



Ensuring application-level availability and process automation across your enterprise





System Automation Topics

1

System Automation Portfolio Highlights

2

System Automation for Multiplatforms Update

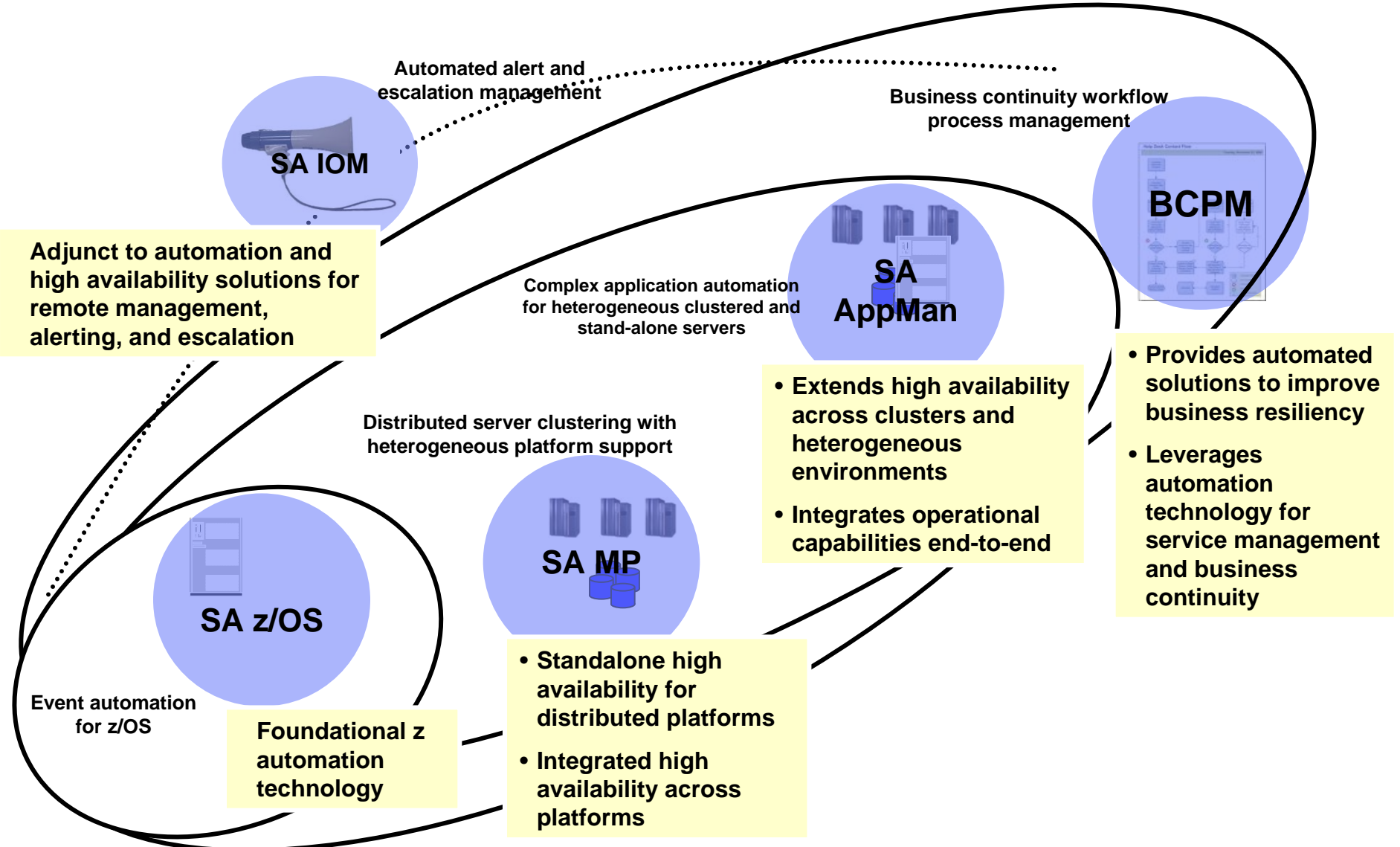
3

System Automation Integration with Tivoli Portfolio

Place holder for format; needs to be cleaned up



System Automation High Availability and Resiliency Solutions





System Automation Basic Principles

- Provide **Continuous Availability** of IT resources
 - Applications, processes, IP addresses, file systems, ...
- Capability to **automatically start and stop** resources with knowledge of...
 - Resource groups, relationships, backup resources, ...



IT Manager

Operator



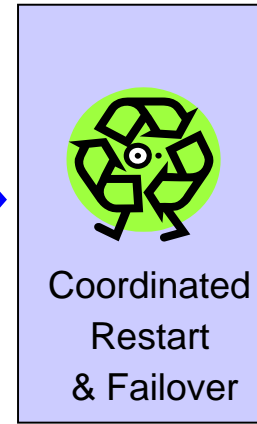
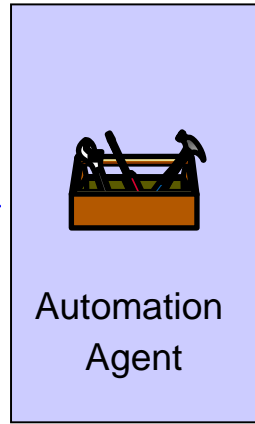
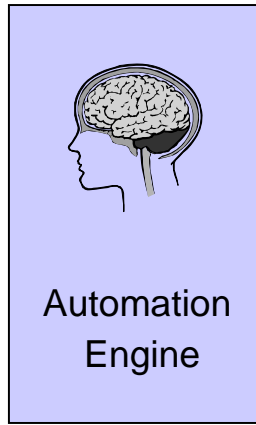
Event



Scheduler



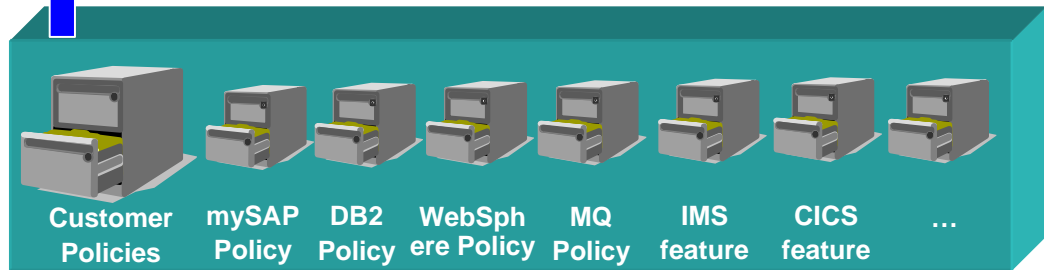
Orchestration



Operator



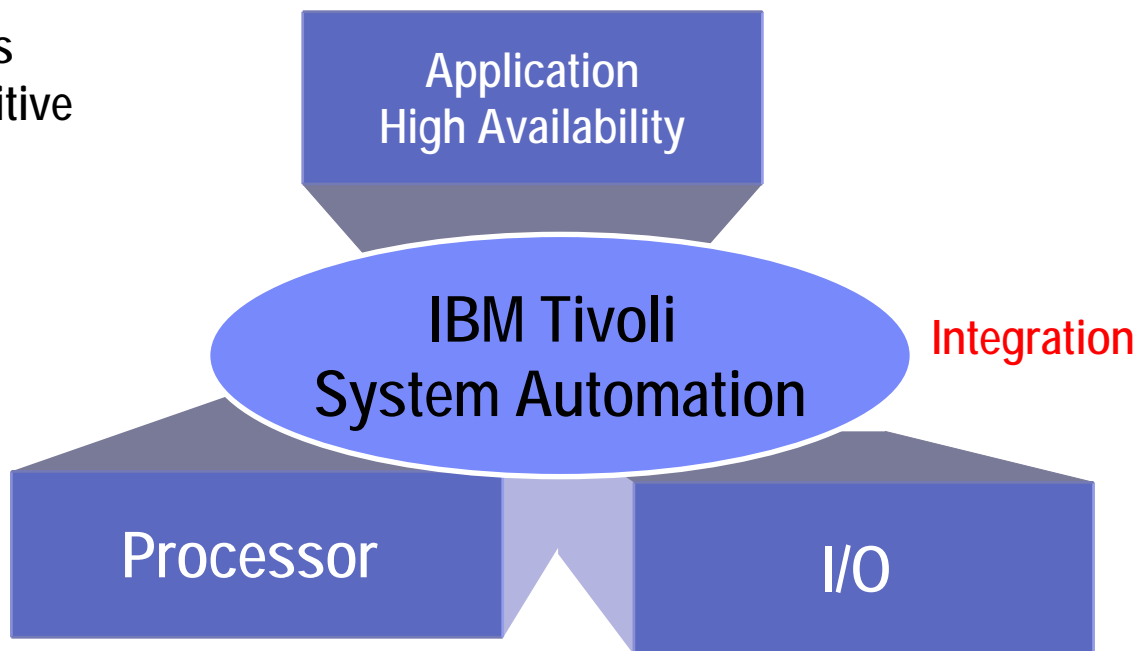
Administrator





What Can You Automate With SA z/OS?

- Automate applications
- Automate many repetitive and complex tasks
- Monitor processes, messages, and alerts



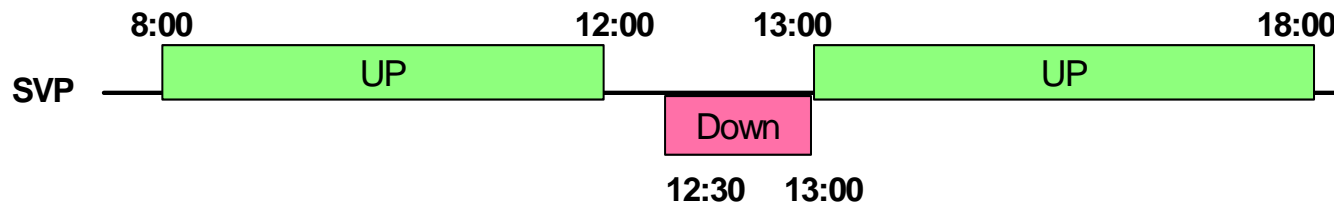
- Initialize, configure, recover, and shut down servers
- External monitoring and automation from a Single Point of Control

- Change I/O configuration on the fly
- Safe through system-integrated switching
- Manage ESCON & FICON Directors



Goal Driven Automation

- **Administrator defines the "goals" for the application according to business requirements**
 - Goals relate to desired state, availability schedule and preferred system
 - Relationships between resources and groups
 - Service Periods:

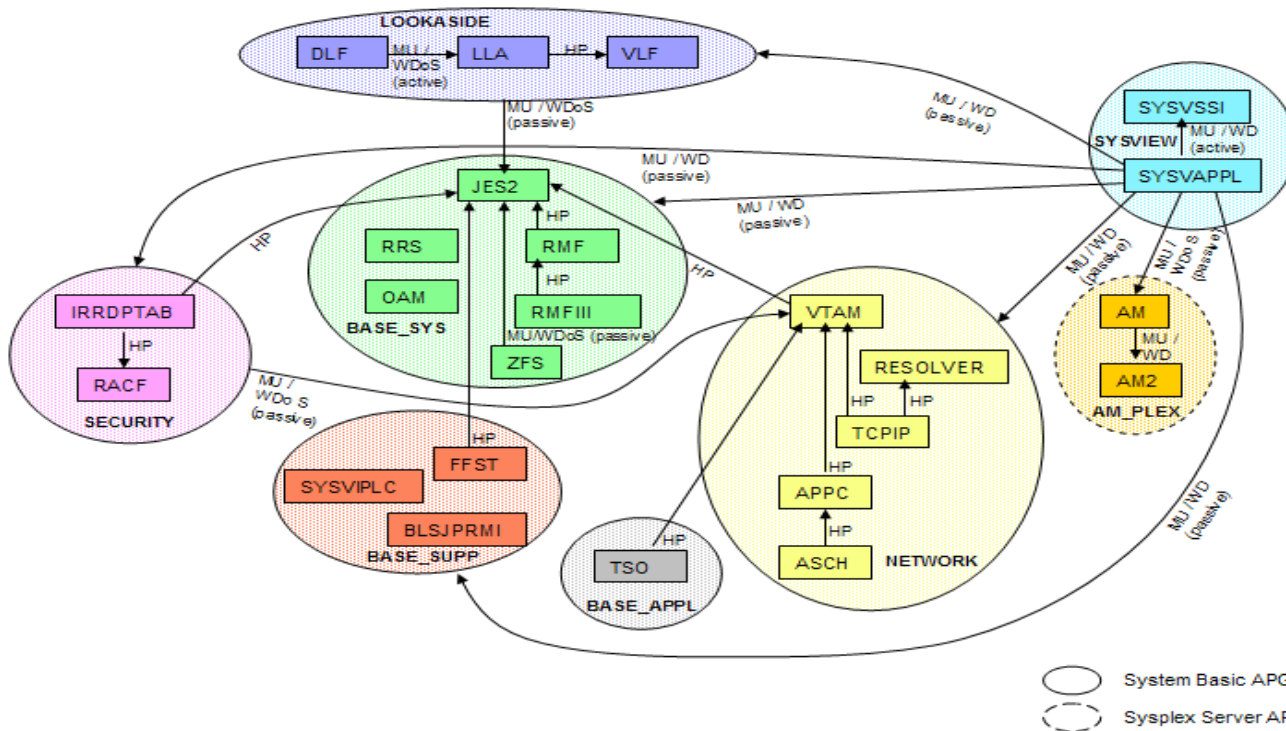
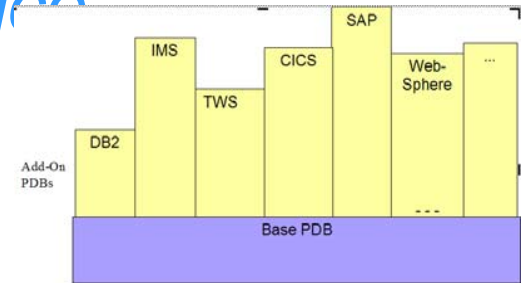


- **System Automation Manager tries to keep the system in line with goals**
- Easy, exception oriented operation
 - Operator can "override" the policy goals by overrides or start/stop requests
- **Responsibility moves from the operation to automation administrator**



Sample Policies based on “Best Practice”

- Base Policy + Multiple add-on policies
- Structured Collection of



DB2
 TWS
 WebSphere
 IMS
 CICS
 NMC
 USS
 ProcOps
 OMEGAMO
 N
 GDPS

○ System Basic APG
 ○ Sysplex Server APG



SA z/OS Powerful Relationship Support

START and STOP relationships

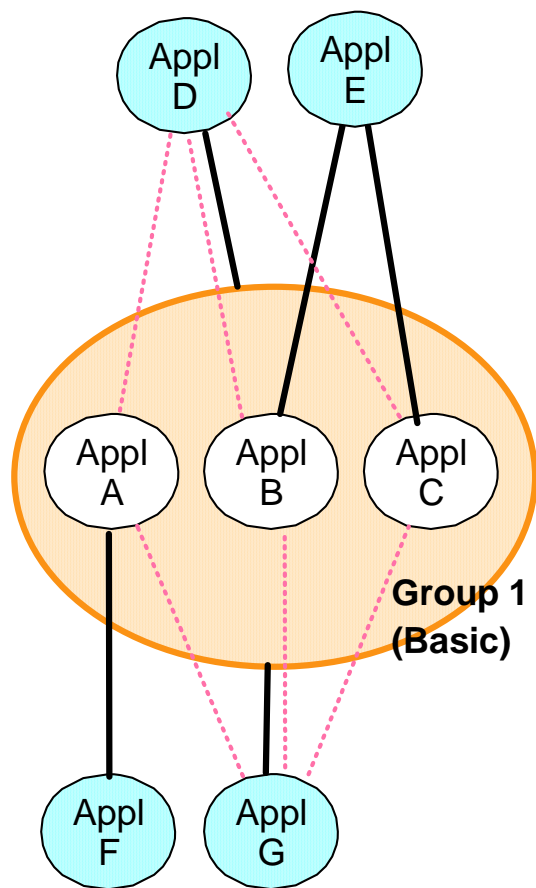
- **Relationships define how one resource relates to another resource**
- *HasParent*
- *MakeAvailable, MakeUnavailable*
- *PrepAvailable, PrepUnavailable*
- *ForceDown*
- **Condition associated with relationship**
- *WhenAvailable, WhenUnavailable*
- *WhenAvailableOrStarting*
- *WhenUnavailableOrStopping*
- *WhenObservedDown*
- **Automation option**
- *Active vs Passive*

Unidirected, sysplex-wide

Evaluated when goal not equal status



Group and Conquer

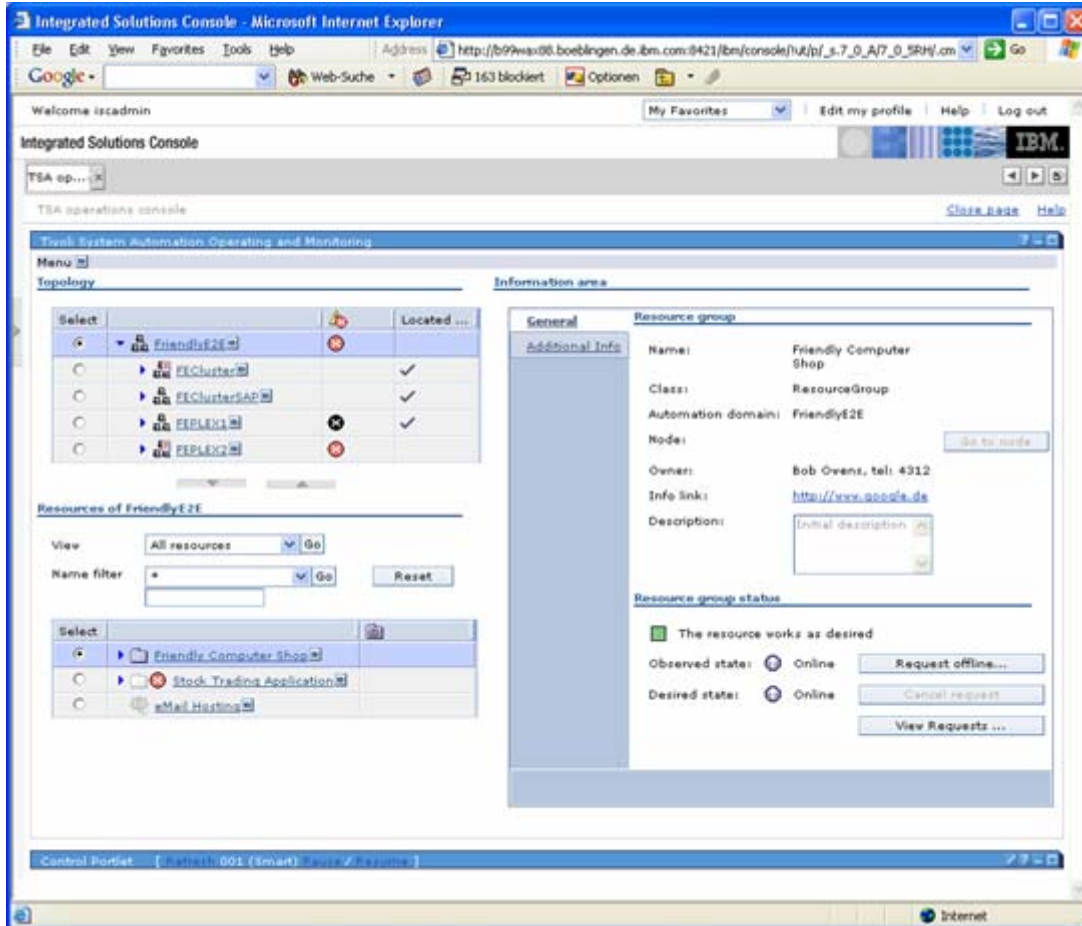


- A group is a collection of multiple resources
- Status derived from the aggregated status of its members
- A group can be part of any dependency or other group
- Membership in multiple groups possible
- Groups are referenced by a sysplex or system-wide unique name
- Members can be distributed within a sysplex
- Enables automation and control for a complete (business) application
- Frees operator from knowing the various pieces the application consists of



TSA AM Automation Web based GUI (ISC based)

Main features

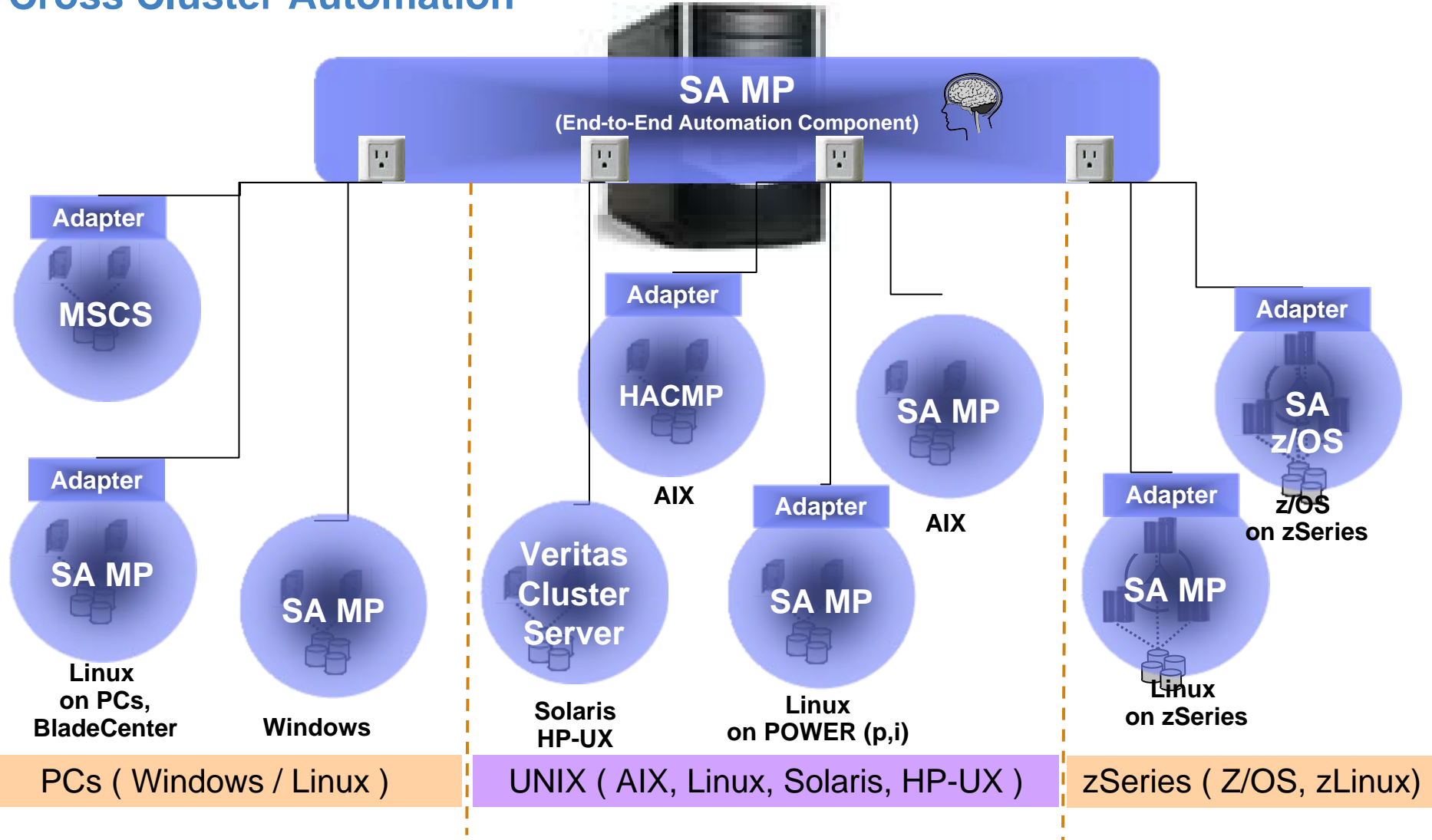


Monitoring and problem analysis: Show...

- Operational status, location, resource details
 - Actively show status changes
- Problems with resources
- Resource dependencies
- Topology
 - Clusters and systems
 - Group membership trees
- Operator instructions per resource
- Automation logs per domain (cluster)
- Filtered views ...
 - matching a specified name filter
 - located on a specific system
 - with errors or warnings
 - with operator requests



SA MP (End-to-End Automation Component) - Cross Cluster Automation





Pre-canned Automation Policy Templates (Linux / AIX)

Move to
SA MP
section

■ Data Management

- DB2 8.x/9.x ESE
- DB2 8.x/9.x ESE DPF
- DB2 8.x/9.x HADR
- DB2 7.x WE, EE
- Oracle 9i
- Oracle 8i



■ WebSphere

- WebSphere Application Server 6.0
- WebSphere MQ



■ Tivoli Products

- Tivoli Workload Scheduler
- CCMDB / TADDM
- Tivoli Storage Manager (TSM)
- TSM Client
- Tivoli Enterprise Console 3.8



■ SAP

- SAP Replicated Enqueue

■ Shared File Systems

- NFS Server
- NFS Client
- Samba



■ Groupware

- Sendmail 8.11



■ Web Servers

- Apache Web Server
- IBM HTTP Server

■ Currently under development:

- WebSphere Application Server 5.1

<http://www.ibm.com/software/tivoli/products/sys-auto-linux/enablement.html>

Resource Startup and Shutdown Times Report

Tivoli



Startup and Shutdown Times for a selected resource Report

Domain name: FriendlyE2E
Resource Name: DB2 Production Server FEPELEX2/SYS1
Time Interval: Mar 26, 2008 12:00 AM - Apr 27, 2008 12:00 PM
Active policy at report generation: Policy 1
Active slices: May 7, 2008 6:20 PM
Deployed graph depth: All

Summary

<u>Cumulative startup time (including dependencies)</u>	<u>Own startup time</u>	<u>Observed startup time</u>
Minimum 2min 15sec	Minimum 2min 15sec	Minimum 22sec
Maximum 2min 47sec	Maximum 2min 47sec	Maximum 29sec
Average 2min 29sec	Average 2min 29sec	Average 26sec
<u>Cumulative shutdown time (including dependencies)</u>	<u>Own shutdown time</u>	<u>Observed shutdown time</u>
Minimum 3min 47sec	Minimum 3min 47sec	Minimum 12sec
Maximum 4min 34sec	Maximum 4min 34sec	Maximum 29sec
Average 4min 11sec	Average 4min 11sec	Average 20sec

Startup times

Chart shows average cumulative startup times



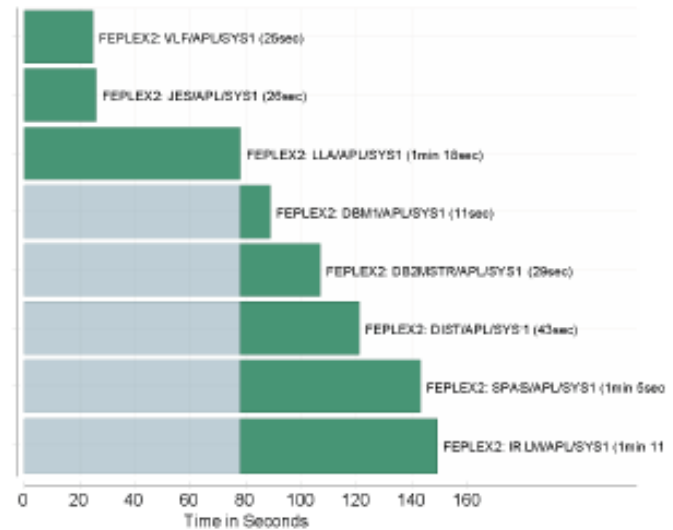
May 7, 2008 6:20:34 PM GMT+02:00

1 / 6

Tivoli



Times shown in graph are the cumulative average startup times. If a resource has startup dependencies, the average cumulative startup time of this dependency chain and the resource own average startup time are displayed in parentheses. The times displayed are formatted like this: Cumulative Startup Time (Dependent Startup Time + Own Startup Time)



Resource Name	Cumulative startup time (including dependencies)			Startup time			Number of startups
	Minimum	Maximum	Average	Minimum	Maximum	Average	
DB2 Production Server FEPELEX2/SYS1	2min 15sec	2min 47sec	2min 29sec	2min 15sec	2min 47sec	2min 29sec	Not applicable
FEPELEX2: DB2/APP/SYS1	2min 15sec	2min 47sec	2min 29sec	1min 5sec	1min 20sec	1min 11sec	Not applicable
FEPELEX2: Z_OS_BASE/APP/SYS1	1min 10sec	1min 27sec	1min 18sec	1min 10sec	1min 27sec	1min 18sec	Not applicable
FEPELEX2: DB2MSTR/APL/SYS1	29sec	29sec	29sec	29sec	29sec	29sec	1

May 7, 2008 6:20:38 PM GMT+02:00

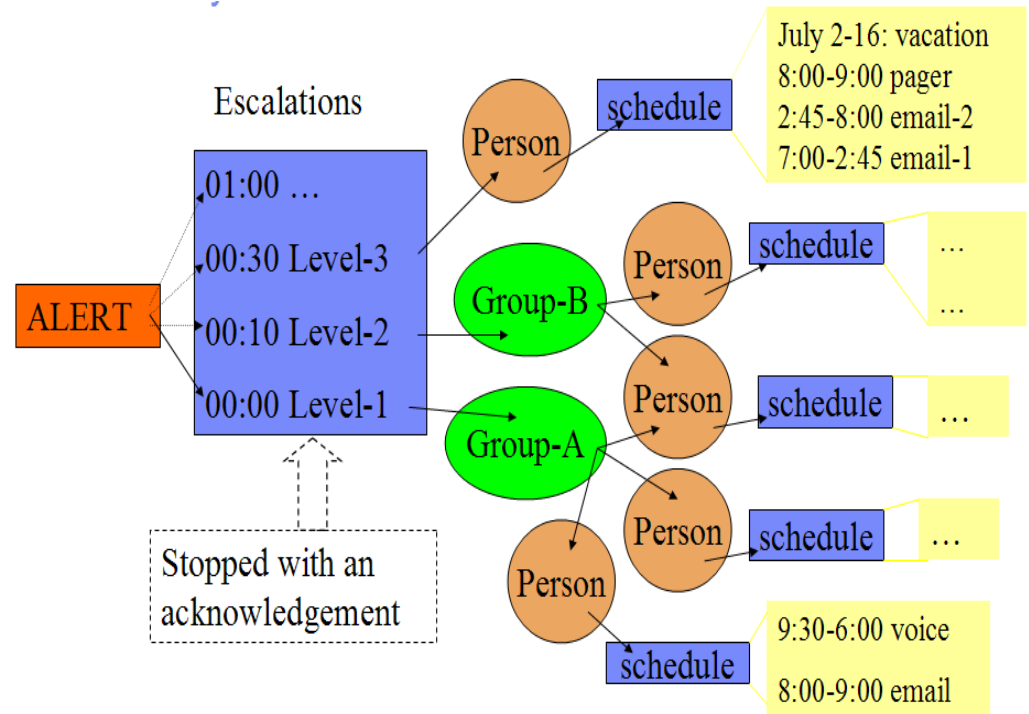
2 / 6



SA IOM Alerts and Notification to Enhance Automation

- **Flexible model for scheduling call outs**
- **Allows individual notification preferences**
- **Can be used to activate a blackout period for a given escalation ID (to prevent alert flooding)**

08:00-09:00 pager
14:00-16:00 email
17:00-24:00 SMS
Sep01-20,2006 vacation





SA IOM Ad-Hoc Notification

Integrated Solutions Console - Welcome iscadmin

View: All tasks

- Welcome
- Security
- Users and Groups
- Troubleshooting
- SAIOM Alert Escalation
 - About
 - Manage policies
 - Manage alerts
 - Ad hoc notification
 - Servers
 - Notify by escalation
 - Notify user
 - Notify group

Notify user

Refresh

Select an ID and specify a priority as well as a message text.

--- Select Action --- Go

Select	User ID	First name	Last name	Descri
<input type="checkbox"/>	jowin	Jon	Winther	

Page 1 of 1 Total: 1 Filtered: 1 Displayed: 1

Include user schedule(s)

Priority:

Message text:

Send



At-A-Glance Status of Notifications

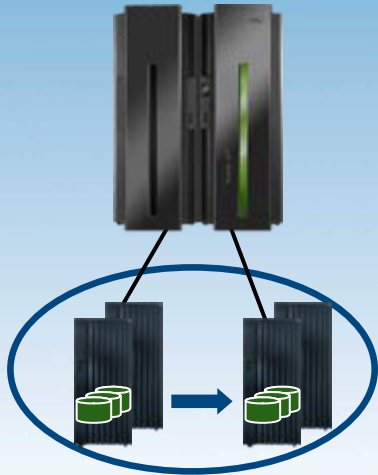
Event history						
Select	Time stamp	Alert ID	Esc. ID	Esc. L...	Event type	Info
	Filter	<input checked="" type="checkbox"/> = 4,797	Filter	Filter	Filter	Filter
<input type="radio"/>	19.03.2007 15:38:48	4797	SMS_ESCALATION	1	Status change	new status=exhausted
<input type="radio"/>	19.03.2007 15:38:48	4797	SMS_ESCALATION	1	Escalation end	total notifications: 2
<input type="radio"/>	19.03.2007 15:38:48	4797	SMS_ESCALATION	1	Escalation level end	level expired
<input type="radio"/>	19.03.2007 15:33:49	4797	SMS_ESCALATION		Helper script end	result from NotifyEmail(5) result=OK desc=
<input type="radio"/>	19.03.2007 15:33:48	4797	SMS_ESCALATION	1	Helper script invoke	NotifyEmail.rex started with 2 recipients
<input type="radio"/>	19.03.2007 15:33:48	4797	SMS_ESCALATION	1	Person processing	user=Gunnar notification=email
<input type="radio"/>	19.03.2007 15:33:48	4797	SMS_ESCALATION	1	Person processing	user=Christa_eMail notification=email
<input type="radio"/>	19.03.2007 15:33:48	4797	SMS_ESCALATION	1	Escalation level start	duration=5 minutes
<input type="radio"/>	19.03.2007 15:33:48	4797	SMS_ESCALATION		Escalation start	ING140I ALERT 'OS_PROBLEM' FOR 'IOMBROKEN/APL/SAT1' ON 'SAT1' AT 17:33:40 2007-03-19
<input type="radio"/>	19.03.2007 15:33:47	4797	SMS_ESCALATION		Alert arrival	
Page 1 of 1		Total: 10 Filtered: 10 Displayed: 10				

GDPS: The Right Level of Protection for Your Business

Continuous Availability of Data within a Data Center

Single Data Center Applications remain active

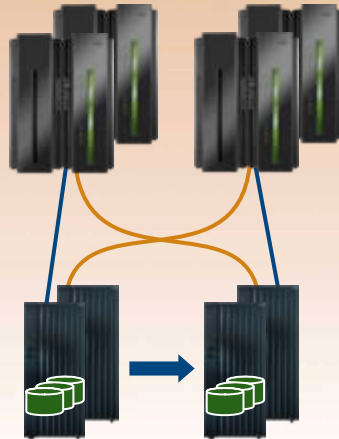
Near-continuous availability to data



Continuous Availability & Disaster Recovery Metropolitan Region

Two Data Centers Systems remain active

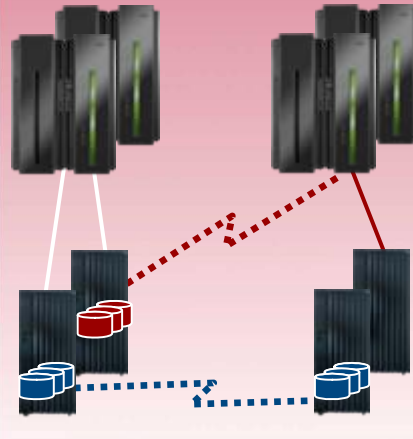
Automated D/R across site or storage failure
No data loss



Disaster Recovery at Extended Distance

Two Data Centers

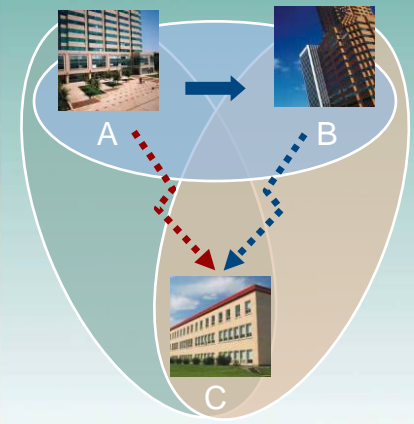
Automated Disaster Recovery
"seconds" of Data Loss



Continuous Availability Regionally and Disaster Recovery Extended Distance

Three Data Centers

Data availability
No data loss
Extended distances





GDPS Supports Two Data Mirroring Technologies

- **Peer to Peer Remote Copy (PPRC)**

- Synchronous data mirroring

- **GDPS manages secondary data consistency**

- No or limited data loss in failover - user policy

- **Production site exception condition monitoring**

- GDPS initiates and executes failover

- **Distance between sites up to 40 KM (fiber)**

- **Designed for Continuous Availability and Disaster Recovery solution**

- **eXtended Remote Copy (XRC)**

- Asynchronous data mirroring

- Limited data loss to be expected in unplanned failover

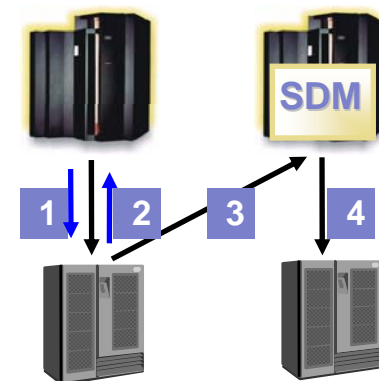
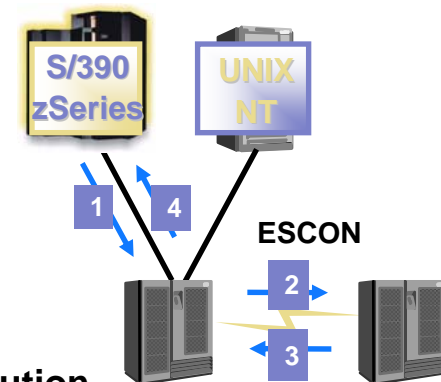
- **XRC manages secondary data consistency**

- **GDPS executes Parallel Sysplex restart**

- Limited user involvement

- **Designed to support unlimited distance**

- **Disaster Recovery solution**





Tivoli Enterprise Portal

File Edit View Help

View: Physical

Enterprise
z/OS
ED01
System Automation fr
Resource Overv
Kah_Resourc
Resource Reque

Physical

Request Summary:
Graph of vote status for all resources.

Compound Status Summary:
Graph of resources by Compound Status.

Request Summary

3

Winning Start
Winning Stop
Losing Start
Losing Stop

PLEX1:SAPLEX:SA

Compound Status Summary

80

2 2 2

CS Problem
CS Degraded
CS Denied
CS Inhibited
CS Awaiting
CS Inauto
CS Satisfactory

PLEX1:SAPLEX:SA

Resource List

Resource Name	Resource Type	System	Compound Status	Observed Status	Desired Status	Health Status	Automation Status	Automation Flag	Hold Flag	Description
JES2MON	MTR	TIVED1	Awaiting	Available	Unavailable	NA	Idle	Yes	No	Monitor for JES2
JES2MON	MTR	TIVED2	Awaiting	Available	Unavailable	NA	Idle	Yes	No	Monitor for JES2
SWPCMON	MTR	TIVED2	Degraded	Available	Available	Critical	Idle	Yes	No	SA z/OS MTR for OMEGAMON SWPC exceptions
XREPMON	MTR	TIVED2	Degraded	Available	Available	Warning	Idle	Yes	No	MTR for OMEGAMON XREP exceptions
SYSPLEX	GRP		Inhibited	Starting	Available	NA	Internal	Yes	No	SA Sample Sysplex
RV_MOVE	APG		Inhibited	SoftDown	Available	NA	Internal	Yes	No	MOVE Group for RV appl
MTRIP	MTR	TIVED2	Satisfactory	Available	Available	Normal	Idle	Yes		
MTRIP	MTR	TIVED1	Satisfactory	Available	Available	Normal	Idle	Yes		
TSOGROUP	APG		Satisfactory	Available	Available	NA	Internal	Yes		
VTAM	APL	TIVED2	Satisfactory	Available	Available	NA	Idle	Yes		
VTAM	APL	TIVED1	Satisfactory	Available	Available	NA	Idle	Yes		
VLF	APL	TIVED2	Satisfactory	Available	Available	NA	Idle	Yes		

Resource List table:
Same data as INGLIST.
Sorted by Compound Status in this example.

PLEX1:SAPLEX:SA

Hub Time: Wed, 06/06/2007 11:44 AM Server Available Resource Overview - localhost - SYSADMIN



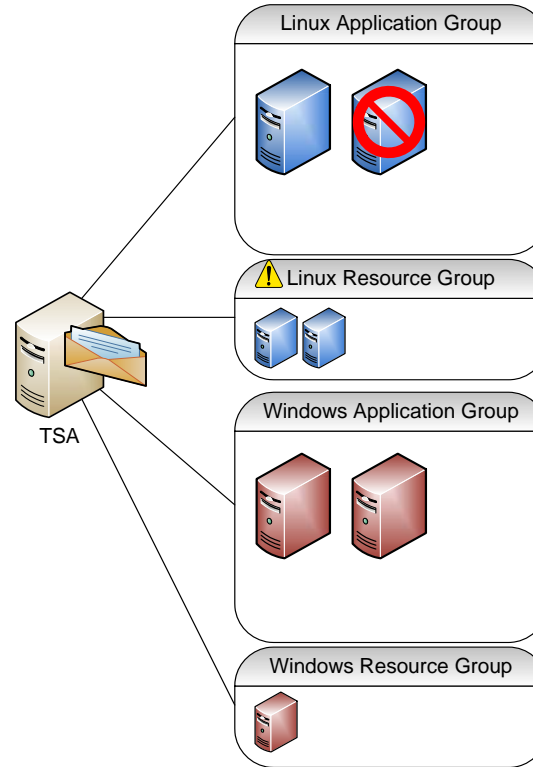
Smarter HA with TSA and TPM



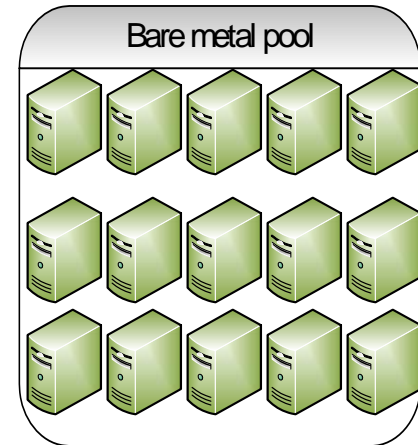
- **TPM provides:**

- Enterprise management of TSA
- Dynamic high availability
- HA Multiple OS's from the same pool
- Same pool for HA and performance

1. **Admin tells TPM to setup a new TSA cluster**
2. **Admin tells TPM to deploy two applications into the cluster**
3. **TSA detects a hardware failure on one of the application machines and fails over to a server in the failover resource group and notifies TPM that it needs more servers in the resource group**
4. **TPM adds servers to the resource group restoring the cluster to an HA state**

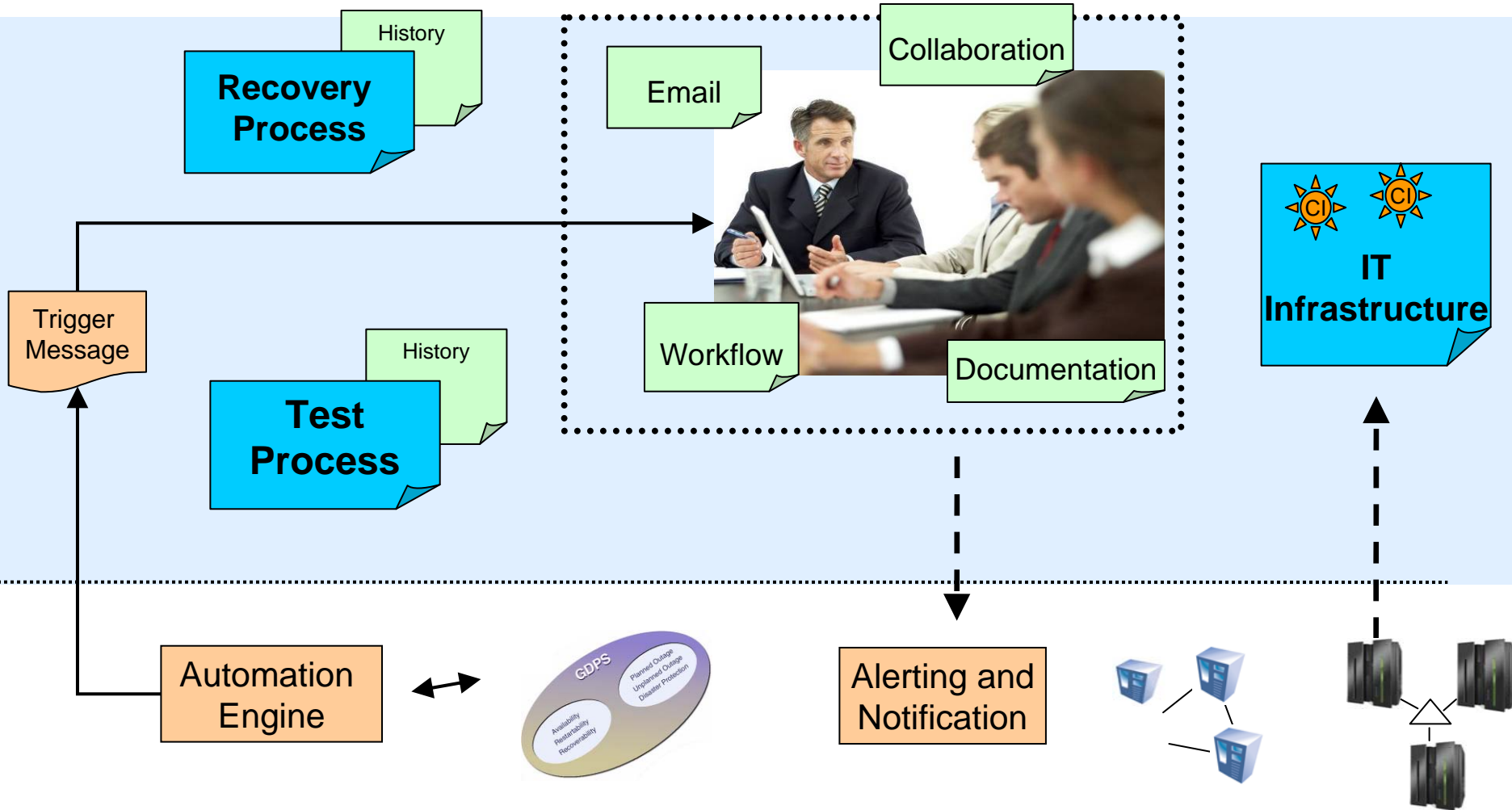


System z10 EC- TPM&DB2



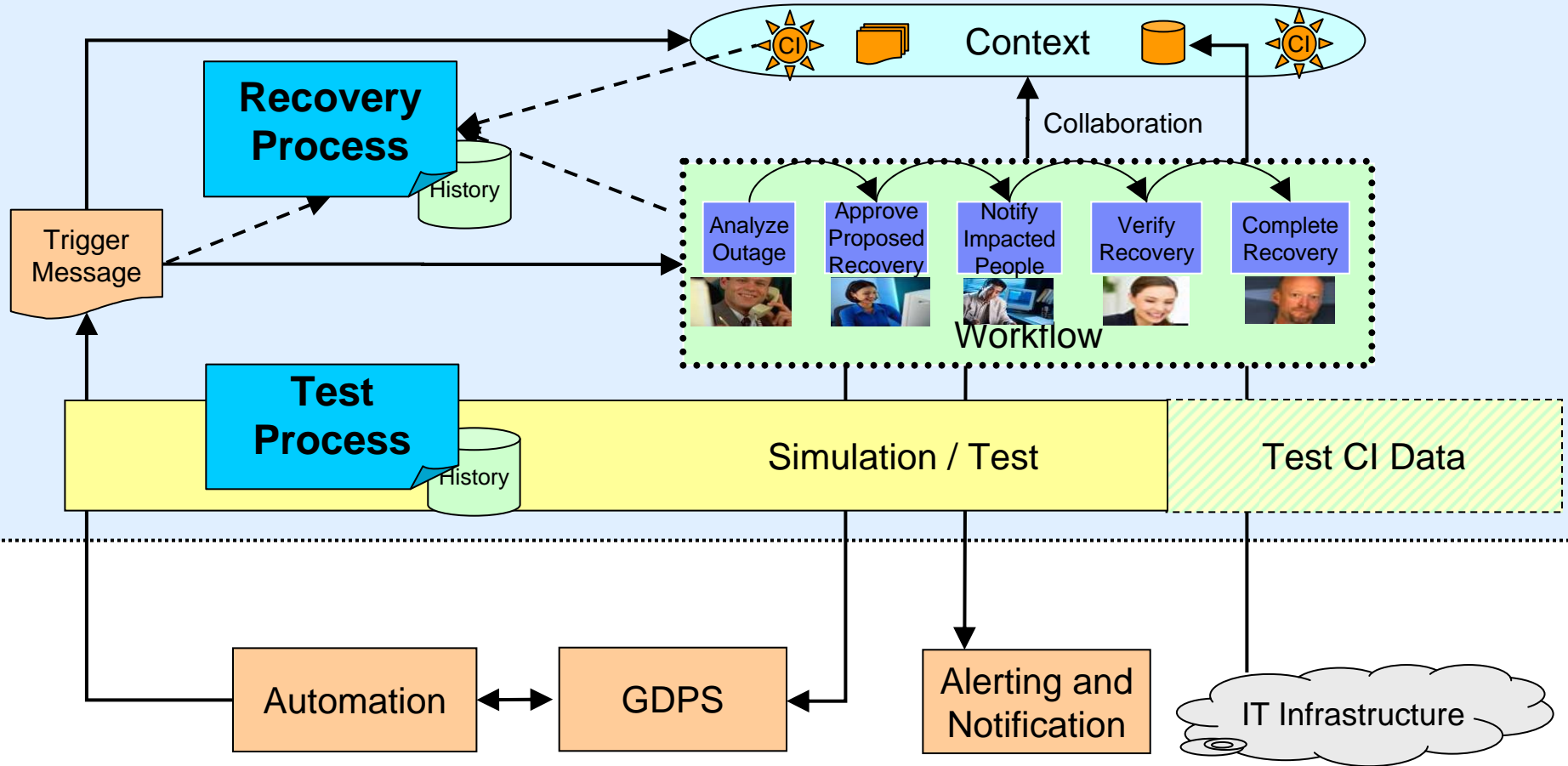


Crisis Management Based on Documentation





Crisis Management Based on BCPM Workflows





BCPM's Simple User Interface to Create Processes

IT Service Continuity Workorder

Go To | Reports | Start Center | Profile | Sign Out | Help

Find: [] Select Action []

List | **Outage Analysis** | Impact Analysis | Plans | Related Records | Specifications | Log

Work Order: 1153 | Owner: [] | Owner Group: [] | Status: WAPPR | Location: BEDFORD | Attachments: []

Work Order Details

Description: GEO112E: SYSTEM PROBLEM
 Test Mode?
 Classification: PMBCM \ PMBCMTOP \ PMBCMSYS
 Class Description: IT Service Continuity System outage request
 Configuration Item: AOC5 | Youris GDPS System

Recovery Details

Selected Recovery Plan: []
 Selected Recovery Option: []
 Job Plan: []
 Outage Reason: []
 Priority: []

Outage Analysis

Message ID: GEO112E
 Message: GEO112E GDPS TAKEOVER PROMPT
 SYSTEM PROBLEM, AOC5 FAILED
 STATUS:
 CF(S) IN SITE1 (OK)
 CF(S) IN SITE2 (OK)
 DASD(OK) (PRIMARY DASD IN SITE1, SECONDARY DASD DUPLEX)
 OPTIONS:
 'SYSAOC5' TO EXECUTE SYSAOC5 FOR COMM=RESTART
 COMM=RESTART AOC5 SAME PLACE
 'SYSSITE2' TO EXECUTE SYSSITE2 FOR COMM=SYSTEMS
 COMM=SYSTEMS AT SITE 2 FAILED

Originator Info

Domain Identifier: SAM3
 System Identifier: AOC3
 Originator Freeze Policy: []
 Get Originator Details

OMP Status Table

Resource Name	Primary	Secondary	Status of Resource
CF	SITE1		OK
CF	SITE2		OK
DASD	SITE1	DUPLEX	OK

Recovery Option Table

Recovery Option	Description	Status	Supplied By OMP?
SYSAOC5	TO EXECUTE SYSAOC5 FOR COMM=RESTART	ACTIVE	<input checked="" type="checkbox"/>
SYSSITE2	TO EXECUTE SYSSITE2 FOR COMM=SYSTEMS	ACTIVE	<input checked="" type="checkbox"/>
NO	TO SUPPRESS ANY ACTION	ACTIVE	<input checked="" type="checkbox"/>
REPEAT	TO CHECK STATUS AGAIN	ACTIVE	<input checked="" type="checkbox"/>

Error Messages

Recovery Process

Trigger Message

Resource Status

Recovery Options



IBM Tivoli Automation Resources

■ Resource Links

- [Business Continuity Process Manager web site](#)
- [GDPS web site](#)
- [System Automation Application Manager web site](#)
- [System Automation for Integrated Operations Management web site](#)
- [System Automation for Multiplatforms web site](#)
- [System Automation for z/OS web site](#)
- [Tivoli Workload Scheduler web site](#)

■ Interactive Forums

- Online discussions with customers and IBM specialists about these solutions
- Product specific forums

■ Annual User Conference

- Subject specific presentations delivered by customers and IBM specialists
- Excellent opportunity for interaction and discussion

■ Demonstrations

- [Business Continuity Process Manager demo](#)
- [System Automation for Multiplatforms demo](#)
- [Tivoli Workload Scheduler demo](#)





Demonstration Topics

- **Achieving end-to-end automation and operations with Tivoli System Automation Application Manager**
- **Introduction to distributed disaster recovery with Tivoli System Automation Application Manager**

To be revised; transition slide to demo





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Thanks for Your Participation

