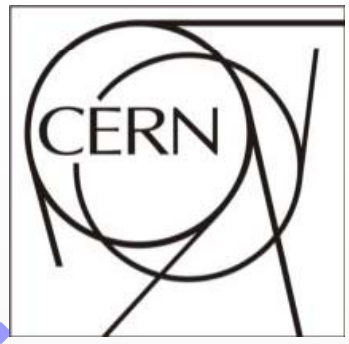


Increasing productivity at CERN with Enterprise Manager Grid Control

Manuel Guijarro

Lucia Moreno

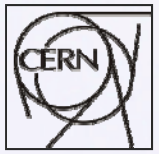
Chris Lambert

CERN

Oracle OpenWorld – October 2009

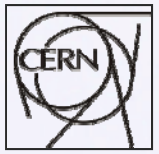
Manuel.Guijarro@cern.ch

Agenda



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

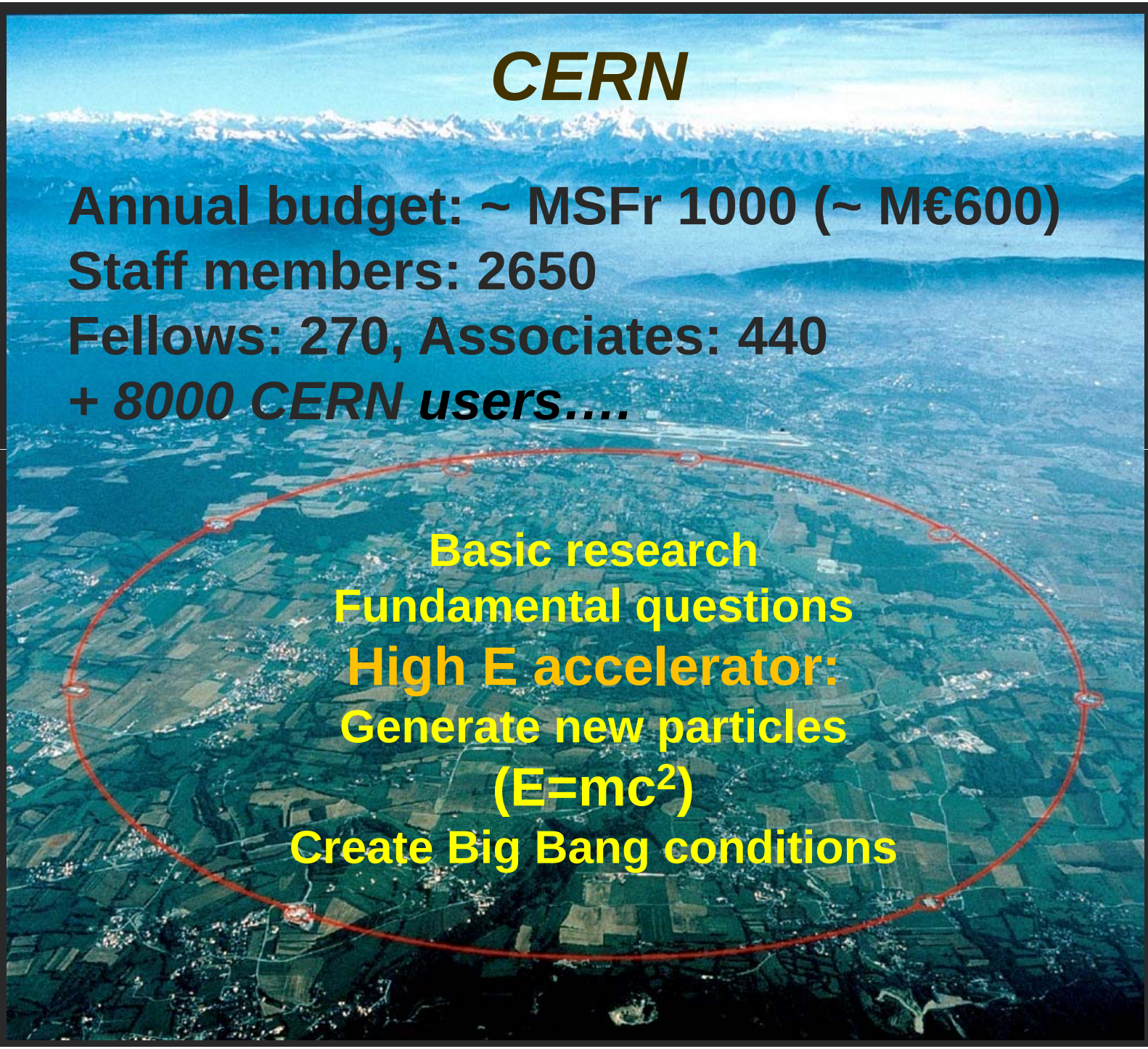
Introduction to CERN



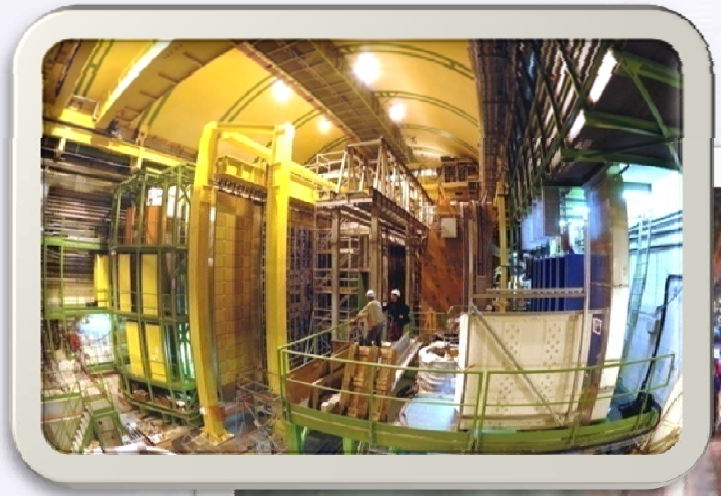
- European Organization for Nuclear Research
  - The world's largest particle physics laboratory
  - Located on Swiss/French border
  - Funded/staffed by 20 member states in 1954
  - With many contributors in the USA
  - Birth place of World Wide Web
  - Made popular by the movie "Angels and Demons"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

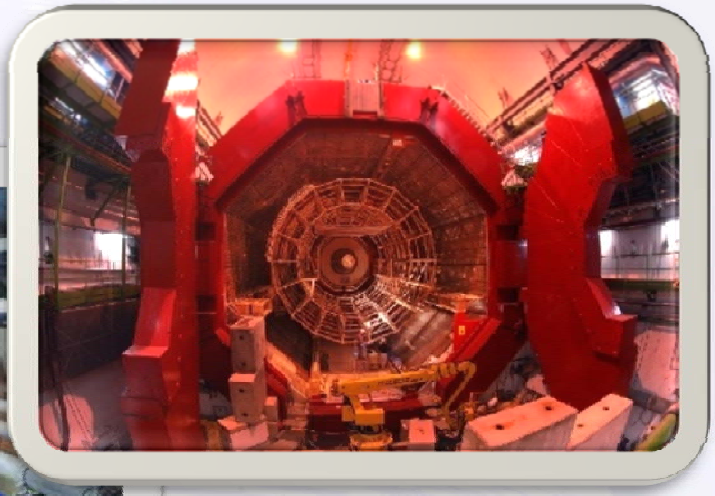
CERN

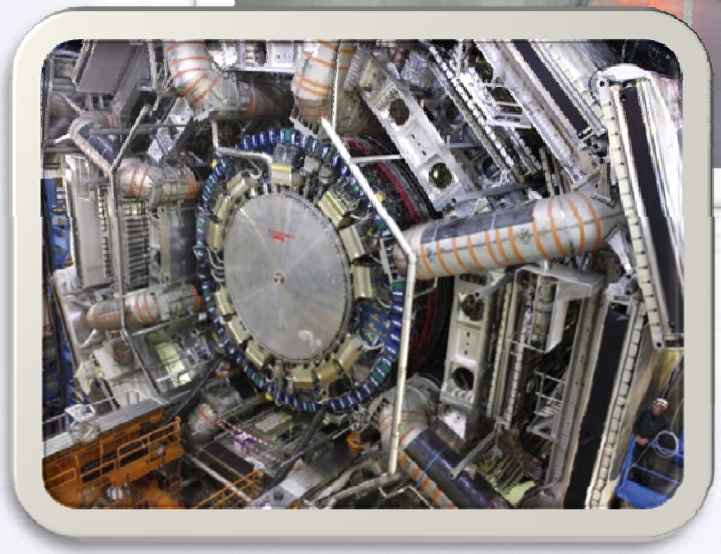
Annual budget: ~ MSFr 1000 (~ M€600)
Staff members: 2650
Fellows: 270, Associates: 440
+ 8000 CERN users….

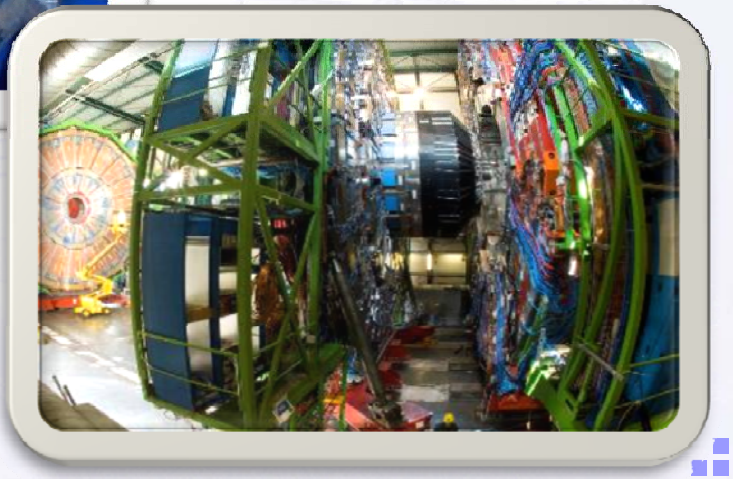


LHC gets ready …









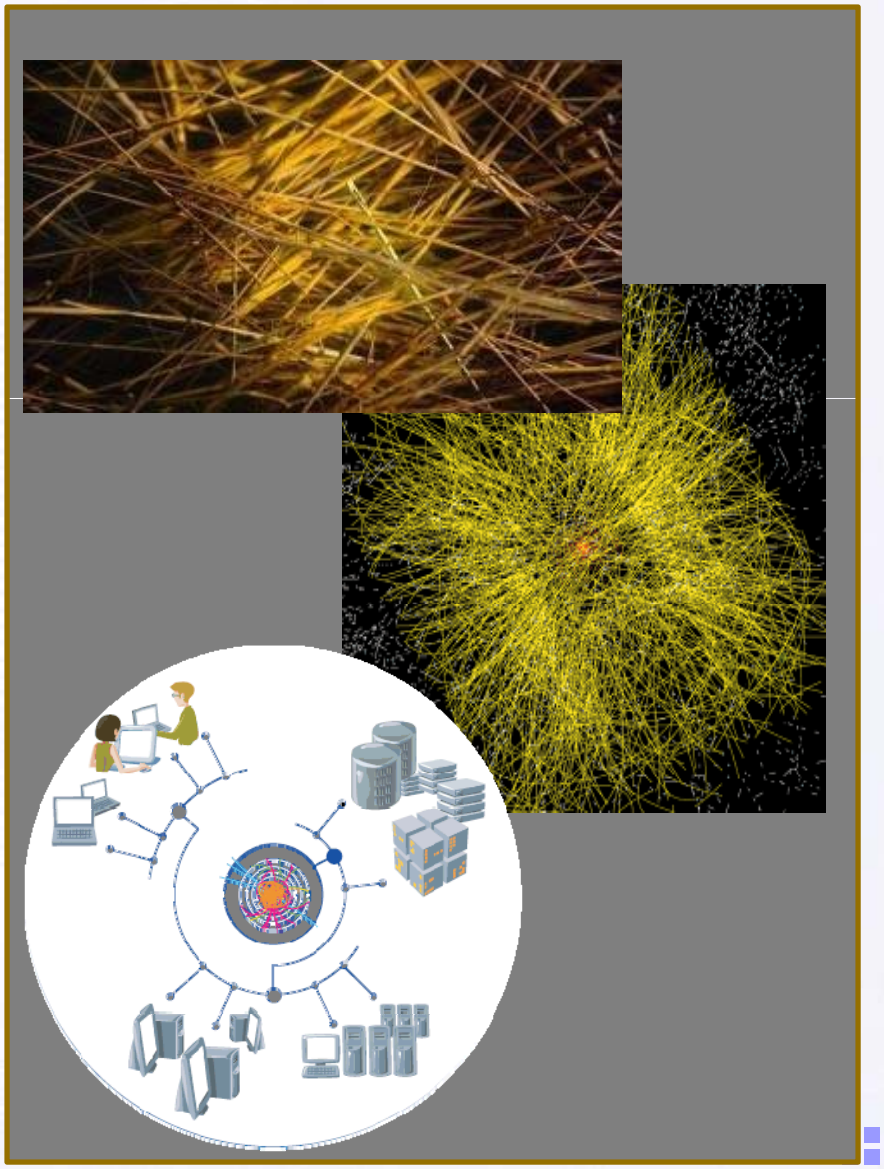
LHC Computing Challenge

- Signal/Noise 10^{-9}
- Data volume
  - High rate * large number of channels * 4 experiments

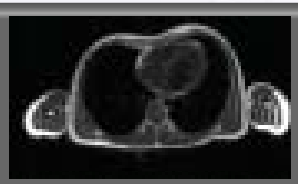
  ➔ **15 PetaBytes of new data each year**
- Compute power
  - Event complexity * Nb. events * thousands users

  ➔ **100 k CPUs (cores)**
- Worldwide analysis & funding
  - Computing funding locally in major regions & countries
  - Efficient analysis everywhere

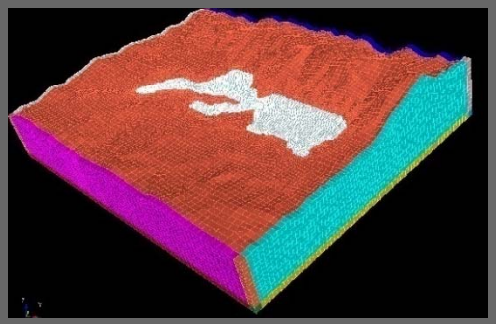
  ➔ **GRID technology**



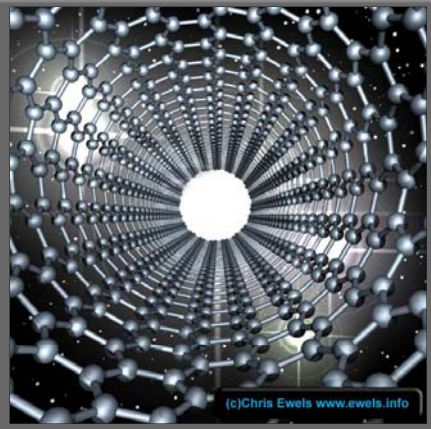
Grid Applications



Medical

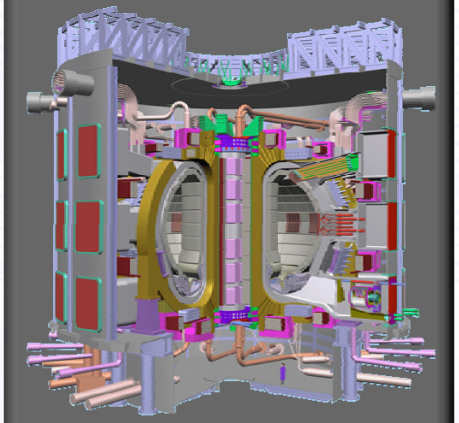


Seismology

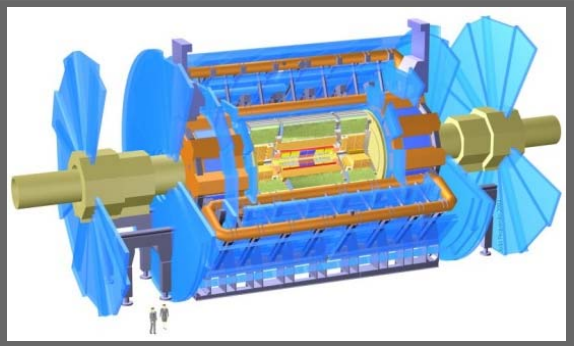


Chemistry

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

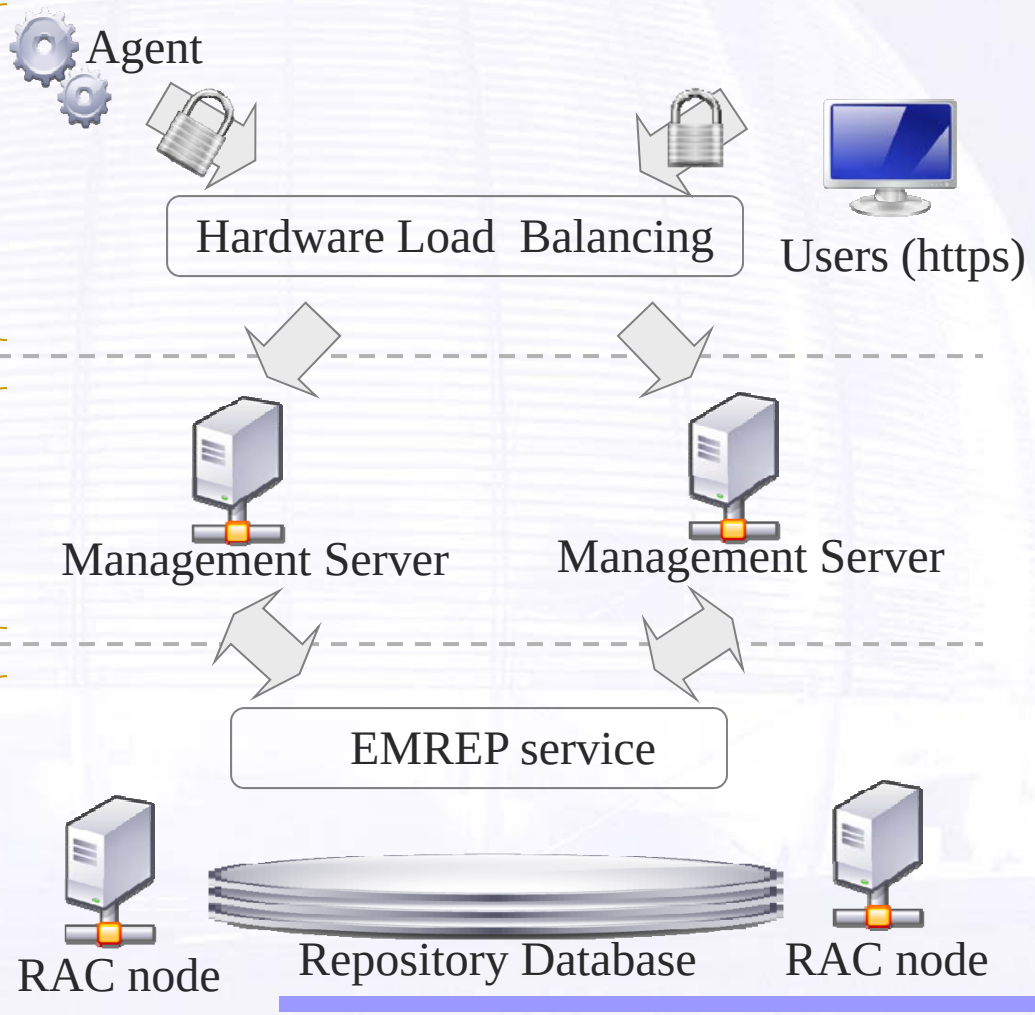
2-Node RAC (load balanced)

RDBMS 10.2.0.4

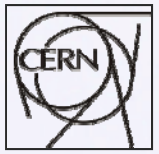
RedHat Linux 4 (64-bit)

NetApp NAS storage

Maximum Availability Architecture

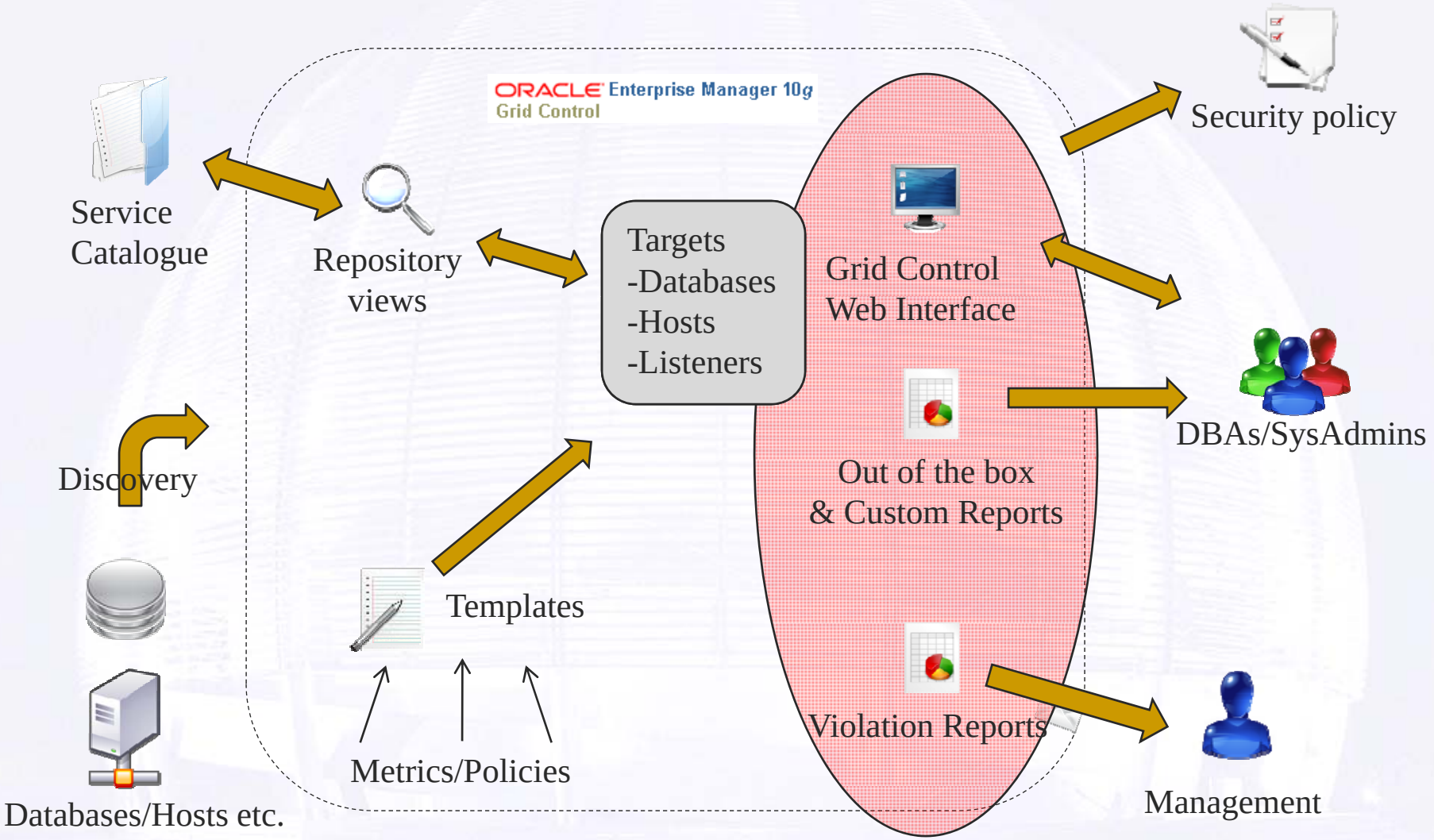


Our Challenge

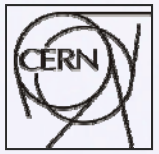


- Minimize cost of monitoring growing architecture
- Provide timely, standardized access to meaningful information
- Enable pro-active management & problem avoidance
- Identify and remove configuration exceptions

Grid Control Solution

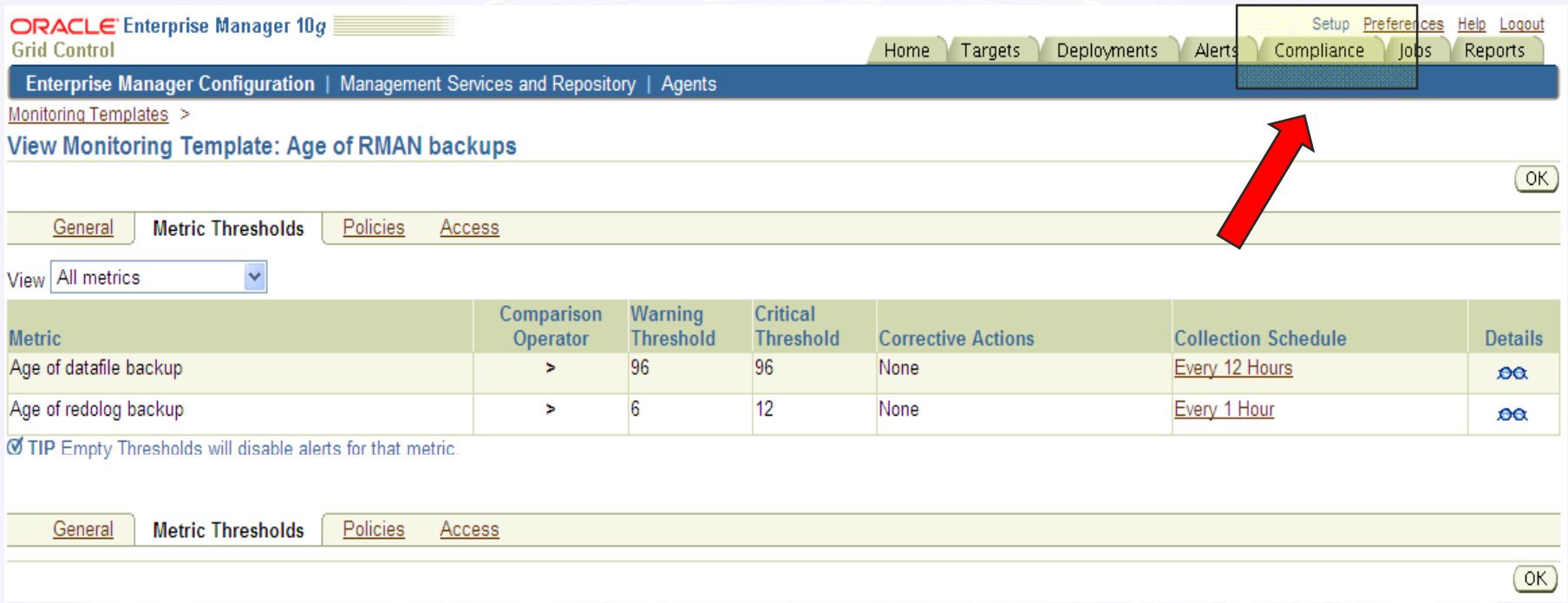


User Defined Policies - Use case

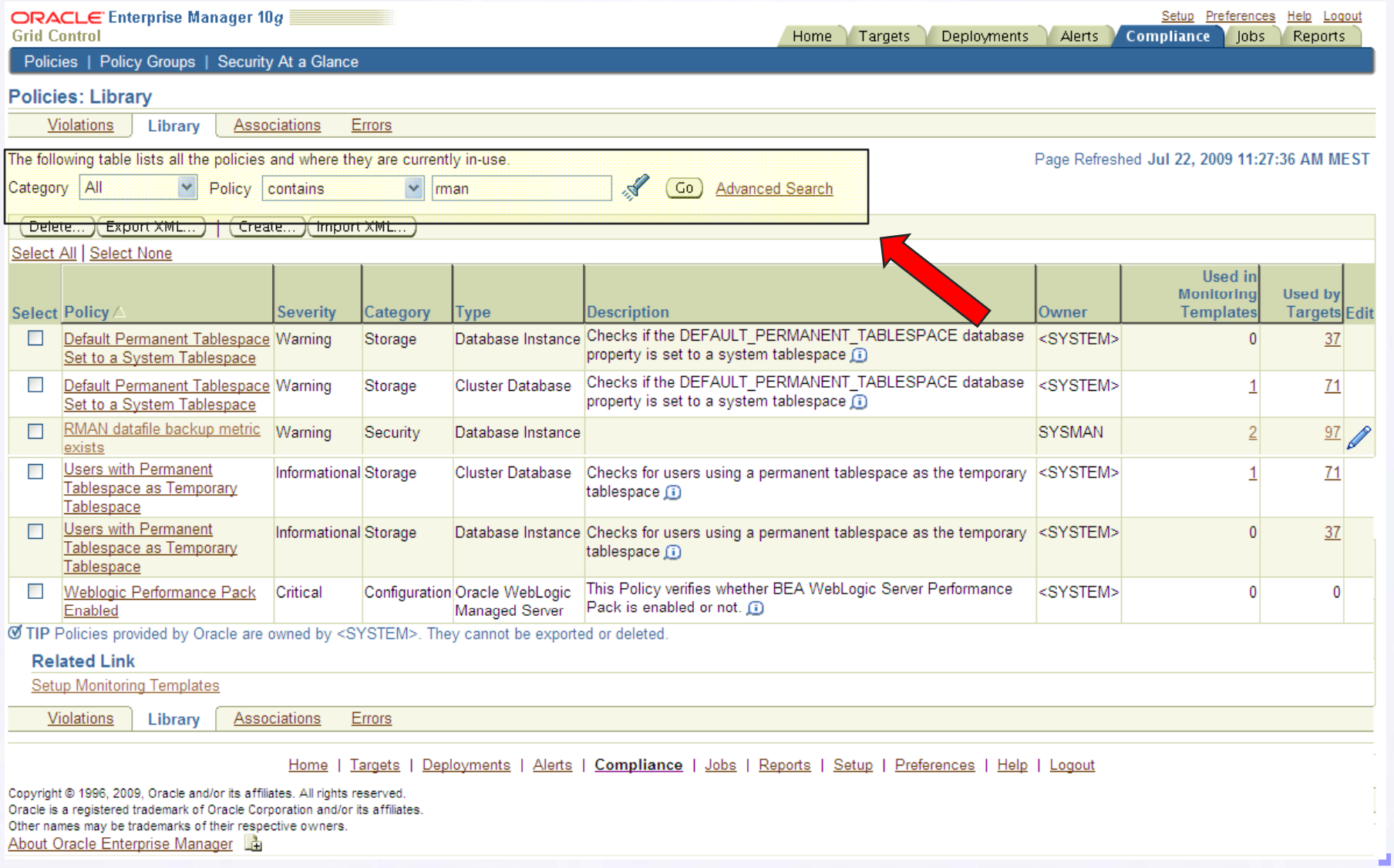


- User Defined Metric Objective: Monitor the last RMAN backup timestamp for all databases
- User Defined Policy Objective: Check that the metric has been successfully applied

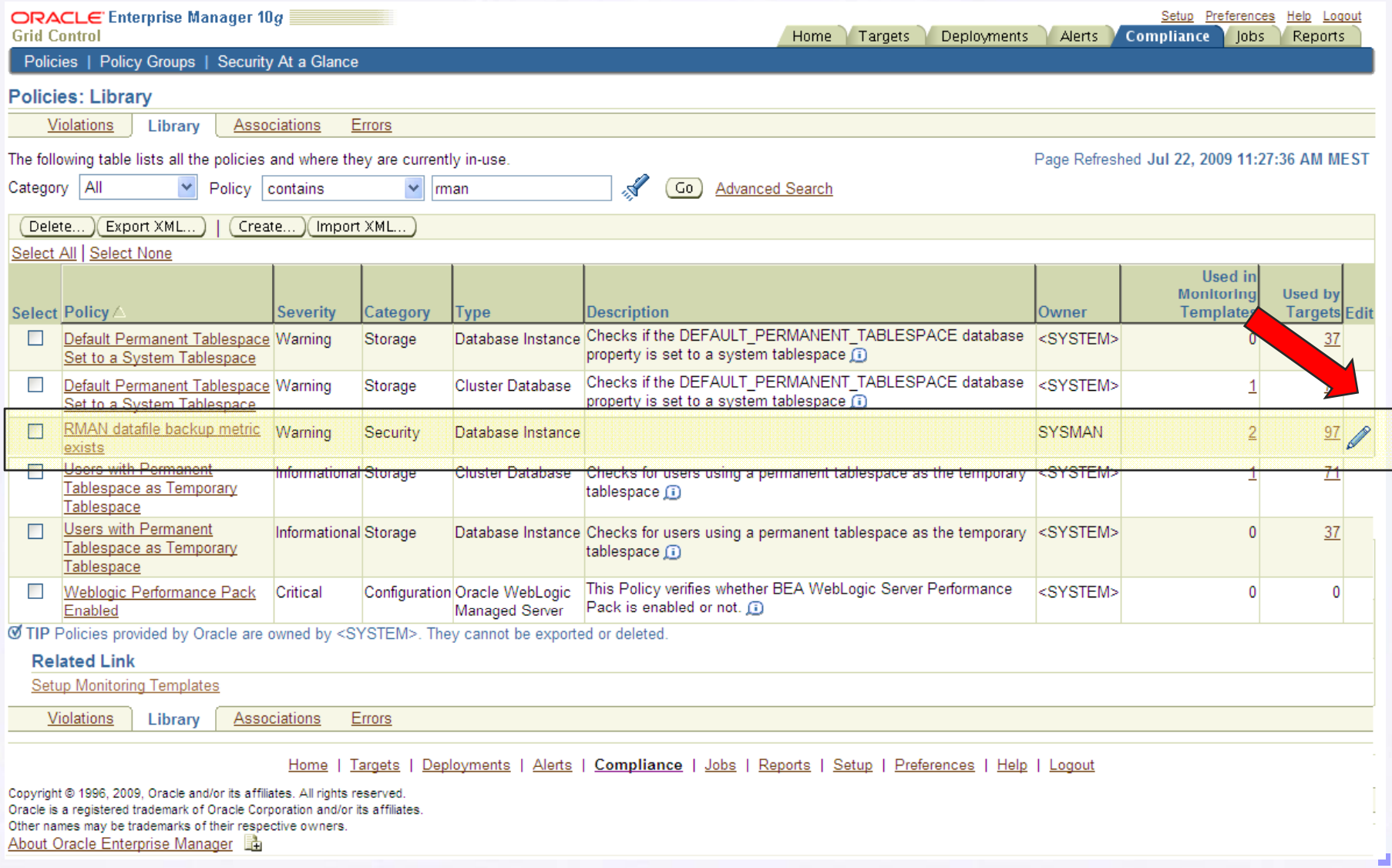
How To (1) – Using User Defined Policies



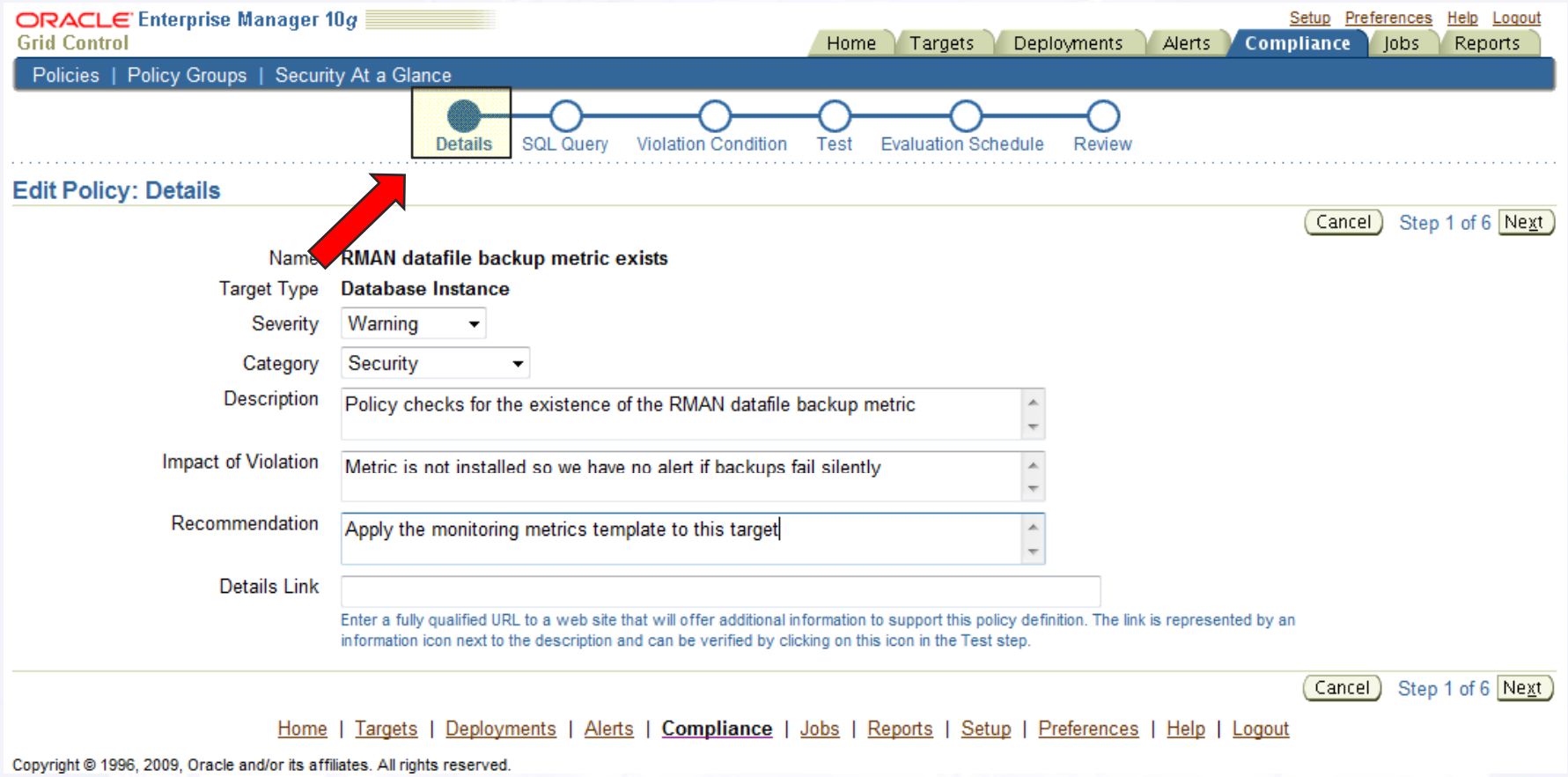
How To (2) – Using User Defined Policies



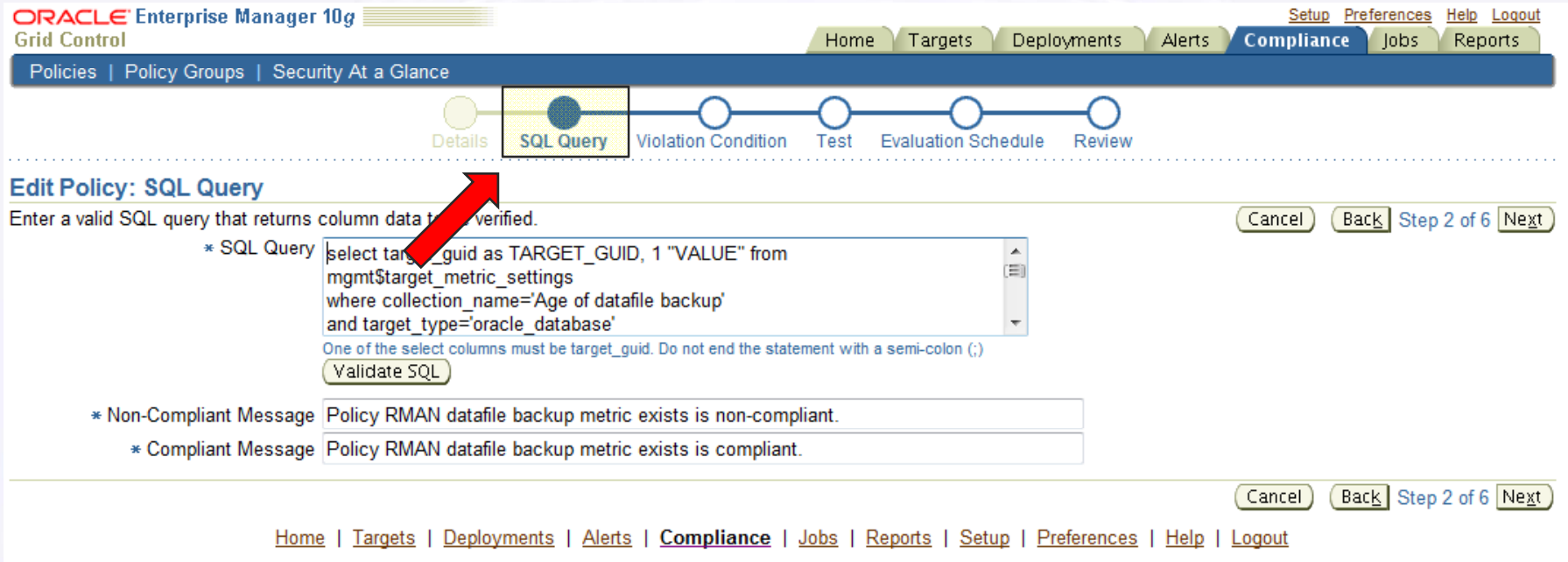
How To (3) – Using User Defined Policies



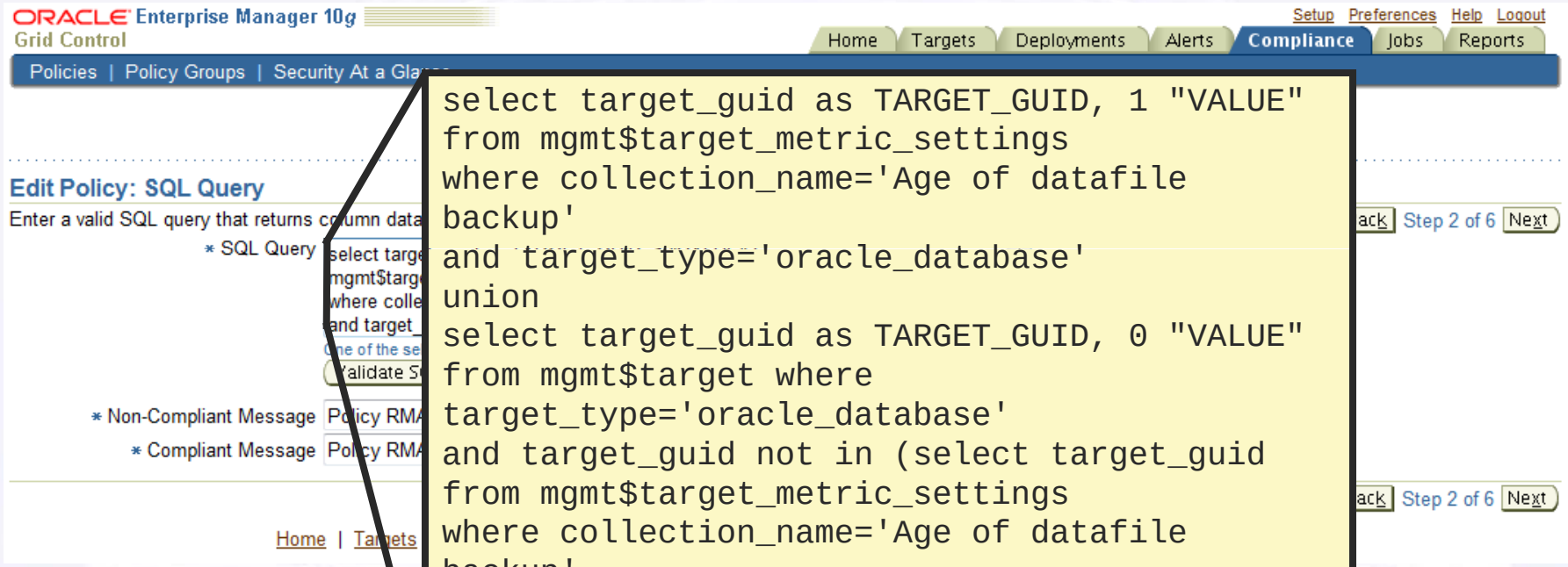
How To (4) – Using User Defined Policies



How To (5) – Using User Defined Policies

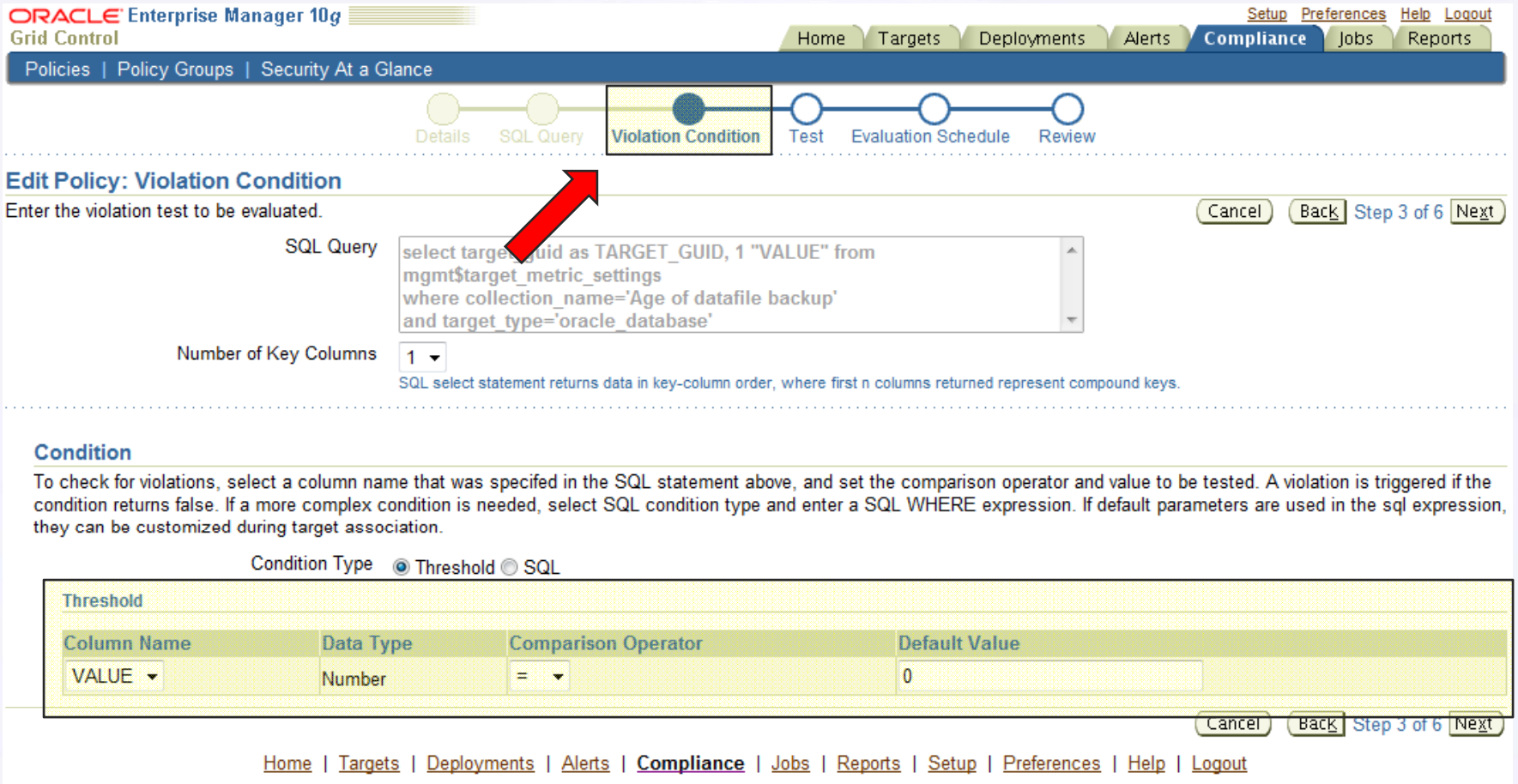


How To (6) – Using User Defined Policies

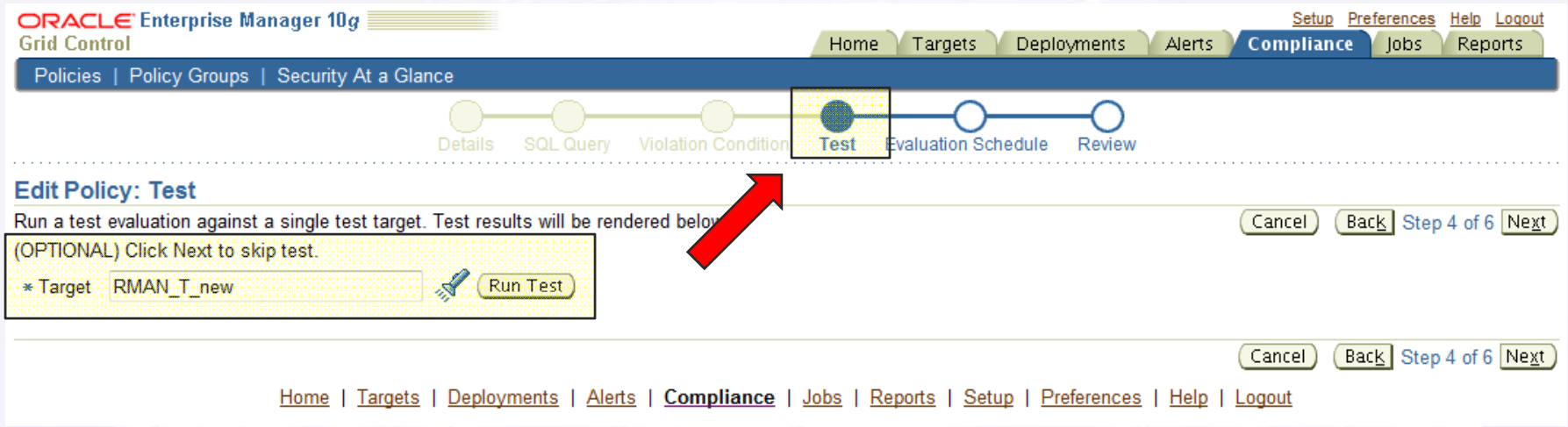


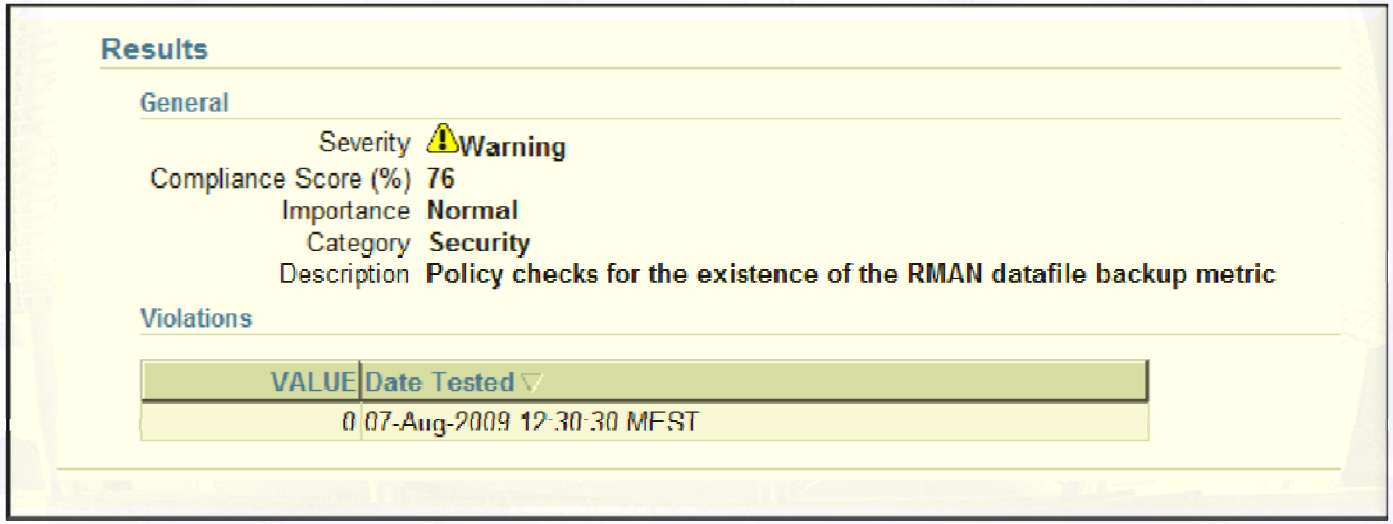

```
select target_guid as TARGET_GUID, 1 "VALUE"
from mgmt$target_metric_settings
where collection_name='Age of datafile
backup'
and target_type='oracle_database'
union
select target_guid as TARGET_GUID, 0 "VALUE"
from mgmt$target where
target_type='oracle_database'
and target_guid not in (select target_guid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

How To (7) – Using User Defined Policies

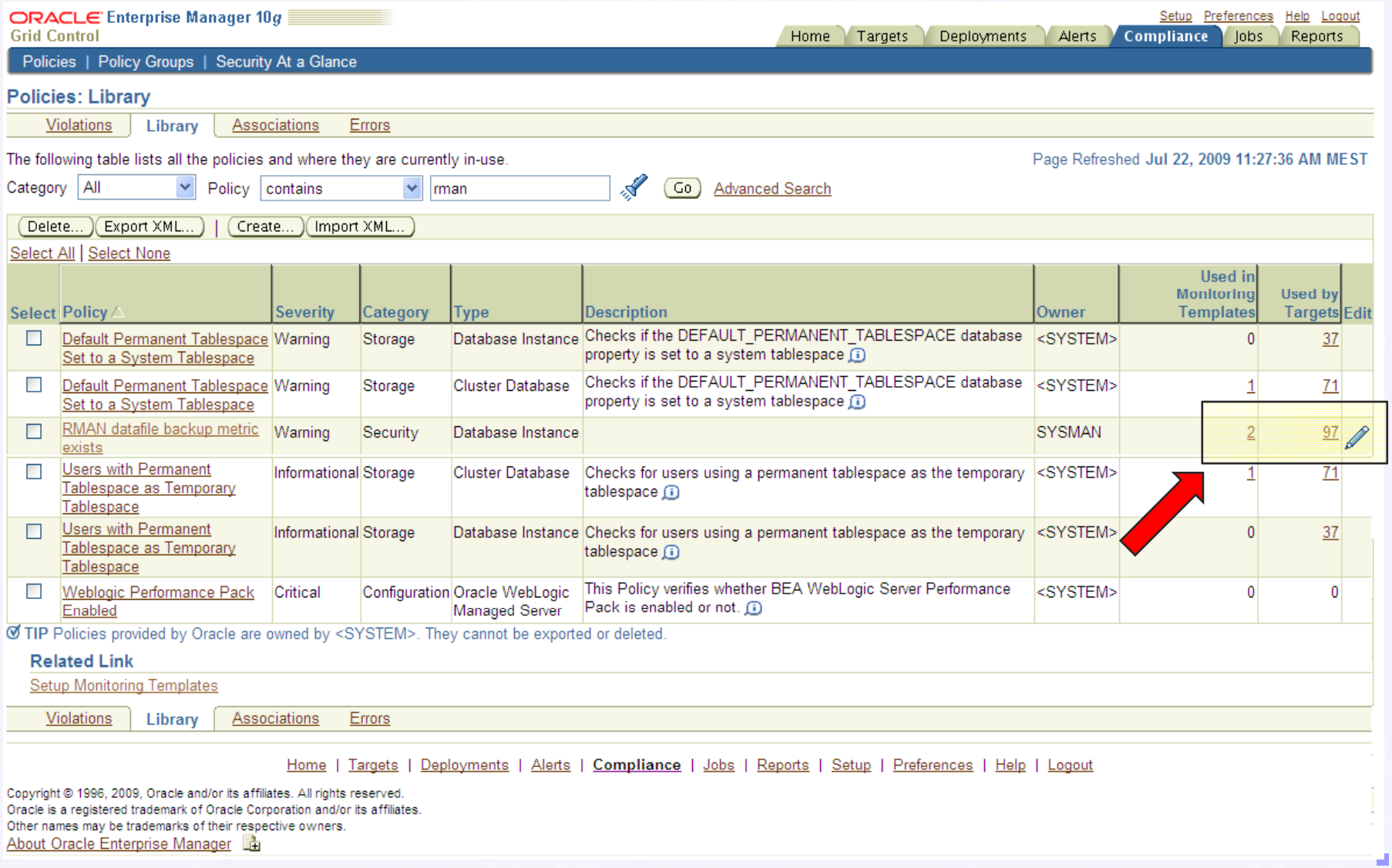


How To (8) – Using User Defined Policies

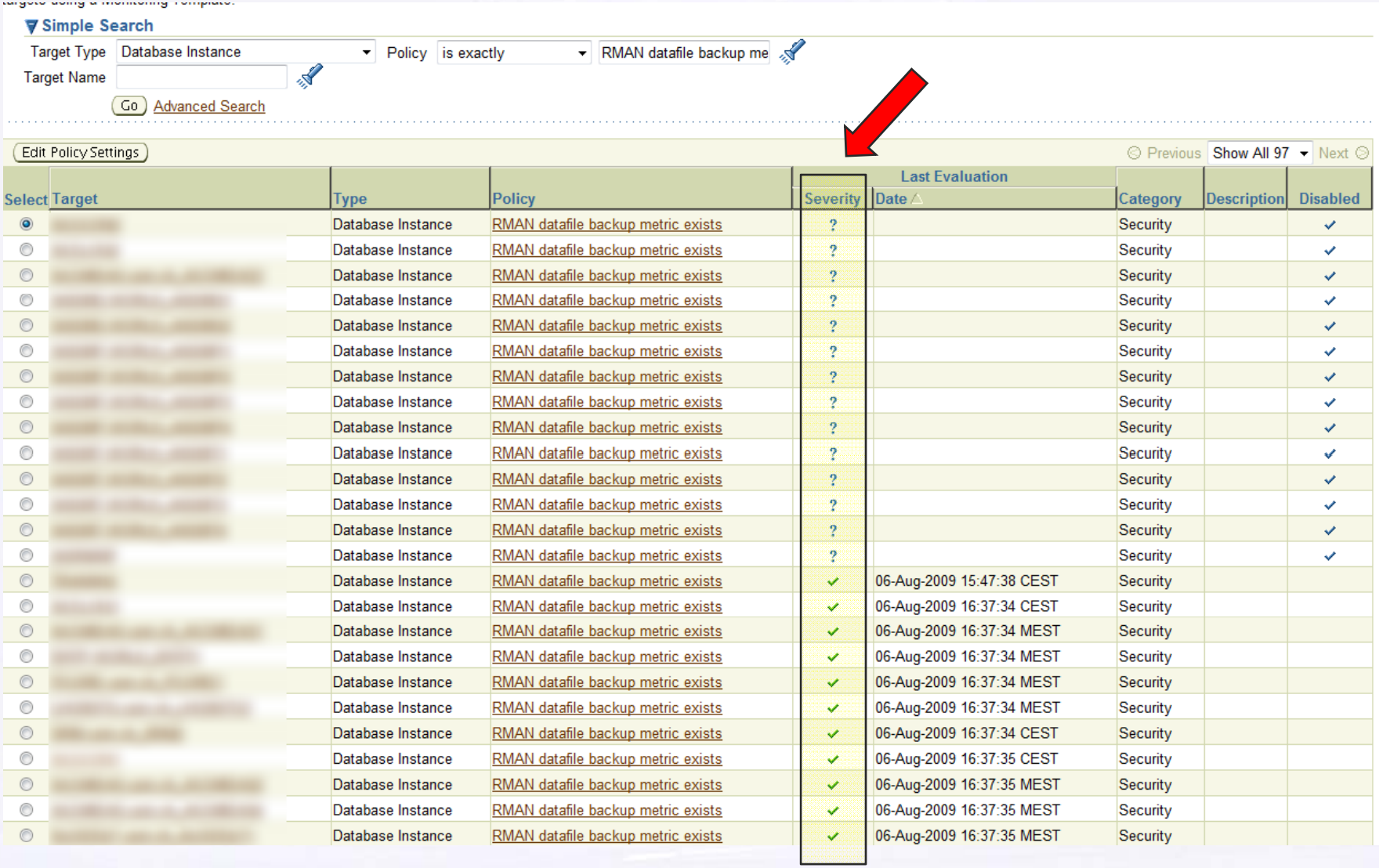




View policy results



View policy results



Simple Search

Target Type: Database Instance | Policy: is exactly | RMAN datafile backup me

Target Name:

Go | Advanced Search

Edit Policy Settings

Previous | Show All 97 | Next

Select	Target	Type	Policy	Last Evaluation Severity	Last Evaluation Date	Category	Description	Disabled
◉	[redacted]	Database Instance	RMAN datafile backup metric exists	?		Security		✓
○	[redacted]	Database Instance	RMAN datafile backup metric exists	?		Security		✓
○	[redacted]	Database Instance	RMAN datafile backup metric exists	?		Security		✓
○	[redacted]	Database Instance	RMAN datafile backup metric exists	?		Security		✓
○	[redacted]	Database Instance	RMAN datafile backup metric exists	?		Security		✓
○	[redacted]	Database Instance	RMAN datafile backup metric exists	?		Security		✓
○	[redacted]	Database Instance	RMAN datafile backup metric exists	?		Security		✓
○	[redacted]	Database Instance	RMAN datafile backup metric exists	?		Security		✓
○	[redacted]	Database Instance	RMAN datafile backup metric exists	?		Security		✓
○	[redacted]	Database Instance	RMAN datafile backup metric exists	?		Security		✓
○	[redacted]	Database Instance	RMAN datafile backup metric exists	?		Security		✓
○	[redacted]	Database Instance	RMAN datafile backup metric exists	?		Security		✓
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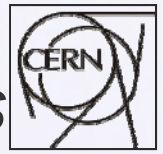
○	[redacted]	Database Instance	RMAN datafile backup metric exists	?		Security		✓
○	[redacted]	Database Instance	RMAN datafile backup metric exists	?		Security		✓
○	[redacted]	Database Instance	RMAN datafile backup metric exists	✓	06-Aug-2009 15:47:38 CEST	Security		
○	[redacted]	Database Instance	RMAN datafile backup metric exists	✓	06-Aug-2009 16:37:34 CEST	Security		
○	[redacted]	Database Instance	RMAN datafile backup metric exists	✓	06-Aug-2009 16:37:34 MEST	Security		
○	[redacted]	Database Instance	RMAN datafile backup metric exists	✓	06-Aug-2009 16:37:34 MEST	Security		
○	[redacted]	Database Instance	RMAN datafile backup metric exists	✓	06-Aug-2009 16:37:34 MEST	Security		
○	[redacted]	Database Instance	RMAN datafile backup metric exists	✓	06-Aug-2009 16:37:34 MEST	Security		
○	[redacted]	Database Instance	RMAN datafile backup metric exists	✓	06-Aug-2009 16:37:34 CEST	Security		
○	[redacted]	Database Instance	RMAN datafile backup metric exists	✓	06-Aug-2009 16:37:35 CEST	Security		
○	[redacted]	Database Instance	RMAN datafile backup metric exists	✓	06-Aug-2009 16:37:35 MEST	Security		
○	[redacted]	Database Instance	RMAN datafile backup metric exists	✓	06-Aug-2009 16:37:35 MEST	Security		
○	[redacted]	Database Instance	RMAN datafile backup metric exists	✓	06-Aug-2009 16:37:35 MEST	Security		

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:

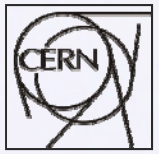
Monitoring task (EM policy)	Time consumed
Time spent in a task per database per month	1 task x 5 mins x 1 month x 1db = 5 mins/month
Time spent in checking a task for all the databases	1 task x 5 mins x 1 month x 100 db = 8 hours/month
Time spent in checking all tasks for all the database	8 hours x 20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

Conclusion (I): Cost benefits

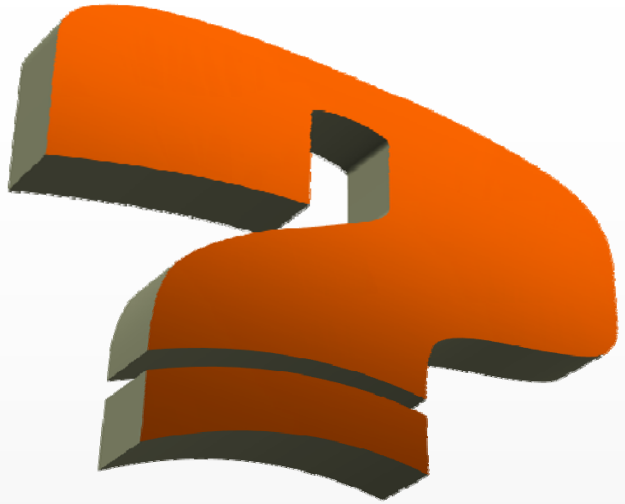
- Example:
  - With Grid Control:

Monitoring task (EM policy)	Time consumed
Time spent in the initial effort in setting up: ✓ 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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CERN Website: http://www.cern.ch