

Increasing productivity at CERN with Enterprise Manager Grid Control

Manuel Guijarro

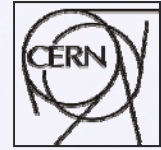
Lucia Moreno

Chris Lambert

CERN

Oracle OpenWorld – October 2009

Manuel.Guijarro@cern.ch

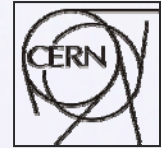


❖❖ *Agenda*

- Introduction to CERN
- Our Grid Control Environment
- Our Challenge
- Grid Control Solution
- User Defined Policies – Use Case
- Other examples – Hands on
- Conclusion



❖❖ Introduction to CERN



- European Organization for Nuclear Research
 - The world's largest particle physics laboratory
 - Located on Swiss/French border
 - Funded/staffed by 20 member states in 1954
 - With many contributors in the USA
 - Birth place of World Wide Web
 - Made popular by the movie "Angels and Demons"
 - <http://www.cern.ch>

- Oracle software and services are critical for the laboratory
 - Physics (accelerator control) and Administration databases
 - Oracle RDBMS, iAS, Grid Control
 - Oracle applications (E-Business suite and OnDemand)



CERN

Annual budget: ~ MSFr 1000 (~ M€600)

Staff members: 2650

Fellows: 270, Associates: 440

+ 8000 *CERN* users....

Basic research

Fundamental questions

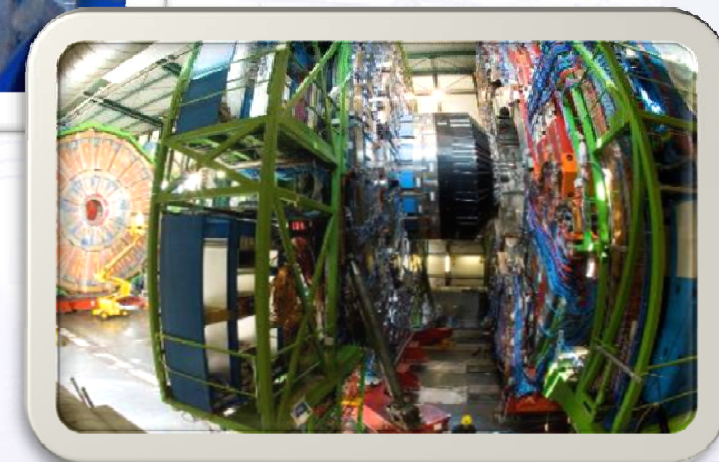
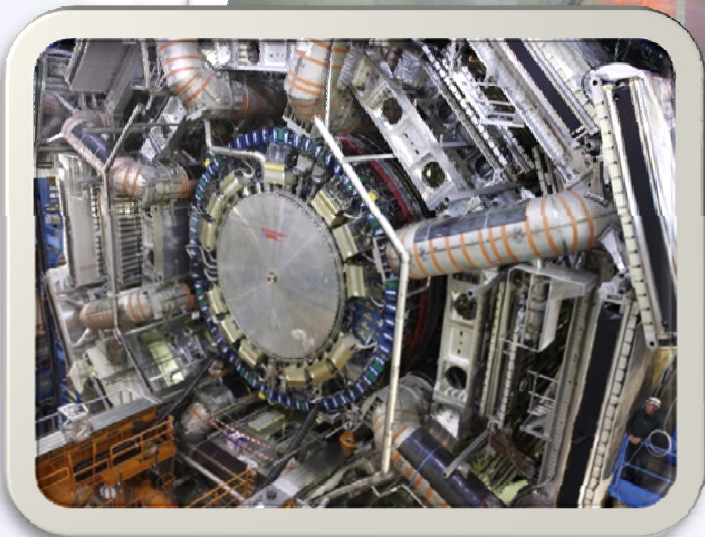
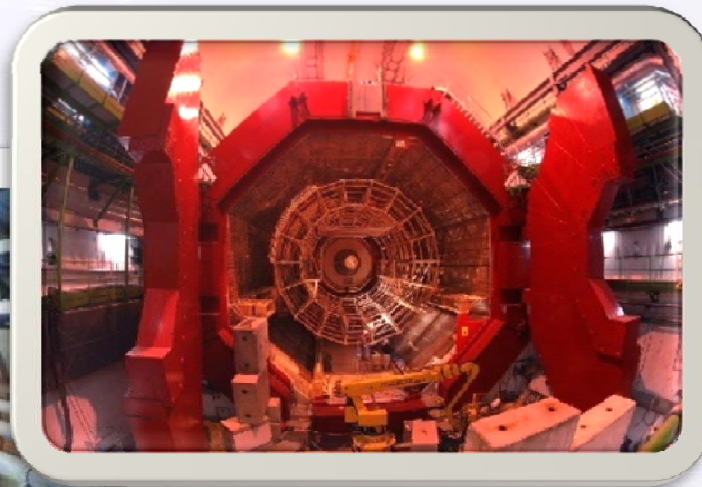
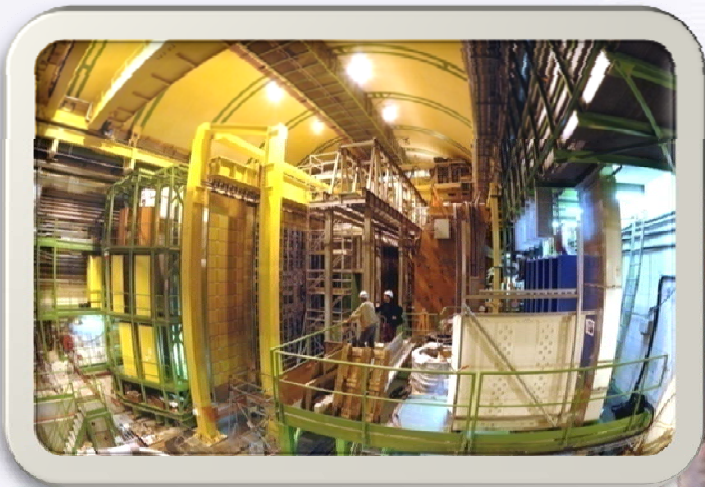
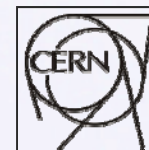
High E accelerator:

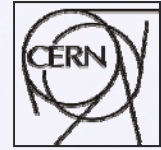
Generate new particles

($E=mc^2$)

Create Big Bang conditions

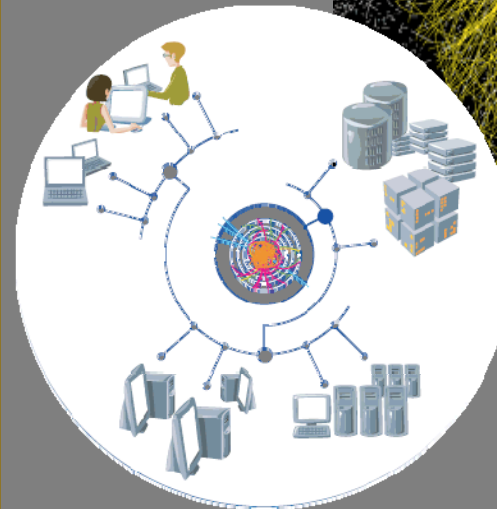
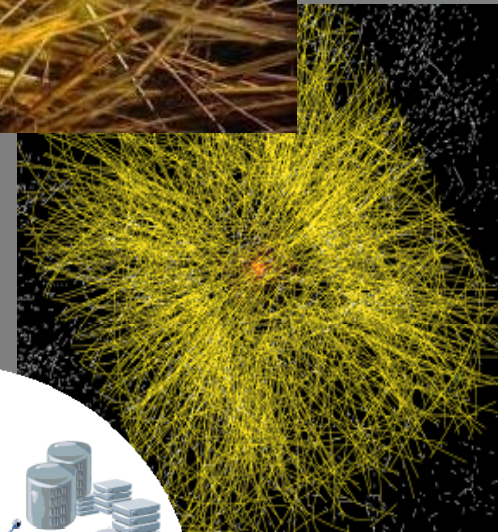
❖❖ LHC gets ready ...



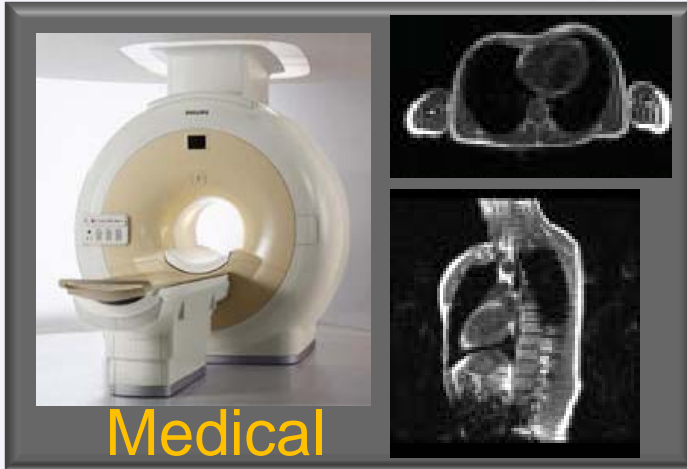
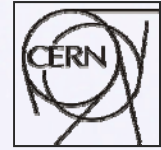


❖❖ LHC Computing Challenge

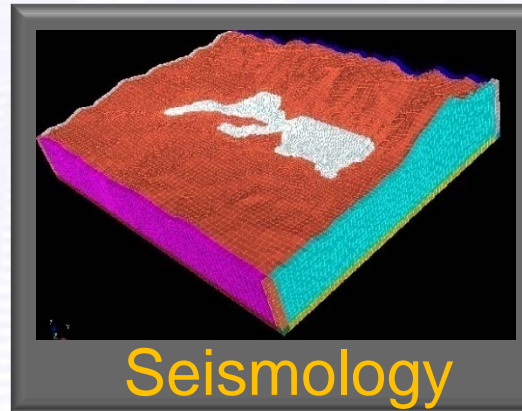
- Signal/Noise 10^{-9}
- Data volume
 - High rate * large number of channels * 4 experiments
 - ➔ **15 PetaBytes of new data each year**
- Compute power
 - Event complexity * Nb. events * thousands users
 - ➔ **100 k CPUs (cores)**
- Worldwide analysis & funding
 - Computing funding locally in major regions & countries
 - Efficient analysis everywhere
 - ➔ **GRID technology**



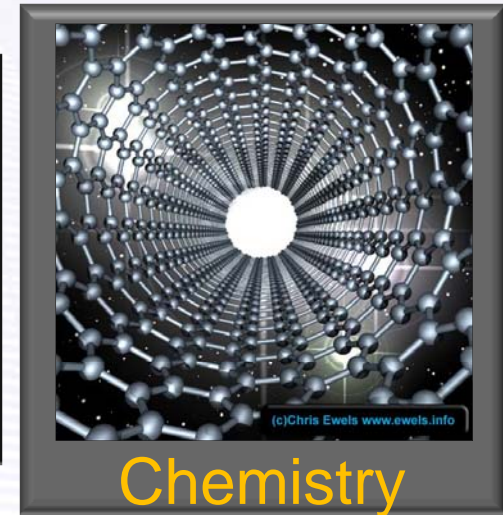
❖❖ Grid Applications



Medical



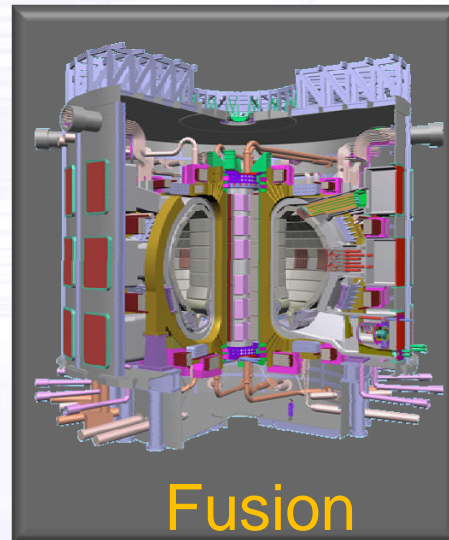
Seismology



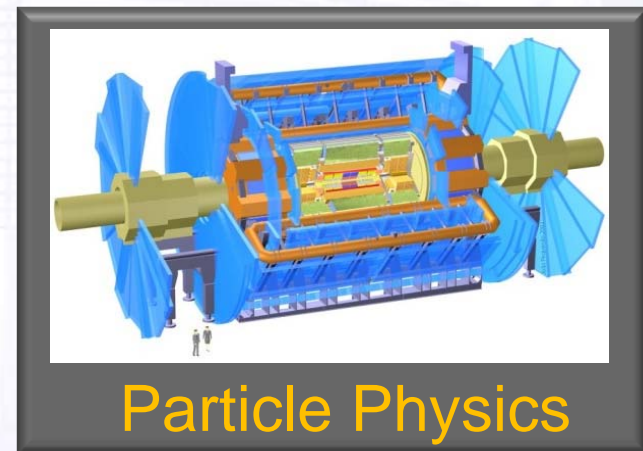
Chemistry



Astronomy



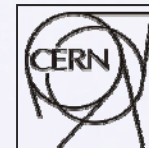
Fusion



Particle Physics



❖❖ Our EM Grid Control Environment



MONITORED TARGETS: ~ 1500
192 INSTANCES (53 RAC DBS)
223 HOSTS

Agent versions:

10.2.0.2, 10.2.0.3

10.2.0.4, 10.2.0.5

Solaris and Linux (32&64 bit)

Secure agent upload

Hardware load balancer

OMS version 10.2.0.5

Linux RHEL 4 (64 bits)

8CPU (2.33GHz) - 16Gb RAM

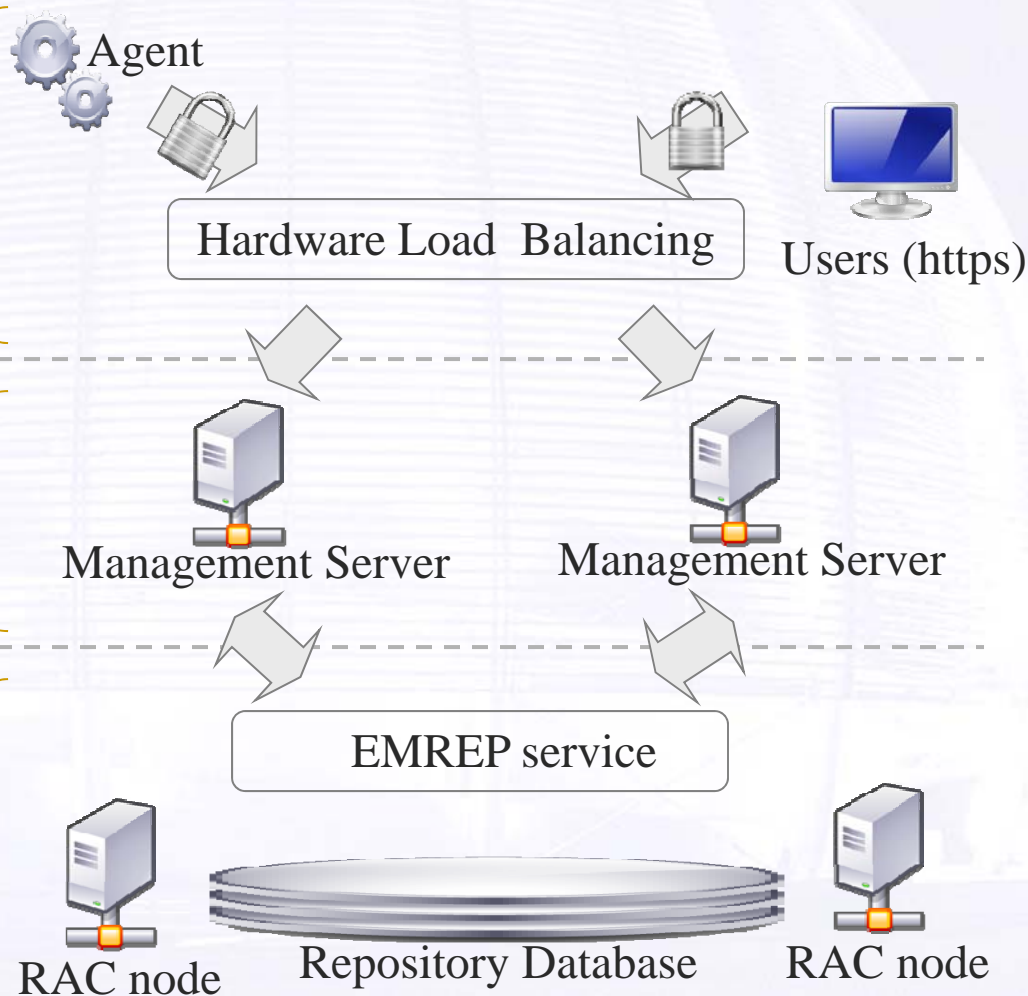
2-Node RAC (load balanced)

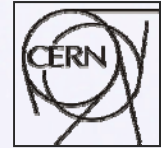
RDBMS 10.2.0.4

RedHat Linux 4 (64-bit)

NetApp NAS storage

Maximum Availability Architecture



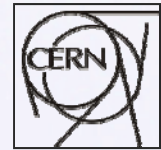


❖❖ *Our Challenge*

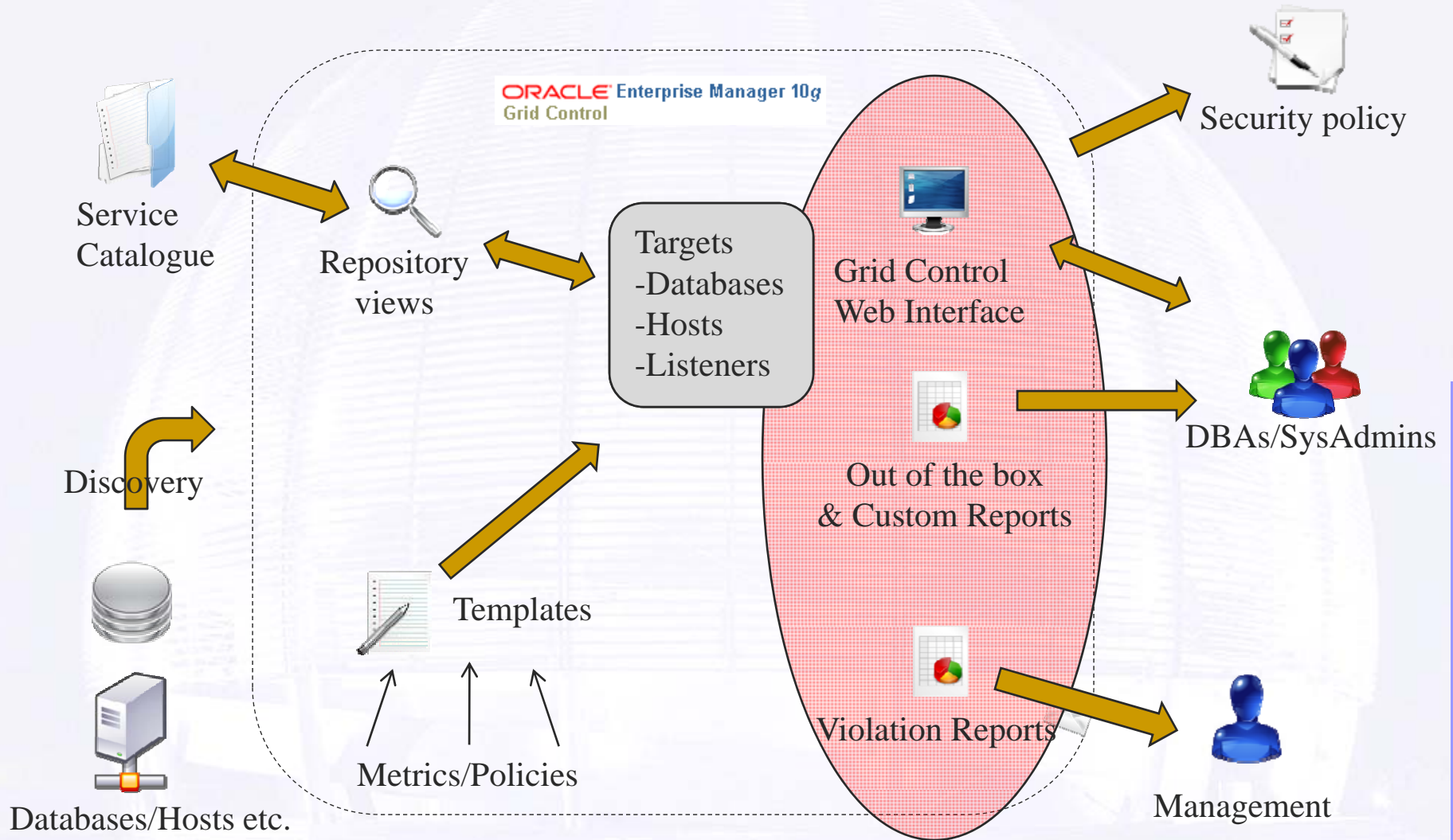
- Minimize cost of monitoring growing architecture
- Provide timely, standardized access to meaningful information
- Enable pro-active management & problem avoidance
- Identify and remove configuration exceptions

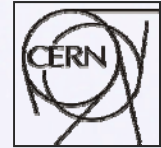


Grid Control Solution



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Grid Control



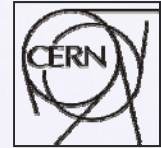


❖❖ *User Defined Policies - Use case*

- User Defined Metric Objective: Monitor the last RMAN backup timestamp for all databases
- User Defined Policy Objective: Check that the metric has been successfully applied



❖❖ How To (1) – Using User Defined Policies



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Grid Control

Home Targets Deployments Alerts **Compliance** Jobs Reports
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Enterprise Manager Configuration | Management Services and Repository | Agents

Monitoring Templates >

View Monitoring Template: Age of RMAN backups

OK

General Metric Thresholds **Policies** Access

View All metrics

Metric	Comparison Operator	Warning Threshold	Critical Threshold	Corrective Actions	Collection Schedule	Details
Age of datafile backup	>	96	96	None	Every 12 Hours	ⓘ
Age of redolog backup	>	6	12	None	Every 1 Hour	ⓘ

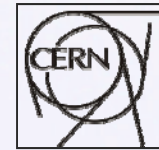
TIP Empty Thresholds will disable alerts for that metric.

General Metric Thresholds **Policies** Access

OK



❖❖ How To (2) – Using User Defined Policies



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Policies: Library

[Violations](#) | **Library** | [Associations](#) | [Errors](#)

The following table lists all the policies and where they are currently in-use.

Page Refreshed Jul 22, 2009 11:27:36 AM MEST

Category Policy [Advanced Search](#)

|

[Select All](#) | [Select None](#)

Select	Policy	Severity	Category	Type	Description	Owner	Used in Monitoring Templates	Used by Targets	Edit
<input type="checkbox"/>	Default Permanent Tablespace Set to a System Tablespace	Warning	Storage	Database Instance	Checks if the DEFAULT_PERMANENT_TABLESPACE database property is set to a system tablespace	<SYSTEM>	0	37	
<input type="checkbox"/>	Default Permanent Tablespace Set to a System Tablespace	Warning	Storage	Cluster Database	Checks if the DEFAULT_PERMANENT_TABLESPACE database property is set to a system tablespace	<SYSTEM>	1	71	
<input type="checkbox"/>	RMAN datafile backup metric exists	Warning	Security	Database Instance		SYSMAN	2	97	
<input type="checkbox"/>	Users with Permanent Tablespace as Temporary Tablespace	Informational	Storage	Cluster Database	Checks for users using a permanent tablespace as the temporary tablespace	<SYSTEM>	1	71	
<input type="checkbox"/>	Users with Permanent Tablespace as Temporary Tablespace	Informational	Storage	Database Instance	Checks for users using a permanent tablespace as the temporary tablespace	<SYSTEM>	0	37	
<input type="checkbox"/>	Weblogic Performance Pack Enabled	Critical	Configuration	Oracle WebLogic Managed Server	This Policy verifies whether BEA WebLogic Server Performance Pack is enabled or not.	<SYSTEM>	0	0	

TIP Policies provided by Oracle are owned by <SYSTEM>. They cannot be exported or deleted.

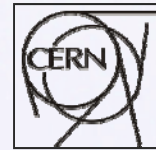
Related Link

[Setup Monitoring Templates](#)

[Violations](#) | **Library** | [Associations](#) | [Errors](#)

[Home](#) | [Targets](#) | [Deployments](#) | [Alerts](#) | **Compliance** | [Jobs](#) | [Reports](#) | [Setup](#) | [Preferences](#) | [Help](#) | [Logout](#)

❖❖ How To (3) – Using User Defined Policies



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[Policies](#) | [Policy Groups](#) | [Security At a Glance](#)

Policies: Library

[Violations](#) | **Library** | [Associations](#) | [Errors](#)

The following table lists all the policies and where they are currently in-use.

Page Refreshed Jul 22, 2009 11:27:36 AM MEST

Category Policy [Advanced Search](#)

|

Select All | Select None

Select	Policy	Severity	Category	Type	Description	Owner	Used in Monitoring Template	Used by Targets	Edit
<input type="checkbox"/>	Default Permanent Tablespace Set to a System Tablespace	Warning	Storage	Database Instance	Checks if the DEFAULT_PERMANENT_TABLESPACE database property is set to a system tablespace i	<SYSTEM>	0	37	
<input type="checkbox"/>	Default Permanent Tablespace Set to a System Tablespace	Warning	Storage	Cluster Database	Checks if the DEFAULT_PERMANENT_TABLESPACE database property is set to a system tablespace i	<SYSTEM>	1		
<input type="checkbox"/>	RMAN datafile backup metric exists	Warning	Security	Database Instance		SYSMAN	2	97	
<input type="checkbox"/>	Users with Permanent Tablespace as Temporary Tablespace	Informational	Storage	Cluster Database	Checks for users using a permanent tablespace as the temporary tablespace i	<SYSTEM>	1	71	
<input type="checkbox"/>	Users with Permanent Tablespace as Temporary Tablespace	Informational	Storage	Database Instance	Checks for users using a permanent tablespace as the temporary tablespace i	<SYSTEM>	0	37	
<input type="checkbox"/>	Weblogic Performance Pack Enabled	Critical	Configuration	Oracle WebLogic Managed Server	This Policy verifies whether BEA WebLogic Server Performance Pack is enabled or not. i	<SYSTEM>	0	0	

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Related Link

[Setup Monitoring Templates](#)

[Violations](#) | **Library** | [Associations](#) | [Errors](#)

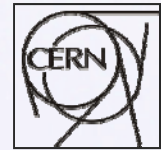
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❖❖ How To (4) – Using User Defined Policies

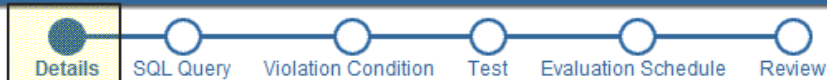


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[Policies](#) | [Policy Groups](#) | [Security At a Glance](#)



Edit Policy: Details

[Cancel](#) [Step 1 of 6](#) [Next](#)

Name **RMAN datafile backup metric exists**

Target Type **Database Instance**

Severity **Warning**

Category **Security**

Description **Policy checks for the existence of the RMAN datafile backup metric**

Impact of Violation **Metric is not installed so we have no alert if backups fail silently**

Recommendation **Apply the monitoring metrics template to this target**

Details Link

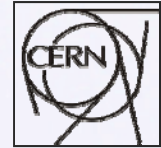
Enter a fully qualified URL to a web site that will offer additional information to support this policy definition. The link is represented by an information icon next to the description and can be verified by clicking on this icon in the Test step.

[Cancel](#) [Step 1 of 6](#) [Next](#)

[Home](#) | [Targets](#) | [Deployments](#) | [Alerts](#) | **Compliance** | [Jobs](#) | [Reports](#) | [Setup](#) | [Preferences](#) | [Help](#) | [Logout](#)



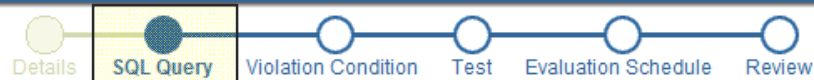
❖❖ How To (5) – Using User Defined Policies



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Grid Control

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Edit Policy: SQL Query

Enter a valid SQL query that returns column data to be verified.

Cancel Back Step 2 of 6 Next

* SQL Query

One of the select columns must be target_guid. Do not end the statement with a semi-colon (;)

Validate SQL

* Non-Compliant Message

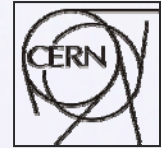
* Compliant Message

Cancel Back Step 2 of 6 Next

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❖❖ How To (6) – Using User Defined Policies



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Grid Control

Home Targets Deployments Alerts Compliance Jobs Reports
Setup Preferences Help Logout

Policies | Policy Groups | Security At a Glance

Edit Policy: SQL Query

Enter a valid SQL query that returns column data

* SQL Query

select target_guid as TARGET_GUID, 1 "VALUE"
from mgmt\$target_metric_settings
where collection_name='Age of datafile
backup'
and target_type='oracle_database'
union
select target_guid as TARGET_GUID, 0 "VALUE"
from mgmt\$target where
target_type='oracle_database'
and target_guid not in (select target_guid
from mgmt\$target_metric_settings
where collection_name='Age of datafile
backup'
and target_type='oracle_database')

* Non-Compliant Message Policy RMA

* Compliant Message Policy RMA

Home | Targets

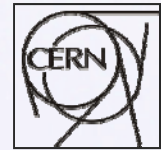
```
select target_guid as TARGET_GUID, 1 "VALUE"  
from mgmt$target_metric_settings  
where collection_name='Age of datafile  
backup'  
and target_type='oracle_database'  
union  
select target_guid as TARGET_GUID, 0 "VALUE"  
from mgmt$target where  
target_type='oracle_database'  
and target_guid not in (select target_guid  
from mgmt$target_metric_settings  
where collection_name='Age of datafile  
backup'  
and target_type='oracle_database')
```

Back Step 2 of 6 Next

Back Step 2 of 6 Next



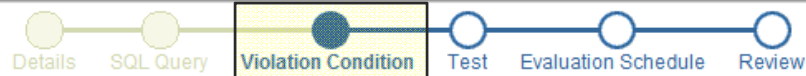
❖❖ How To (7) – Using User Defined Policies



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Policies | Policy Groups | Security At a Glance



Edit Policy: Violation Condition

Enter the violation test to be evaluated.

Cancel Back Step 3 of 6 Next

SQL Query

Number of Key Columns

SQL select statement returns data in key-column order, where first n columns returned represent compound keys.

Condition

To check for violations, select a column name that was specified in the SQL statement above, and set the comparison operator and value to be tested. A violation is triggered if the condition returns false. If a more complex condition is needed, select SQL condition type and enter a SQL WHERE expression. If default parameters are used in the sql expression, they can be customized during target association.

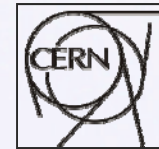
Condition Type Threshold SQL

Threshold			
Column Name	Data Type	Comparison Operator	Default Value
VALUE	Number	=	0

Cancel Back Step 3 of 6 Next

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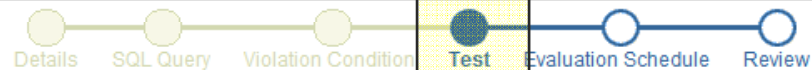
How To (8) – Using User Defined Policies

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Edit Policy: Test

Run a test evaluation against a single test target. Test results will be rendered below.

[Cancel](#) [Back](#) [Step 4 of 6](#) [Next](#)

(OPTIONAL) Click Next to skip test.

* Target [Run Test](#)

[Cancel](#) [Back](#) [Step 4 of 6](#) [Next](#)

[Home](#) | [Targets](#) | [Deployments](#) | [Alerts](#) | **Compliance** | [Jobs](#) | [Reports](#) | [Setup](#) | [Preferences](#) | [Help](#) | [Logout](#)

Results

General

Severity Warning

Compliance Score (%) 76

Importance Normal

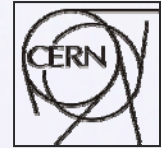
Category Security

Description Policy checks for the existence of the RMAN datafile backup metric

Violations

VALUE	Date Tested ▾
	07-Aug-2009 12:30:30 MFST

View policy results



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Grid Control

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|

[Select All](#) | [Select None](#)

Select	Policy	Severity	Category	Type	Description	Owner	Used in Monitoring Templates	Used by Targets	Edit
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<input type="checkbox"/>	Default Permanent Tablespace Set to a System Tablespace	Warning	Storage	Cluster Database	Checks if the DEFAULT_PERMANENT_TABLESPACE database property is set to a system tablespace	<SYSTEM>	1	71	
<input type="checkbox"/>	RMAN datafile backup metric exists	Warning	Security	Database Instance		SYSMAN	2	97	
<input type="checkbox"/>	Users with Permanent Tablespace as Temporary Tablespace	Informational	Storage	Cluster Database	Checks for users using a permanent tablespace as the temporary tablespace	<SYSTEM>	1	71	
<input type="checkbox"/>	Users with Permanent Tablespace as Temporary Tablespace	Informational	Storage	Database Instance	Checks for users using a permanent tablespace as the temporary tablespace	<SYSTEM>	0	37	
<input type="checkbox"/>	Weblogic Performance Pack Enabled	Critical	Configuration	Oracle WebLogic Managed Server	This Policy verifies whether BEA WebLogic Server Performance Pack is enabled or not.	<SYSTEM>	0	0	

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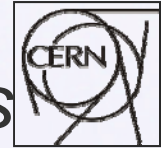
Related Link

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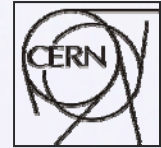
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❖❖ *Other Examples – Using User Defined Policies*

- Monitor if DB auditing is enabled
- Monitor if the audit data management procedure has been applied or if the login auditing trigger is enabled
- Monitor if the truncate audit procedure exists





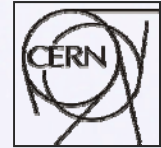
❖❖ Conclusion (I): Cost benefits

■ Example:

○ Without Grid Control:

Monitoring task (EM policy)	Time consumed
Time spent in a task per database per month	1 task x 5 mins x 1 month x 1db = 5 mins/month
Time spent in checking a task for all the databases	1 task x 5 mins x 1 month x 100 db = 8 hours/month
Time spent in checking all tasks for all the database	8 hours x 20 tasks = 166 hours/month
Conclusion => 1 post (FTE) just to check policies!!!!!!	





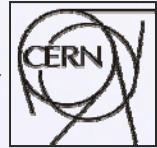
❖❖ Conclusion (I): Cost benefits

- Example:
 - With Grid Control:

Monitoring task (EM policy)	Time consumed
Time spent in the initial effort in setting up: <ul style="list-style-type: none">✓ The User Defined Metric✓ The User Defined Policy	It takes a few hours each. No overhead in re-running the policy.
Conclusion => The post (FTE) can invest the time in taking new projects without increasing costs	

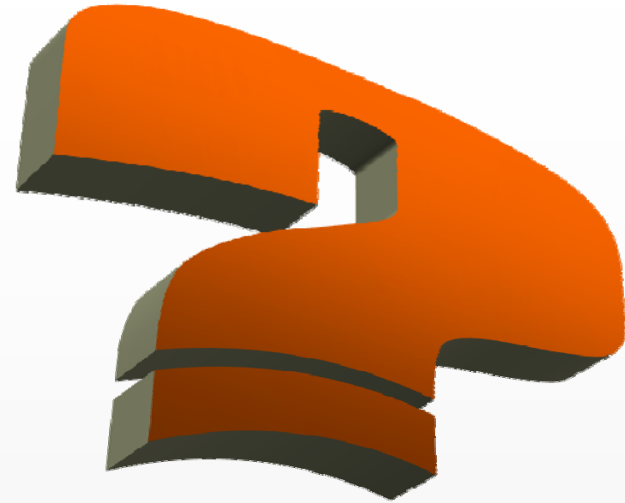


❖❖ *Conclusion (II): Increased productivity*



- Furthermore... Grid control reduces manpower needs by:
 - Providing centralized access to meaningful information
 - Enforcing compliance with our standards
 - Decreasing time consumed by daily operations
 - Reducing downtime by pro-active monitoring
 - Assisting DBAs in their tuning and performance improvement tasks
 - ...and all with little additional effort even for a constantly expanding IT infrastructure





Questions?

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