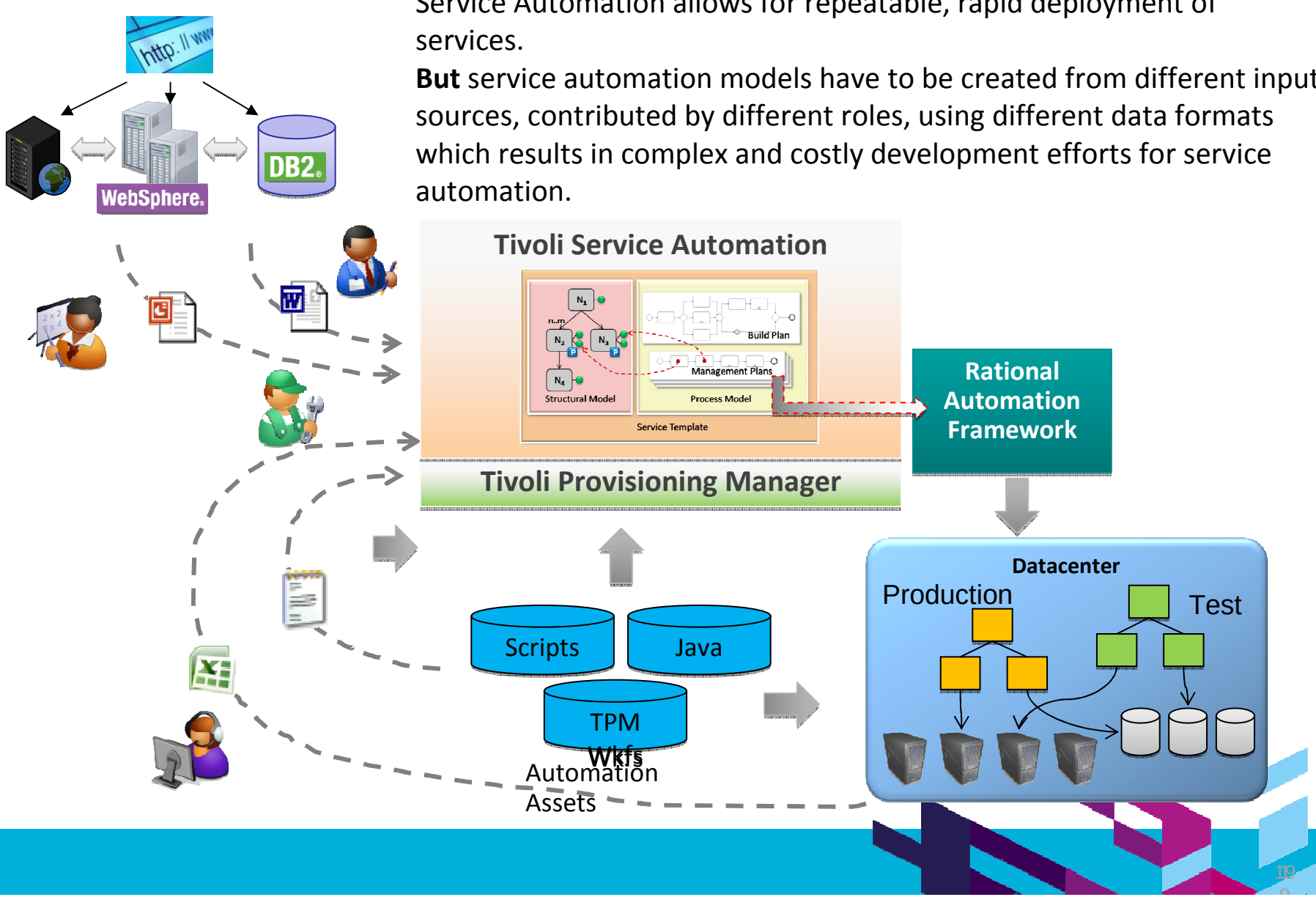


Rational Automaton Framework package available on Integrated Service Management Library to integrate TPM workflows with RAF workflows

The Remaining Challenge…

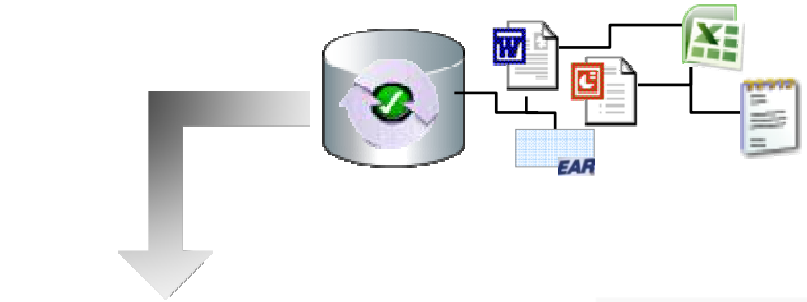
Service Automation allows for repeatable, rapid deployment of services.

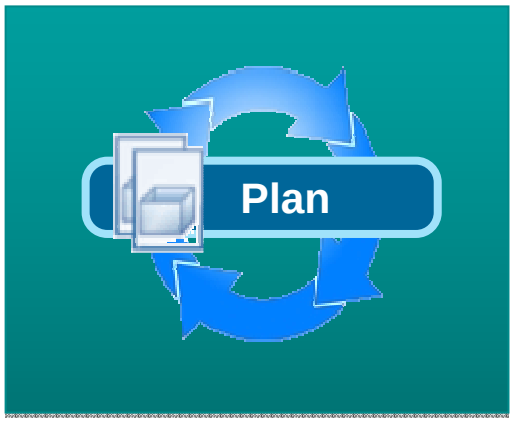
But service automation models have to be created from different input sources, contributed by different roles, using different data formats which results in complex and costly development efforts for service automation.

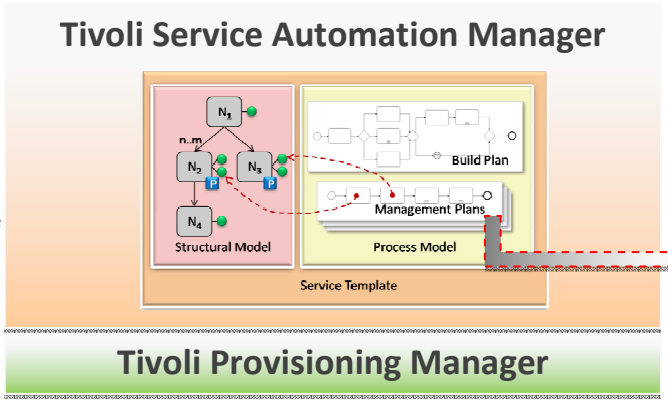


Automation by Design as the Next Step

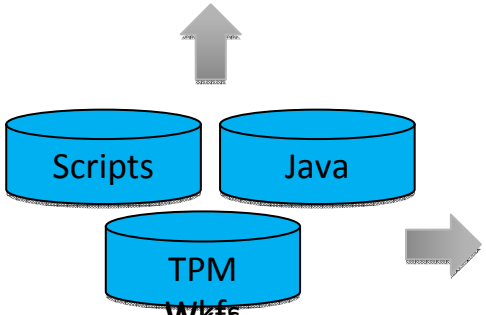
Integrated architecture and design tooling supporting different roles, and generation of automation models and flows out of design models leads to and end-to-end integrated flow of design → deployment → management of IT- and Cloud Services.

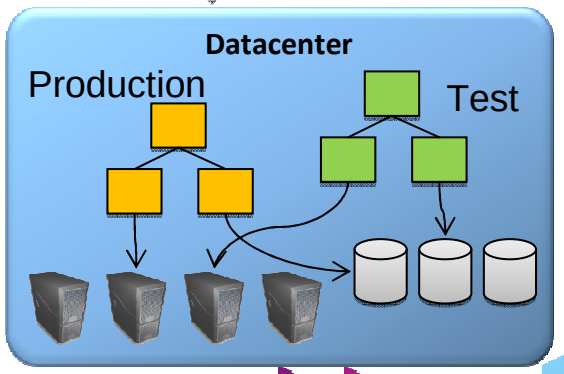


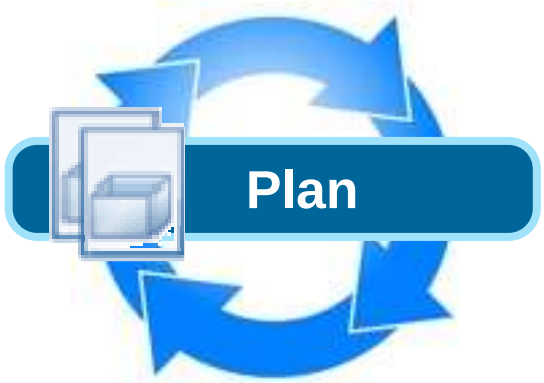


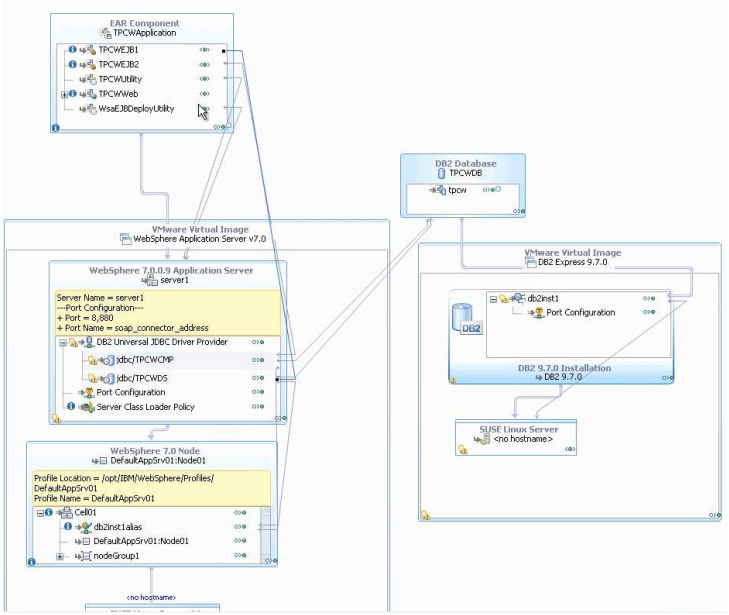


Rational Automation Framework






Plan


EAR Component
TPCWApplication
TPCWEJB1
TPCWEJB2
TPCWUtility
TPCWWeb
WsaEJBDeployUtility
DB2 Database
TPCWDB
tpcw
VMware Virtual Image
WebSphere Application Server v7.0
WebSphere 7.0.0.9 Application Server
server1
Server Name = server1
---Port Configuration---
+ Port = 8,880
+ Port Name = soap_connector_address
DB2 Universal JDBC Driver Provider
jdbc/TPCWCMP
jdbc/TPCWDS
Port Configuration
Server Class Loader Policy
WebSphere 7.0 Node
DefaultAppSrv01:Node01
Profile Location = /opt/IBM/WebSphere/Profiles/DefaultAppSrv01
Profile Name = DefaultAppSrv01
Cell01
db2inst1alias
DefaultAppSrv01:Node01
nodeGroup1
<no hostname>
VMware Virtual Image
DB2 Express 9.7.0
db2inst1
Port Configuration
DB2
DB2 9.7.0 Installation
DB2 9.7.0
SUSE Linux Server
<no hostname>

What is Tivoli's Discovery and Mapping capability ?

- One of Tivoli brand's focus areas is IT Service Management – ensuring that business apps provide the required service
- Understanding your production IT infrastructure, applications, relationships, dependencies and change helps provide:
  - Higher levels of customer service
  - Minimisation of change-related risk
  - Improved processes for software building, delivery and support
- IBM's primary technology for achieving this is:

Tivoli Application Dependency Discovery Manager (TADDM)

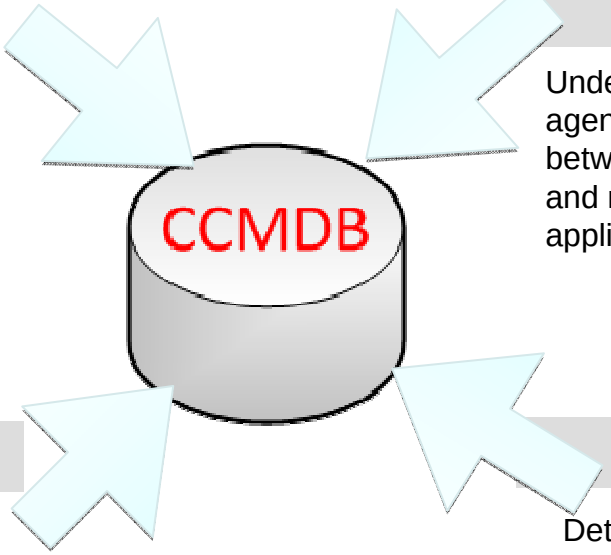
TADDM tells you what IT your organisation has, how it is configured and how it is changing over time

Universal Discovery Engine

Discovers configuration items and their Actual State. Includes Topology Views and the ability to discover relationships between items. Name Reconciliation And Normalization of data

Application Mapping with Dependencies

Understand what IT you have through agent-less discovery of interdependencies between applications, middleware, servers and network components and automated application mapping



Configuration Auditing

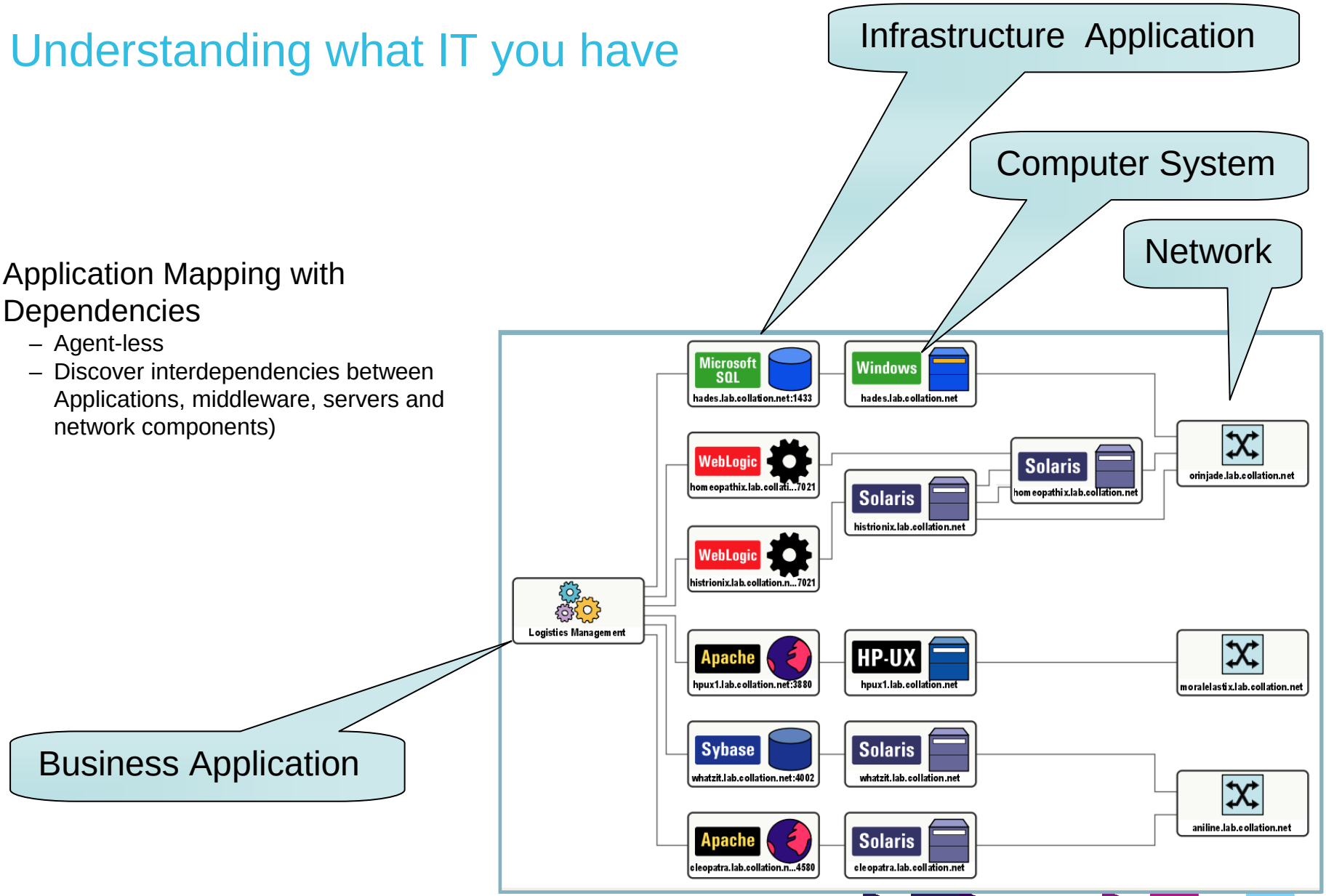
Shows how configuration items are configured and changing over time by capturing the configuration of each CI, tracking changes to it and providing analytics to report on the history of these configuration changes over time

Compliance

Determines if configuration items are compliant by using the capability to compare discovered configuration of CIs to a "reference configuration" and determine the variations that define violations to local policy

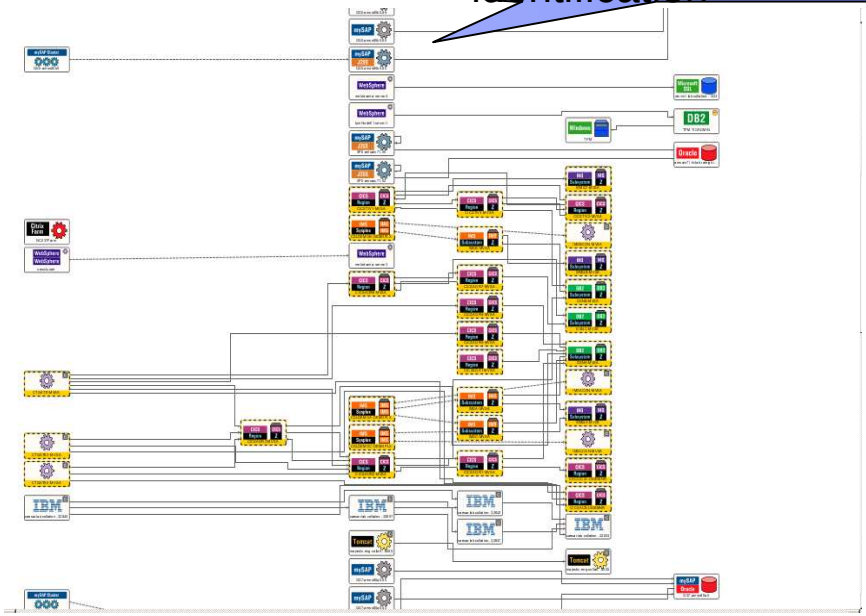
Understanding what IT you have

- Application Mapping with Dependencies
  - Agent-less
  - Discover interdependencies between Applications, middleware, servers and network components)



How are your CIs configured (& changing over time)

- Configuration Auditing
  - Tracks changes in applications
  - Depicts that information on the map
  - Depicts that information thru reports



Details of what has changed

Change History: Results

Component	Type	Change	Date	Attribute	Old Value	New Value	Id
cleopatra.lab.collation.net:8080	Apache	Updated	2/20/09 8:50 EST				
ApacheWebContainer	ApacheWebContainer	Updated	2/20/09 8:50 EST	keepAliveTimeout	30	40	40
ApacheWebContainer	ApacheWebContainer	Updated	2/20/09 8:50 EST	maxClients	140	50	50
conf/httpd.conf	ConfigFile	Updated	2/20/09 8:50 EST				

Are my CI's compliant with SOE?

- Compliance
  - Compare configuration to "reference master"
  - Compare to your standard policy

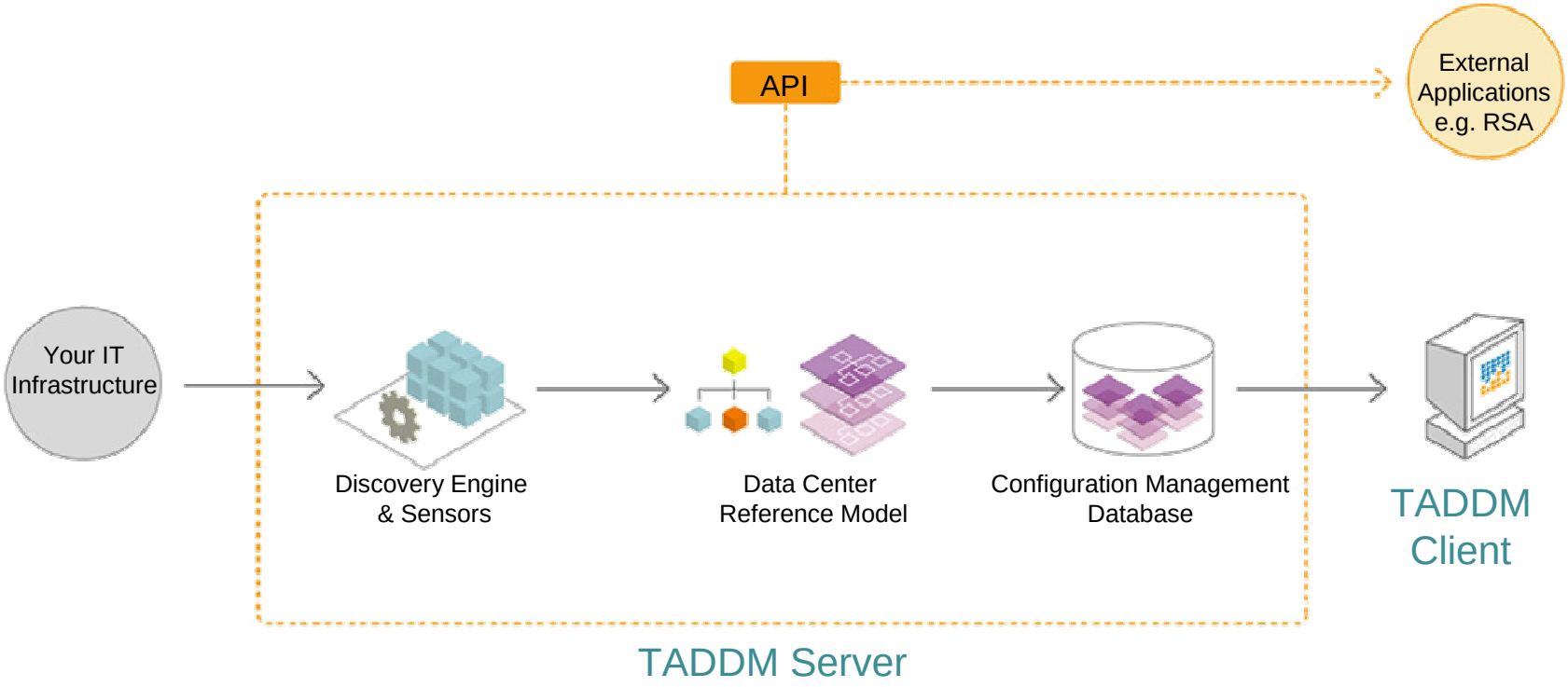
Comparing two instances of an Apache Web Server to the reference master

Component Comparison: Results

	unknown:7003 - Version: Current	unknown:8080 - Version: Current
Modules		
Product Version	1.3.26 (Unix)	2.0.54
Label	homeopathix.lab.collation.net:7003	cleopatra..lab.collation.net:8080
Primary SAP		
Host System		
Name	homeopathix.lab.collation.net	cleopatra.lab.collation.net
Config Contents		
conf/httpd.conf		
Content		
Size	36400	36394
Group	coll	other
Checksum	lgT9jWpbuLwhAlaadr1WVA==	EWNic0ws/3UB5WwMpdEPPQ==
Owner	jwang	root
Permissions	-rw-r-----	-rw-r--r--
Last Modified	1/28/05 14:15 EDT	8/8/06 01:14 EDT
Process Pools		
App Descriptors		
Containers		
ApacheWebContainer		
Server Root	/usr/local/apache2	/usr/local/apache-2.0.54
Keep Alive Timeout	15	40
Server Type	standalone	
Virtual Hosts		
Max Clients	150	50
Score Board File	/usr/local/apache2/logs/httpd.scoreboard	
Start Servers	5	2
Pid File	/usr/local/apache2/logs/httpd.pid	/usr/local/apache-2.0.54/logs/httpd.pid
Min Spare Servers	5	2

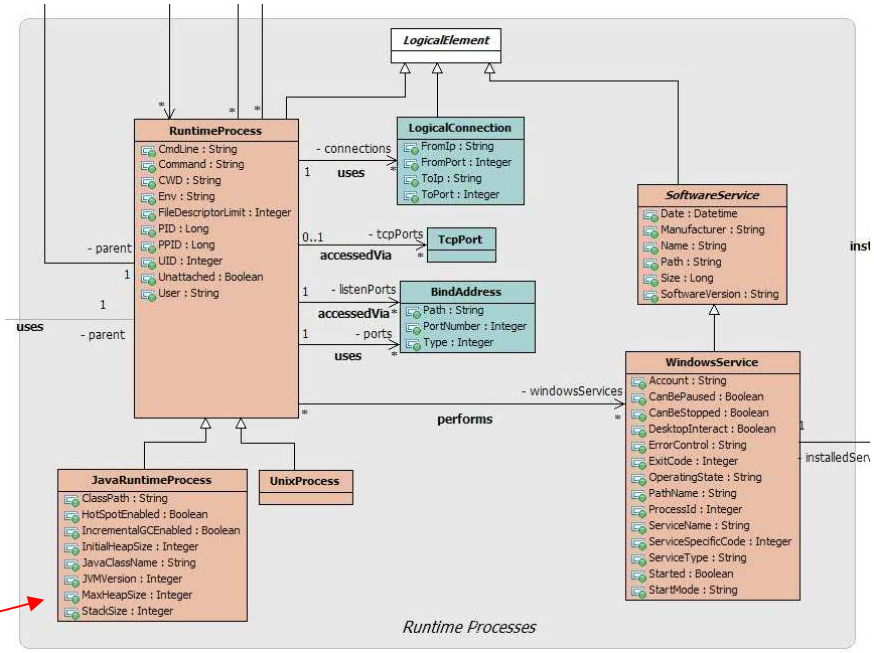
Highlighted values show deviations for authorized state

How TADDM Works



DataCenter Reference Model (aka Common Data Model)

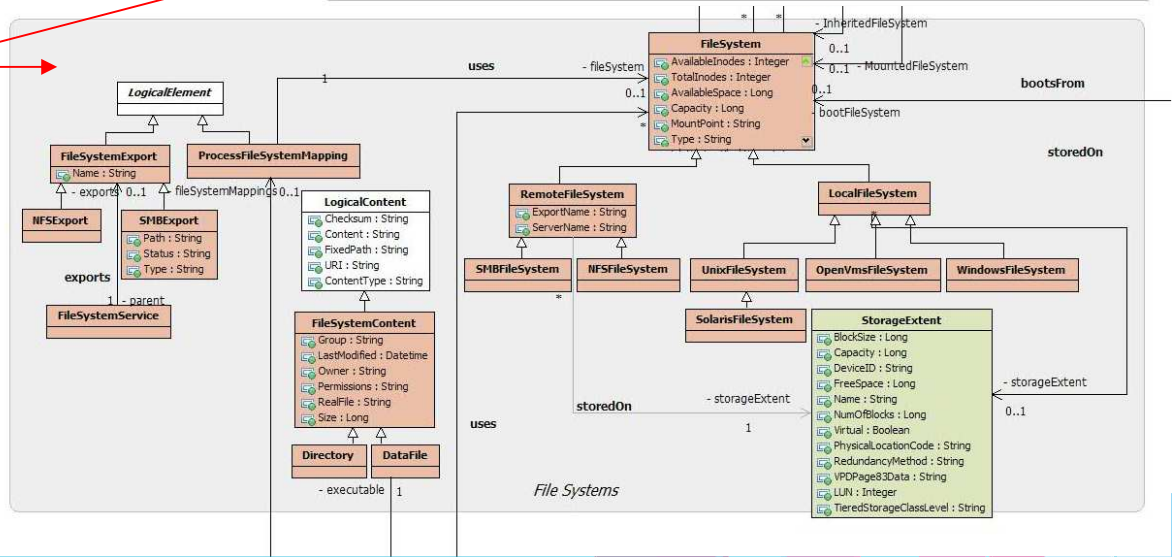
- Holds all CI's discovered by TADDM
- Contains CI details and relationships between them
- Common data format shared between various Tivoli products
- Easily augmented with data from other sources



Sections

The Common Data Model is divided into "sections" to organize related model entities and make it easier to navigate for those that ha more abstract sections, so you may need to familiarize yourself with multiple sections to understand all the relevant details for your pur Miscellaneous.

- Administration
- Apache
- Applications
- BizTalk
- Blade
- CM Cluster
- Citrix
- Cluster
- Computer System
- Core
- DB2
- Databases
- Dependency
- Devices
- Equipment and Metering
- Generic
- HIS
- HVAC Equipment
- HiRDB
- IIS
- IPlanet
- ITIL
- Informix
- IpNetwork
- IpRoute
- J2EE
- JBoss
- Lotus
- Lotus Config
- MQ Series
- MS Failover Cluster
- MS SQL Server
- Metadata
- Metric
- Microsoft Exchange 2003
- Microsoft Exchange 2007
- Microsoft Exchange 2007 reso
- Mobile
- MySAP
- Networking
- Operating System
- Oracle
- Oracle App
- Oracle App Web
- Physical
- Power Distribution Equipment
- Power Storage Equipment
- Process
- Relationships
- SMS
- Security
- Services
- SharePoint



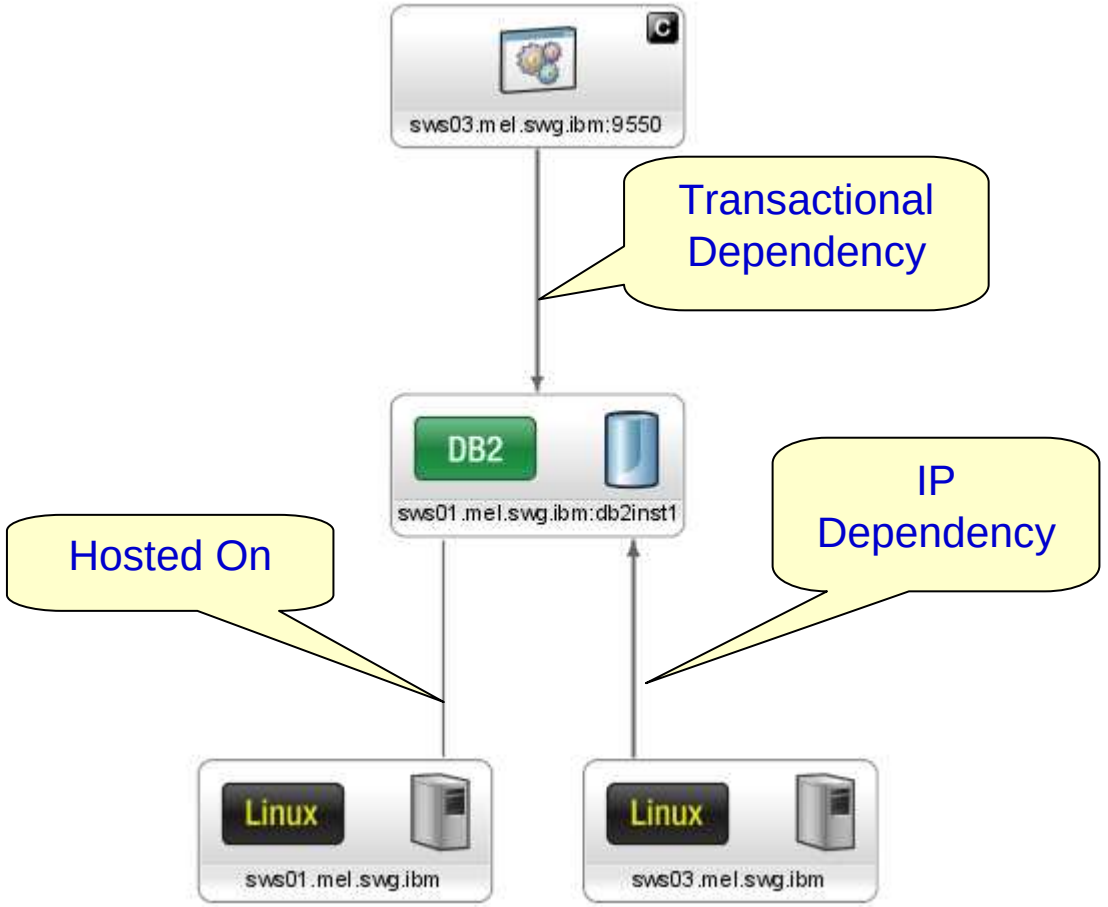
An example - Out-of-the-Box Software Relationship Mapping for DB2

Useful information TADDM tells us:

-What software and applications run on a system?

-What other application or systems are dependant on this system?

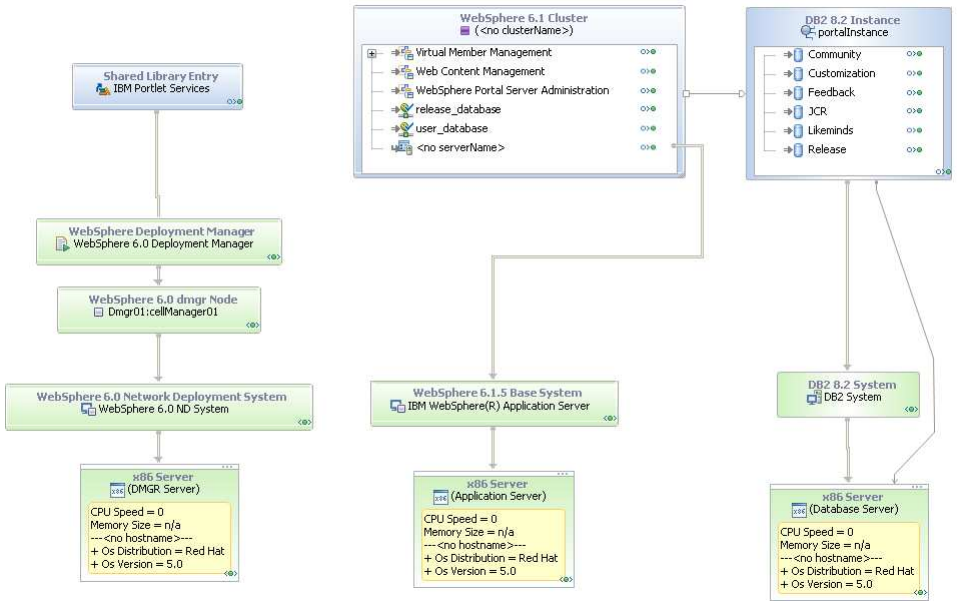
-If I deploy something new or change a piece of IT, what is the impact?



In Summary, TADDM provides the knowledge of what is out there, how it is configured and used by your business apps

Rational Software Architect

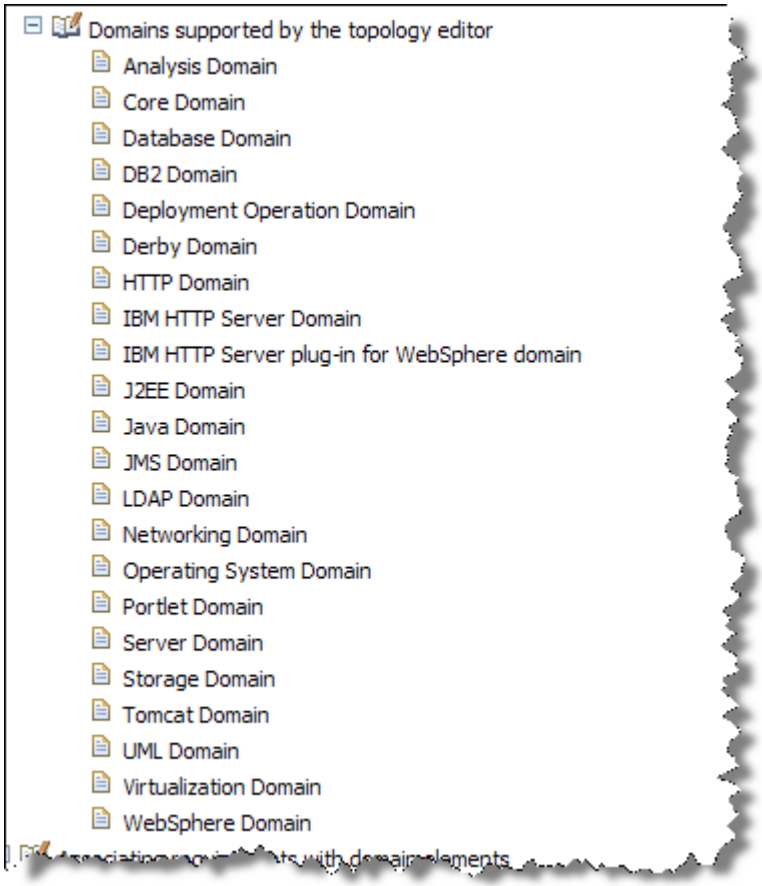
- **Smarter IT Deployment Planning**
  - Communicate and validate IT deployments to avoid costly problems late in the application lifecycle
- **Deployment Template Design and Reuse**
  - Capture and reuse organizational standards to quickly and easily plan deployments
- **Datacenter Discovery**
  - Quickly construct a topology describing what you have in your infrastructure



RSA Extension for Deployment Planning

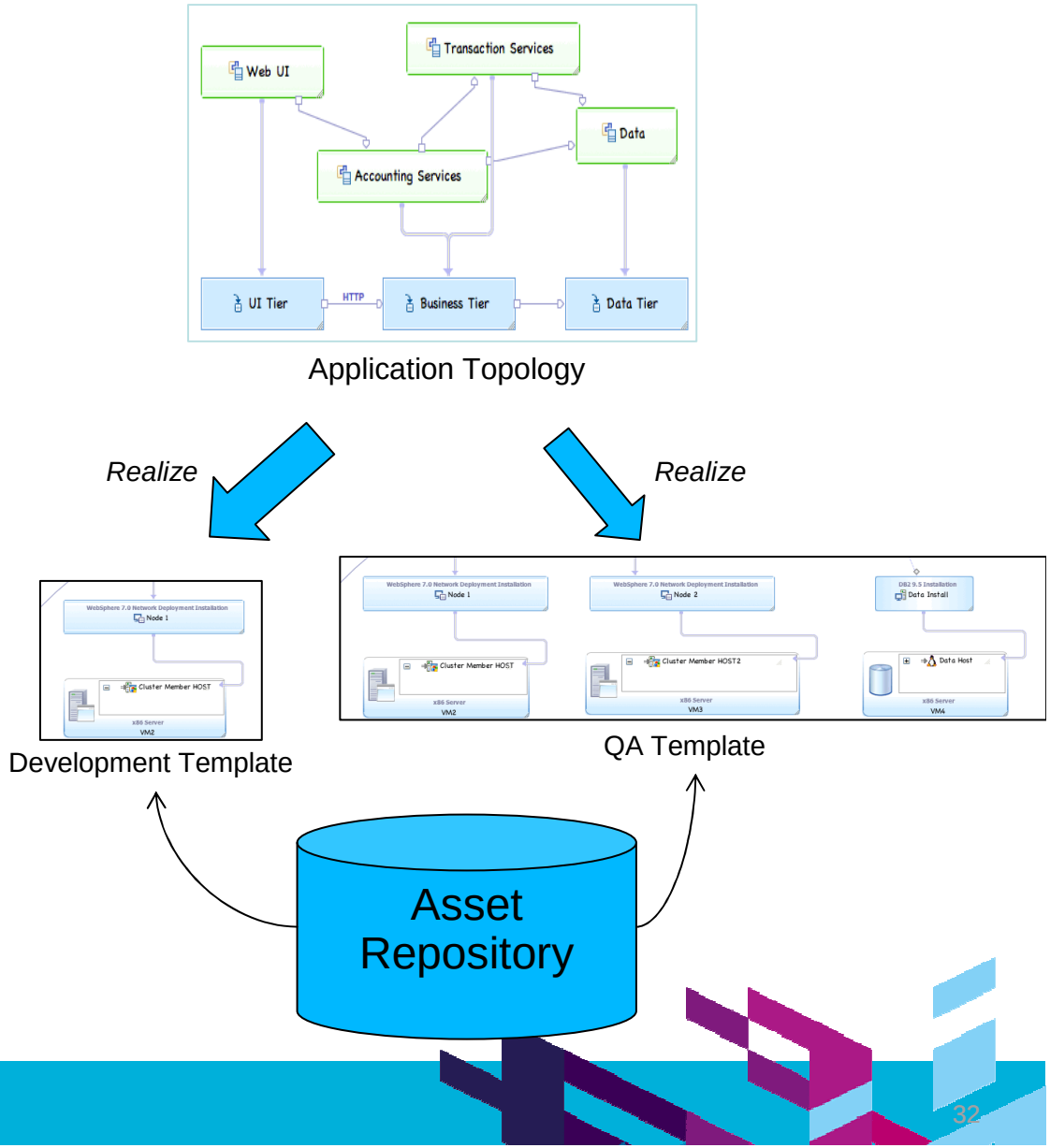
Deployment Planning Capabilities

- **Rich UI Diagraming**
  - Multiple views over the same data
  - Layers and re-usable appearances
  - Validation feedback in diagrams
  - Flexible representations
- **Backed by a rich semantic model**
  - Simple Extensible XML format
    - Dynamic extensions as well as static supported by a simple to use SDK
  - Technology domains (over 25 domains and growing)
  - Model changes reflected automatically in all diagrams
  - Constraints and validation with Quick Fix resolutions
- **Which can be reported upon**
  - BIRT report templates



Standardize with Deployment Templates

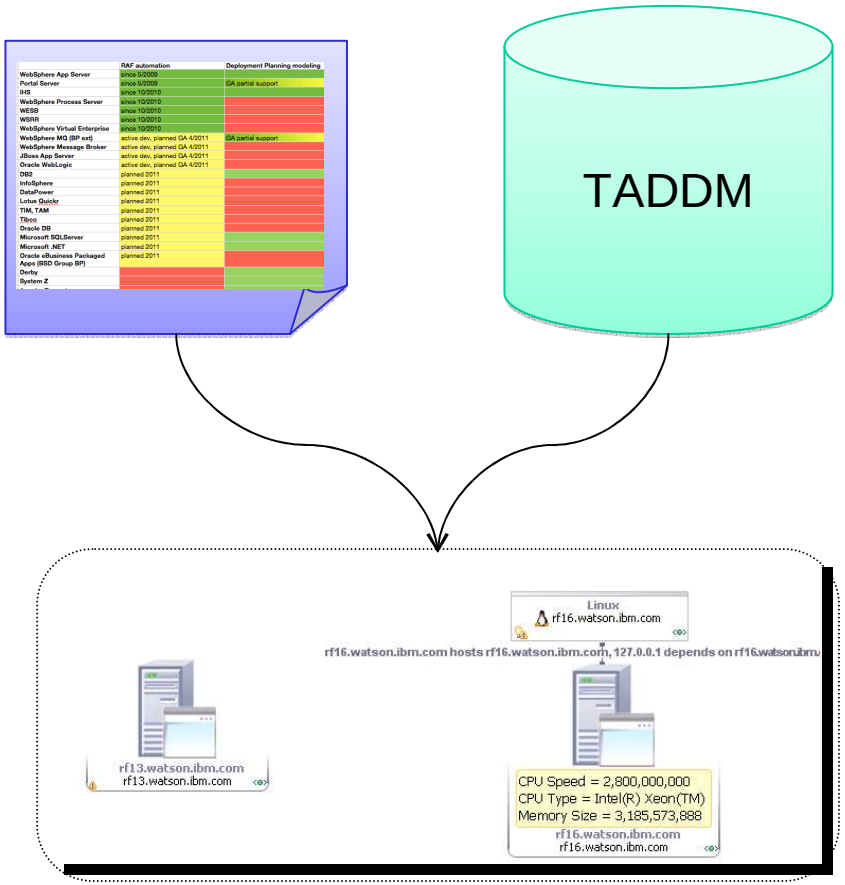
- Define and capture organizational standards with deployment templates
- Govern using an asset repository
- Reuse to guide deployment placement and implementation choices
- Ideal for capturing standard environment patterns and configurations



Datacenter Discovery

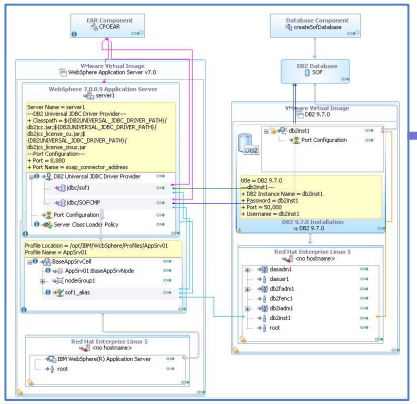
Start with what you know

- Reduce manual creation of topologies representing the current state of the datacenter
- Improved integration with Tivoli Application Dependency and Discovery Manager
  - Advanced WebSphere environment discovery
- Import datacenter information captured in spreadsheets



Automation Planning

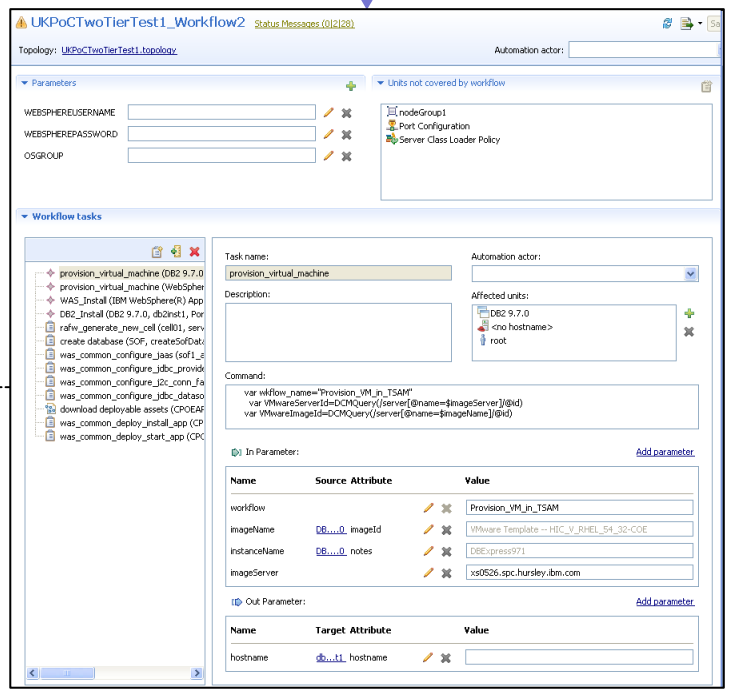
- Parameters and configuration files derive their values from the model
- Single source of truth provides pre-deployment validation and problem identification
- Allows post-generation adjustments as needed



Deployment Topology

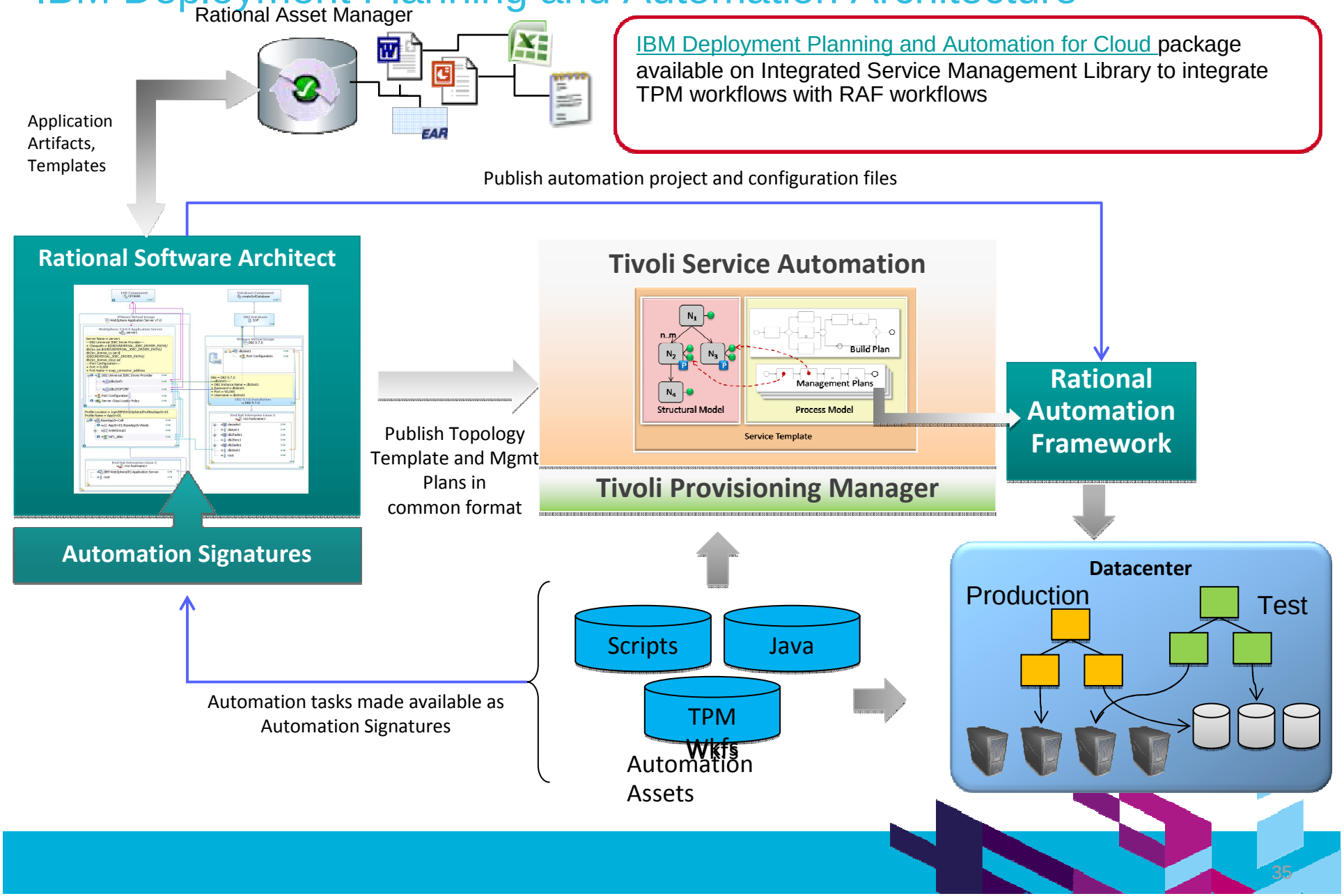
Analyze & Generate

Reference

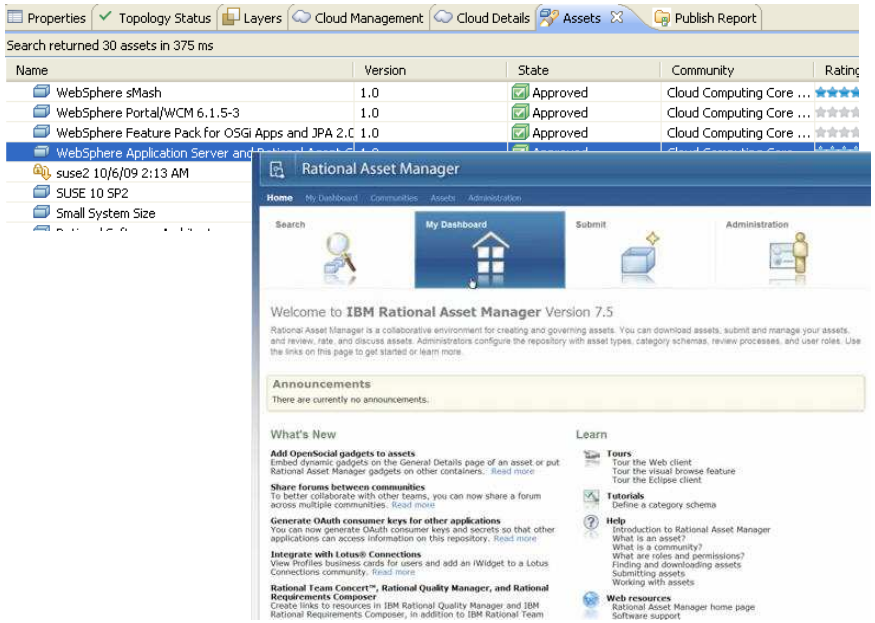


Automation Plan

IBM Deployment Planning and Automation Architecture



Govern

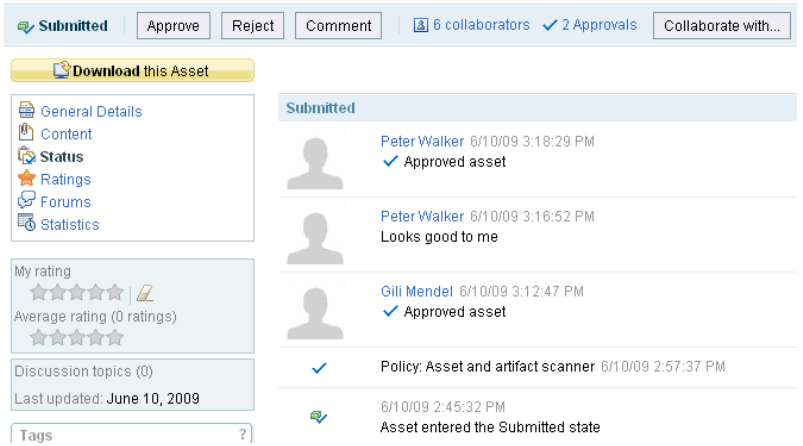

Properties
Topology Status
Layers
Cloud Management
Cloud Details
Assets
Publish Report
Search returned 30 assets in 375 ms
Name
Version
State
Community
WebSphere sMash
1.0
Approved
Cloud Computing Core ...
WebSphere Portal/WCM 6.1.5-3
1.0
Approved
Cloud Computing Core ...
WebSphere Feature Pack for OSGi Apps and JPA 2.0
1.0
Approved
Cloud Computing Core ...
suse2 10/6/09 2:13 AM
SUSE 10 SP2
Small System Size
Rational Asset Manager
Home
My Dashboard
Communities
Assets
Administration
Search
My Dashboard
Submit
Administration
Welcome to IBM Rational Asset Manager Version 7.5
Announcements
There are currently no announcements.
What's New
Learn
Tours
Tutorials
Help
Web resources

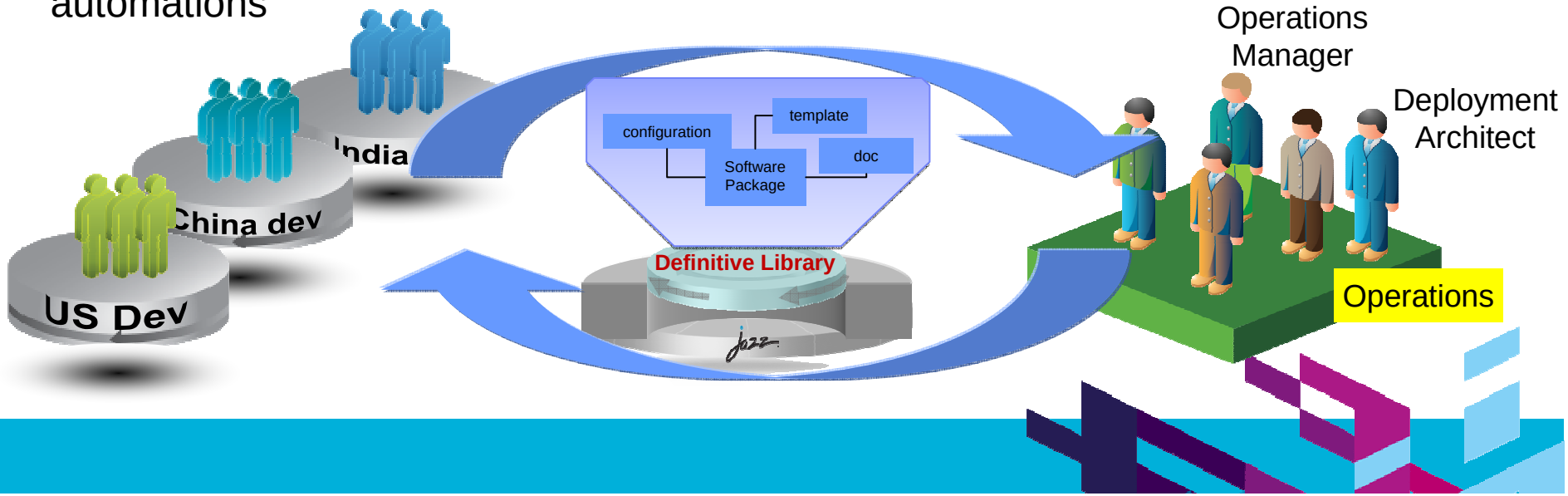
Govern your deployments using a definitive library

Deploy the right deliverables, with the right plan, using the right automation

Gain control over the:

- **People** who are stakeholders in the decision making
- **Workflow** to manage sharing
- **Policies** to enforce rules
- **Access permissions** to control access
- **Traceability and auditing** for plans and automations





Development

Deb
Software Dev. Mgr.

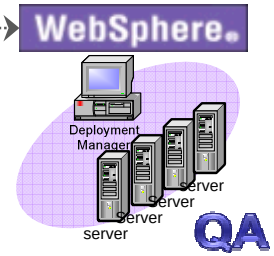
Deploy to QA please

Implementation

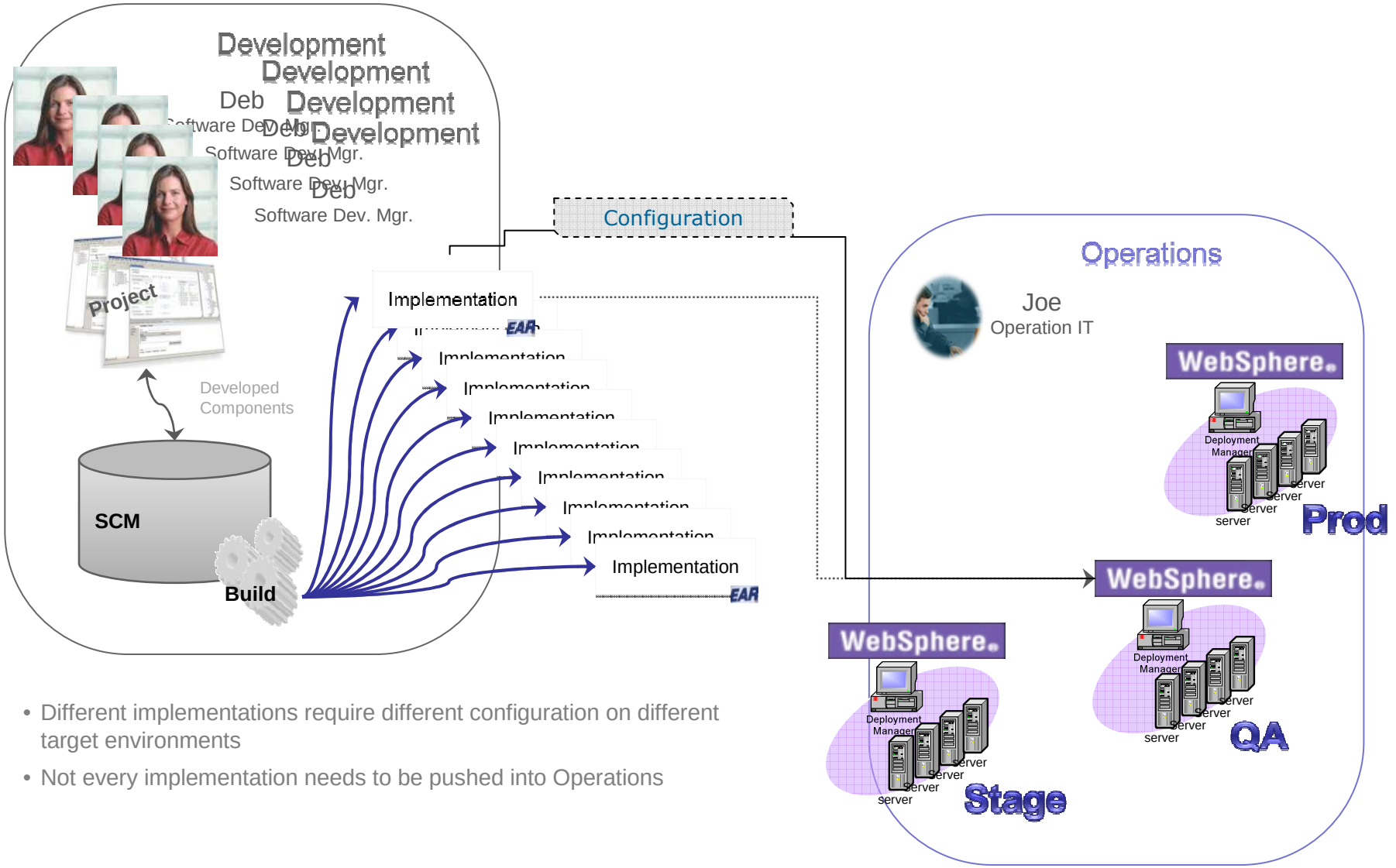
EAR

Operations

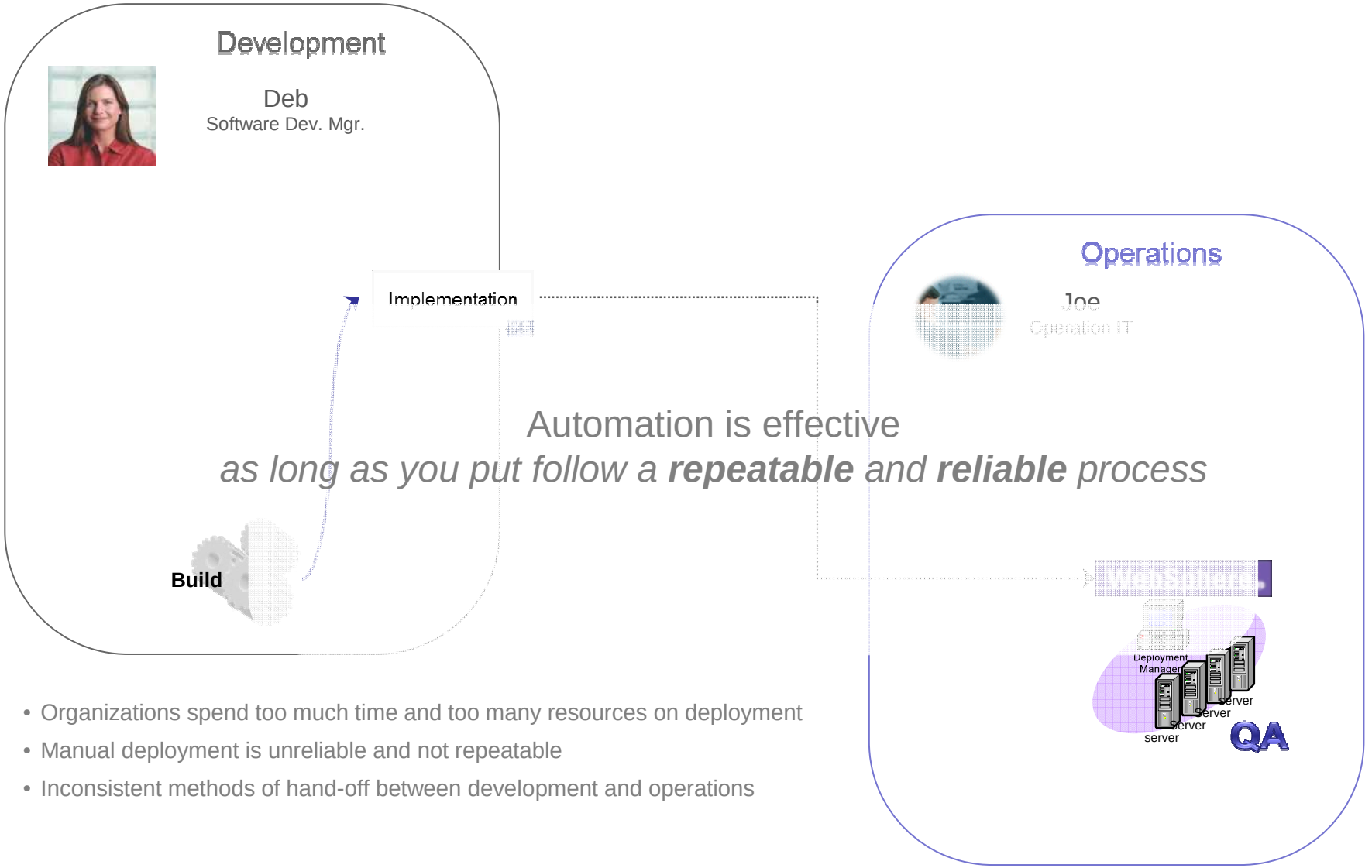
Joe
Operation IT



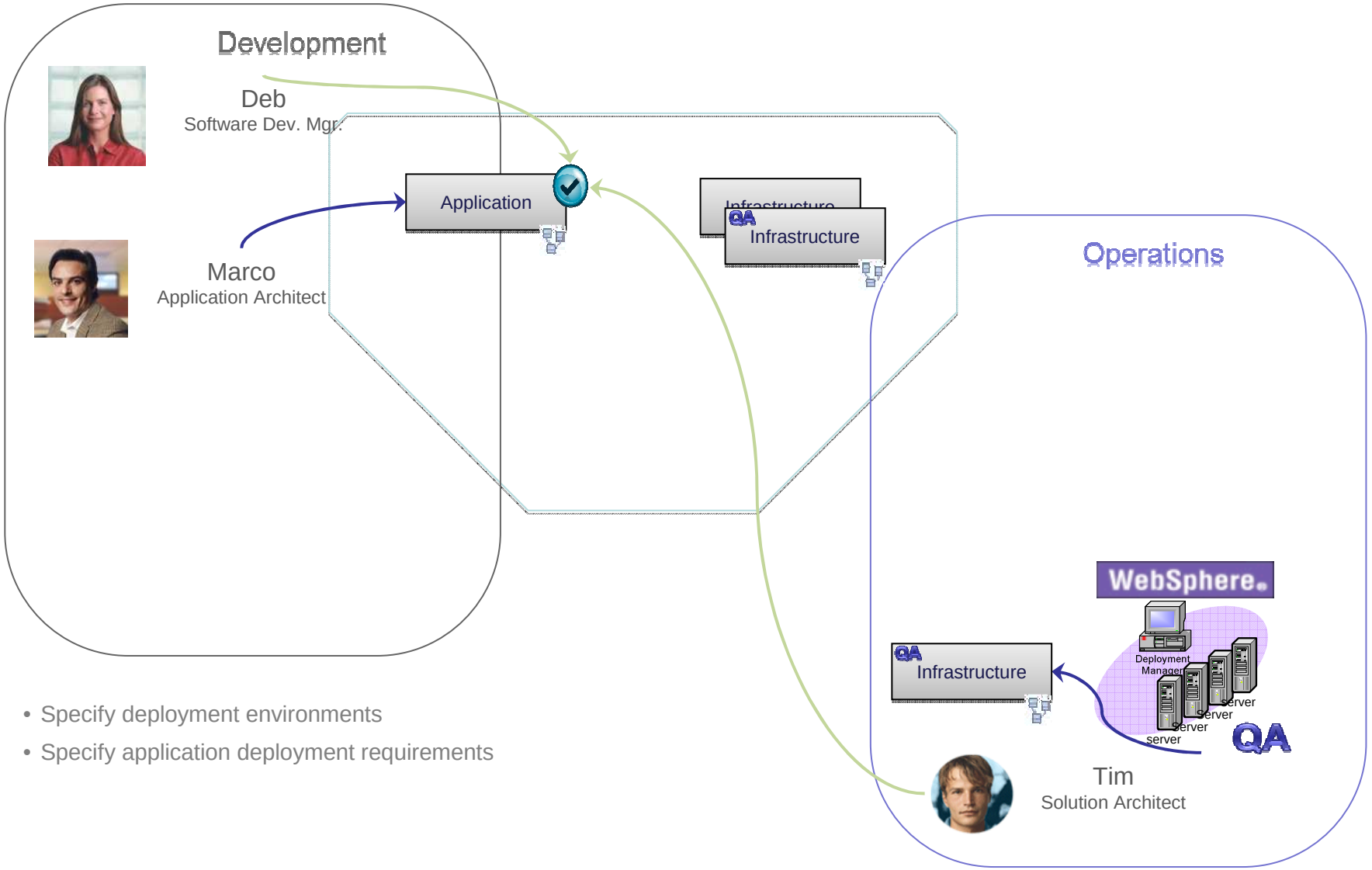
- It takes more than and EAR and a target environment to deploy an application



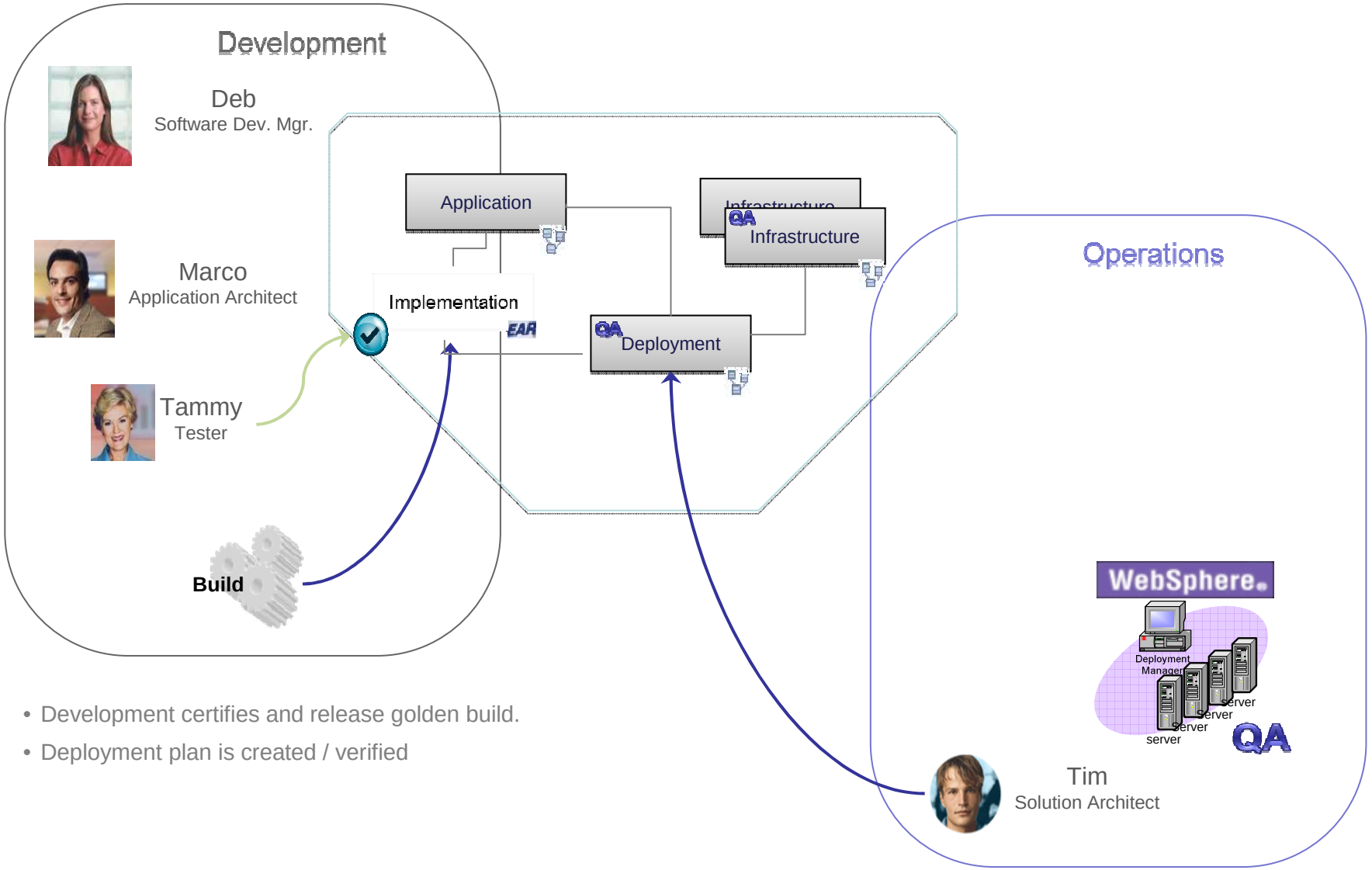
- Different implementations require different configuration on different target environments
- Not every implementation needs to be pushed into Operations



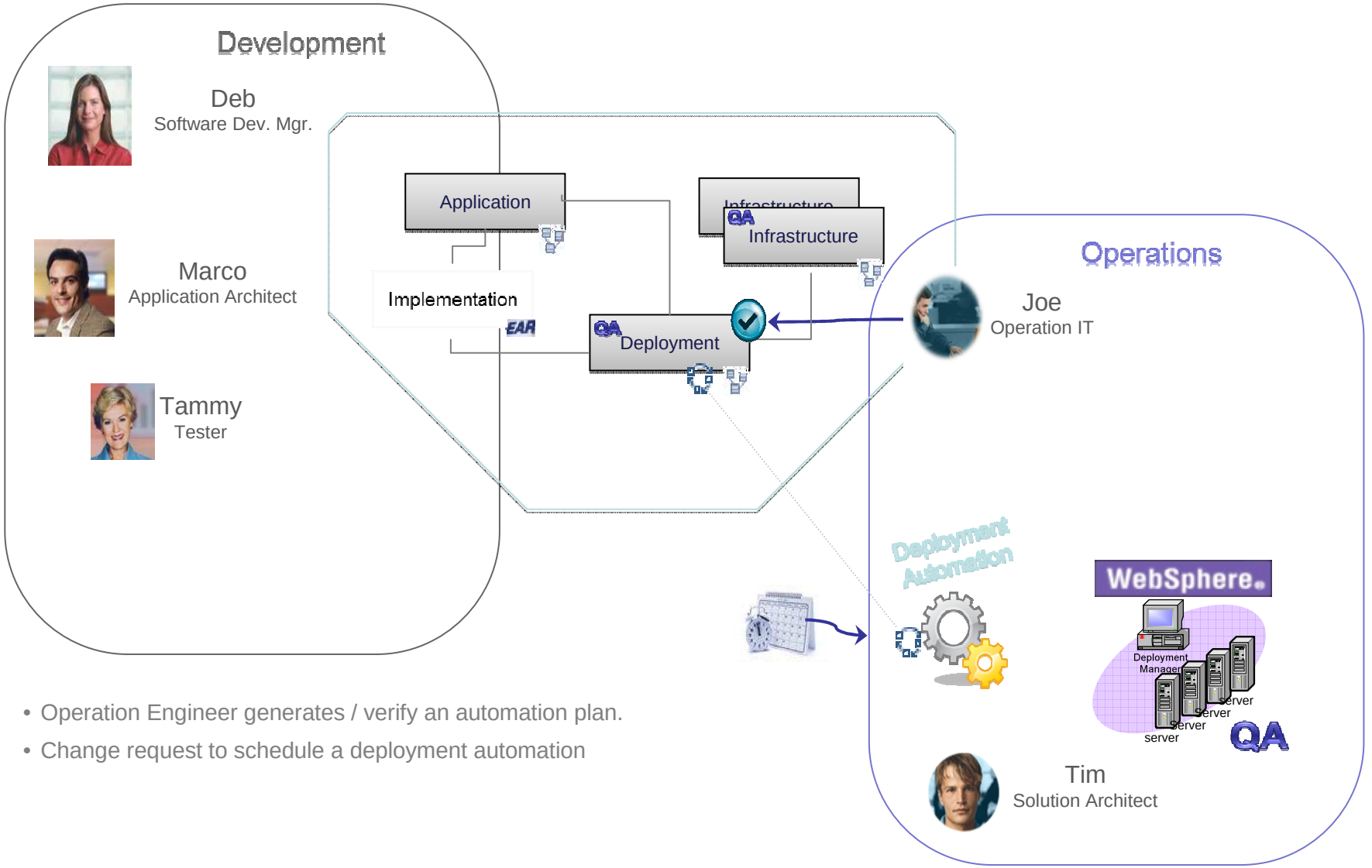
- Organizations spend too much time and too many resources on deployment
- Manual deployment is unreliable and not repeatable
- Inconsistent methods of hand-off between development and operations



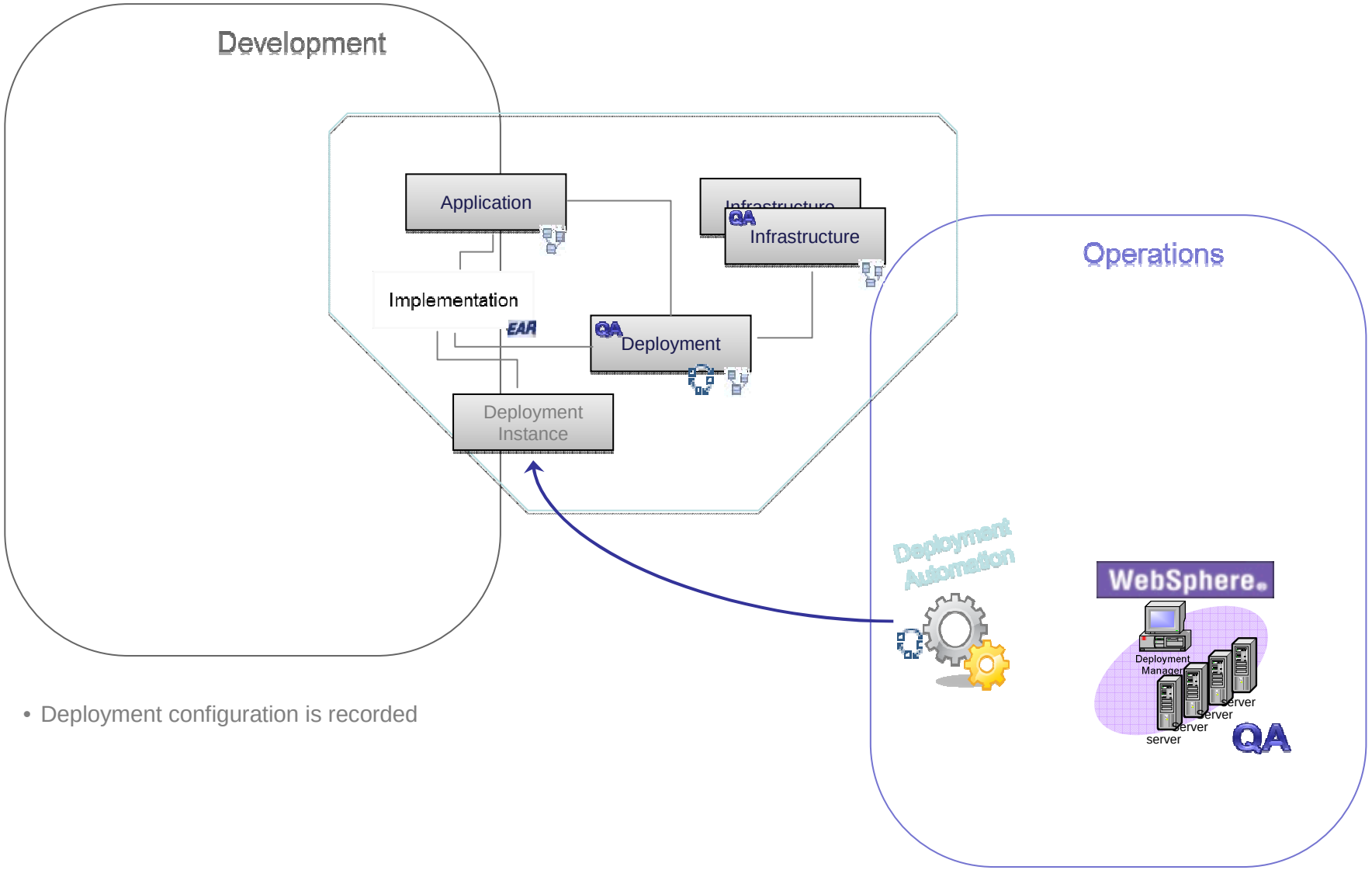
- Specify deployment environments
- Specify application deployment requirements



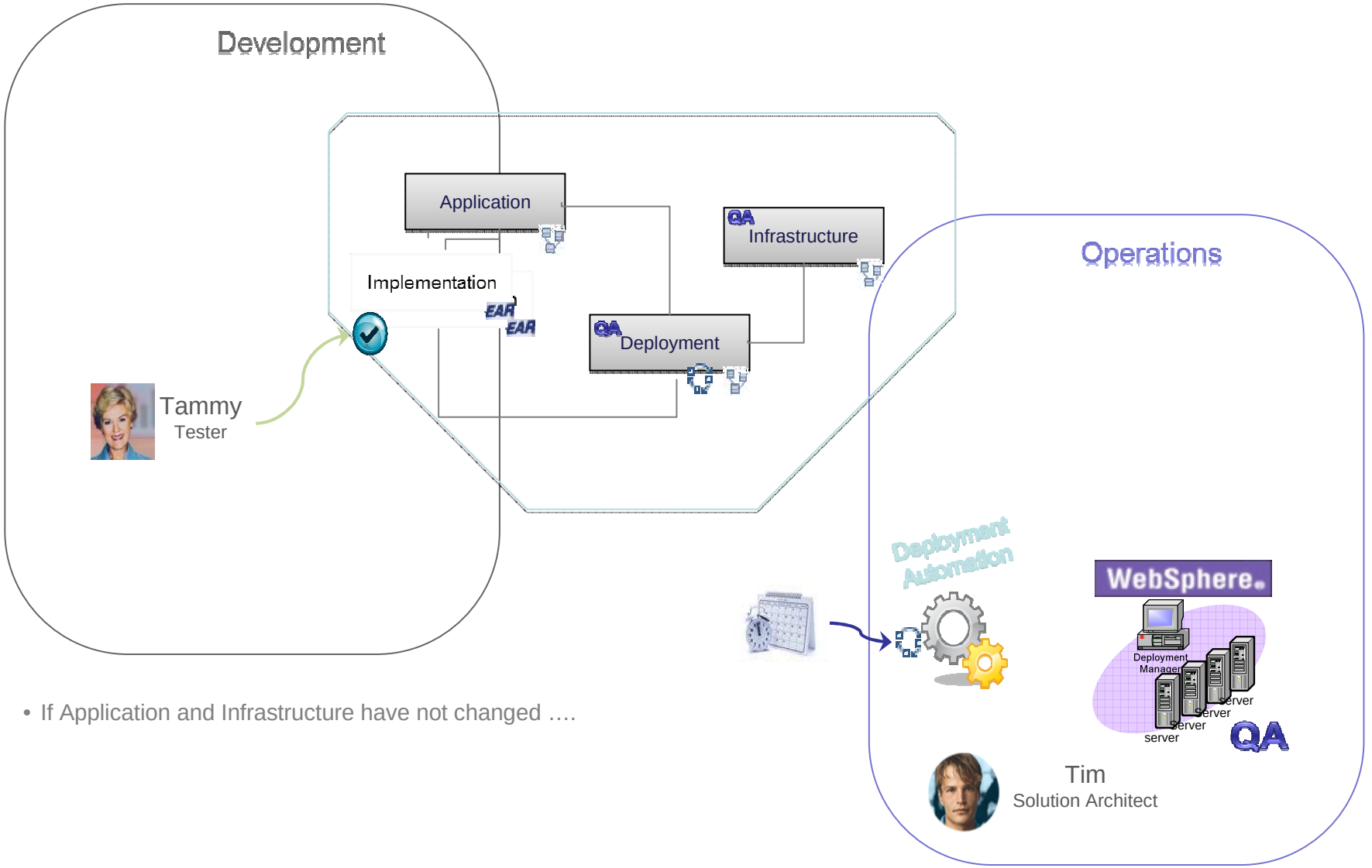
- Development certifies and release golden build.
- Deployment plan is created / verified



- Operation Engineer generates / verify an automation plan.
- Change request to schedule a deployment automation



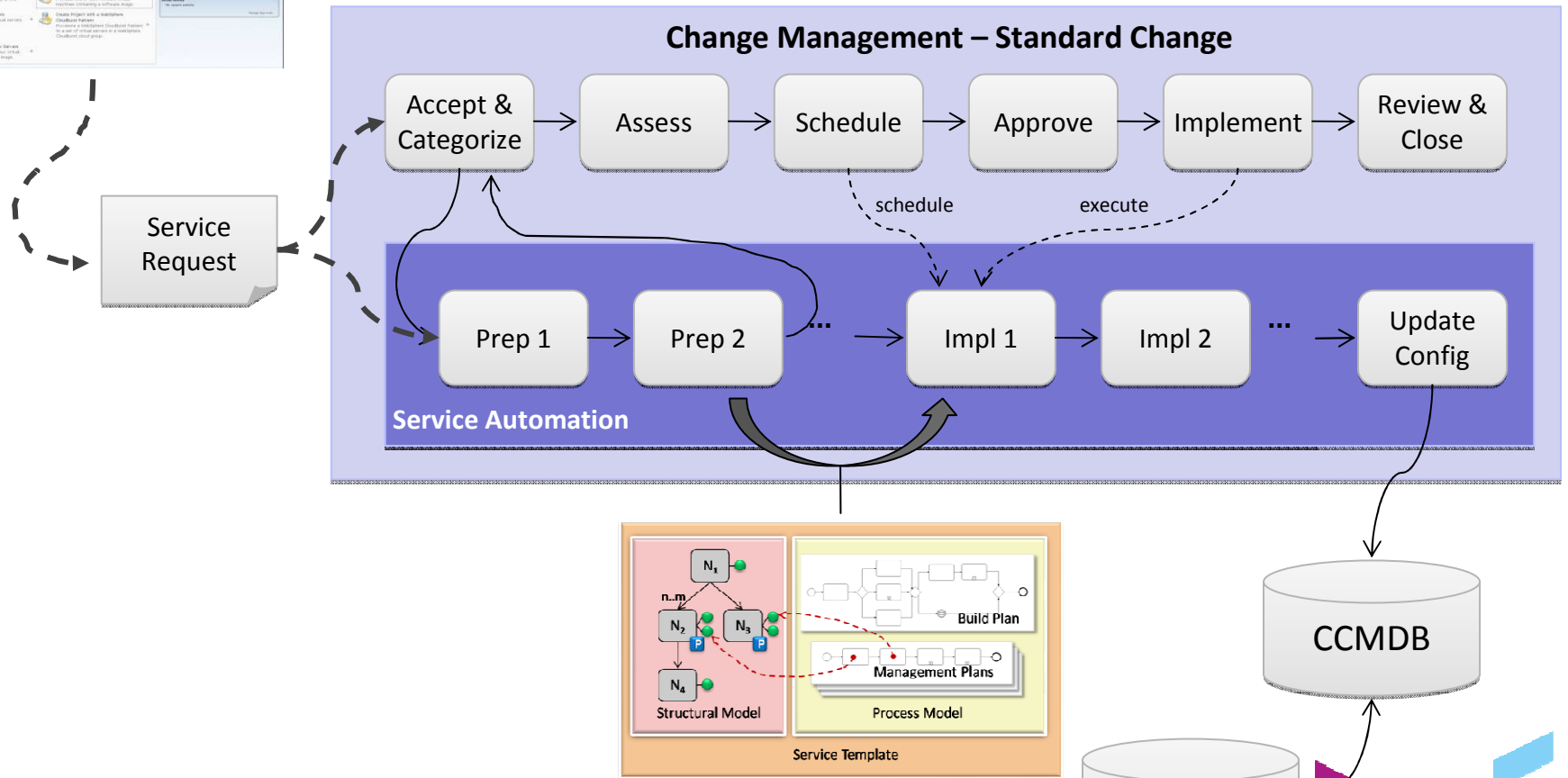
- Deployment configuration is recorded



- If Application and Infrastructure have not changed ….

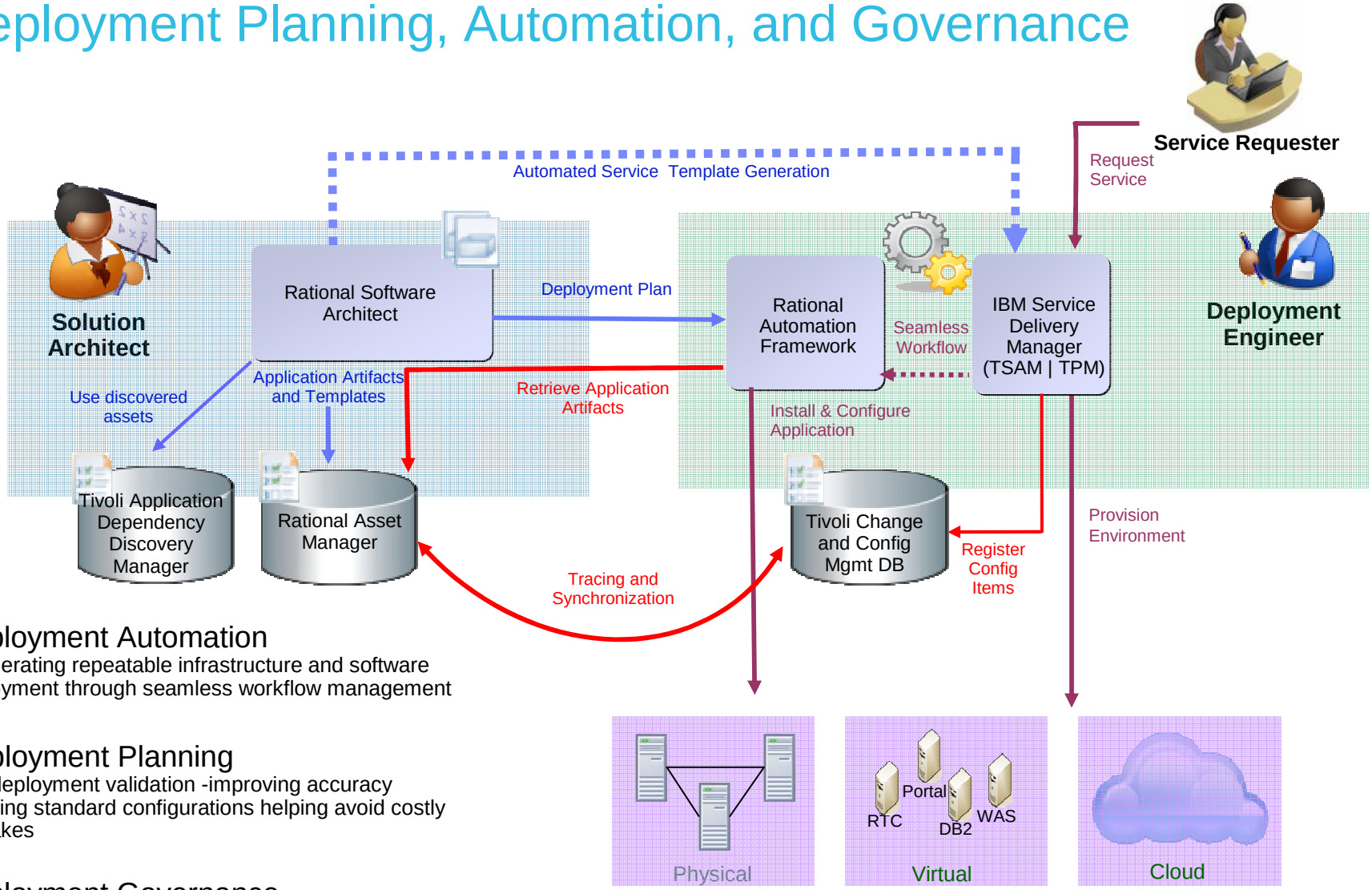
Integrated Service Automation, Change and Configuration Management

Service automation can be used stand-alone for lean and rapid service management **or** it can be configured to integrate with change management to have ITIL-aligned governance over the IT environment, including automated configuration updates



Understanding the Flow

Deployment Planning, Automation, and Governance



- **Deployment Automation**
  Accelerating repeatable infrastructure and software deployment through seamless workflow management
- **Deployment Planning**
  Pre-deployment validation -improving accuracy
  Reusing standard configurations helping avoid costly mistakes
- **Deployment Governance**
  Linking development and operation assets for improved traceability and change management

Summary

- Cloud Computing provides **virtualization, standardization and automation** to **increase flexibility and reduce costs** for software delivery
- IBM Deployment Planning and Automation **speeds the delivery of high quality applications** to the cloud
- We have **services offerings** to help you **plan, manage and secure** your IT transformation onto cloud

For more information:
http://www.ibm.com/rational/cloud

www.ibm/software/rational

www.ibm/software/rational

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