

Grid Control

INSTALLATION & CONFIGURATION

ESSENTIALS

Michael New

new **dba** solutions

Overview of Grid Control

GC Installation

- Architecture
- Infrastructure design
- HA/DR recommendations

GC Configuration

- Notification rules
- Agent configuration
- Metric tuning
- Jobs and UDMs
- B&R procedures

GC Architecture



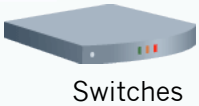
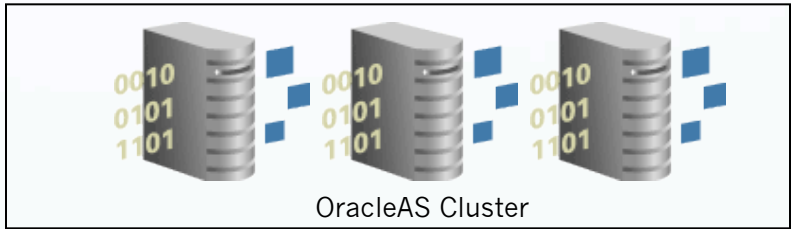
GC Architecture

- Grid Computing infrastructure
- GC topology
- Data flow between GC components
- Grid Control, DB Control, and AS Control

Grid Computing Infrastructure

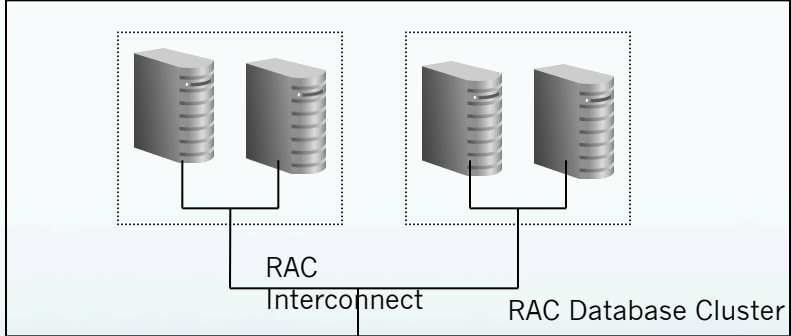


Tier 1 - Client

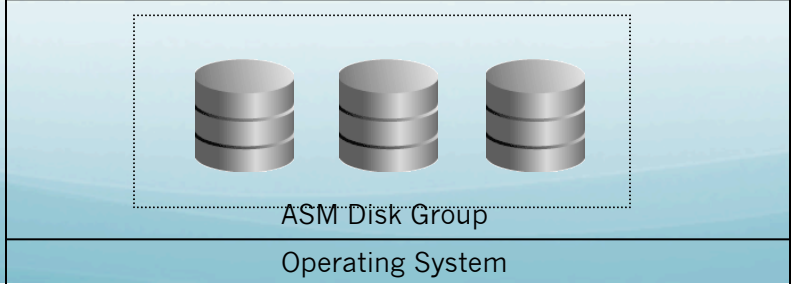


Tier 2 – Application Server

.NET	ODBC	Oracle Net	OCI	JDBC	OTHER
------	------	------------	-----	------	-------

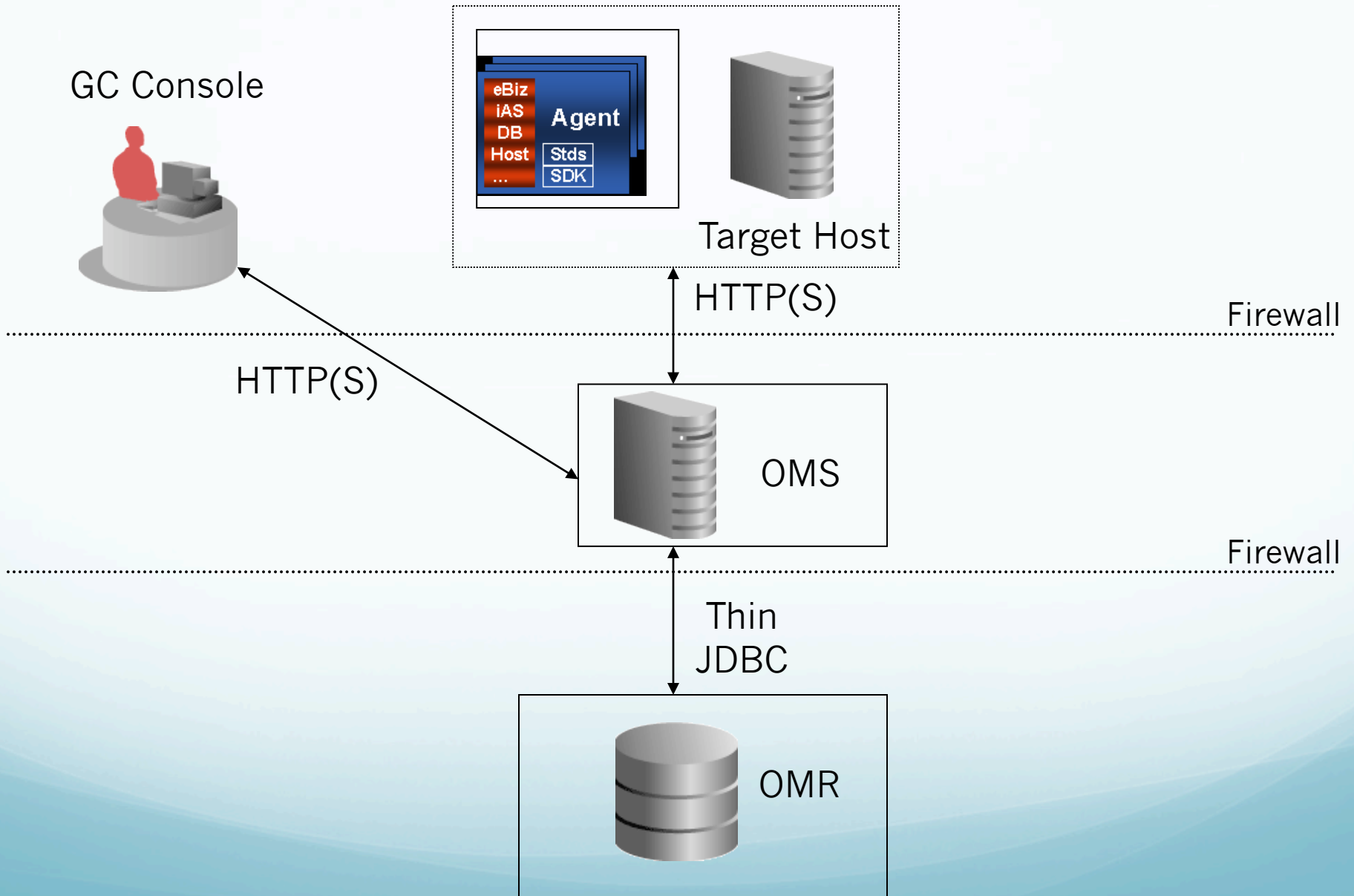


Tier 3 - Database

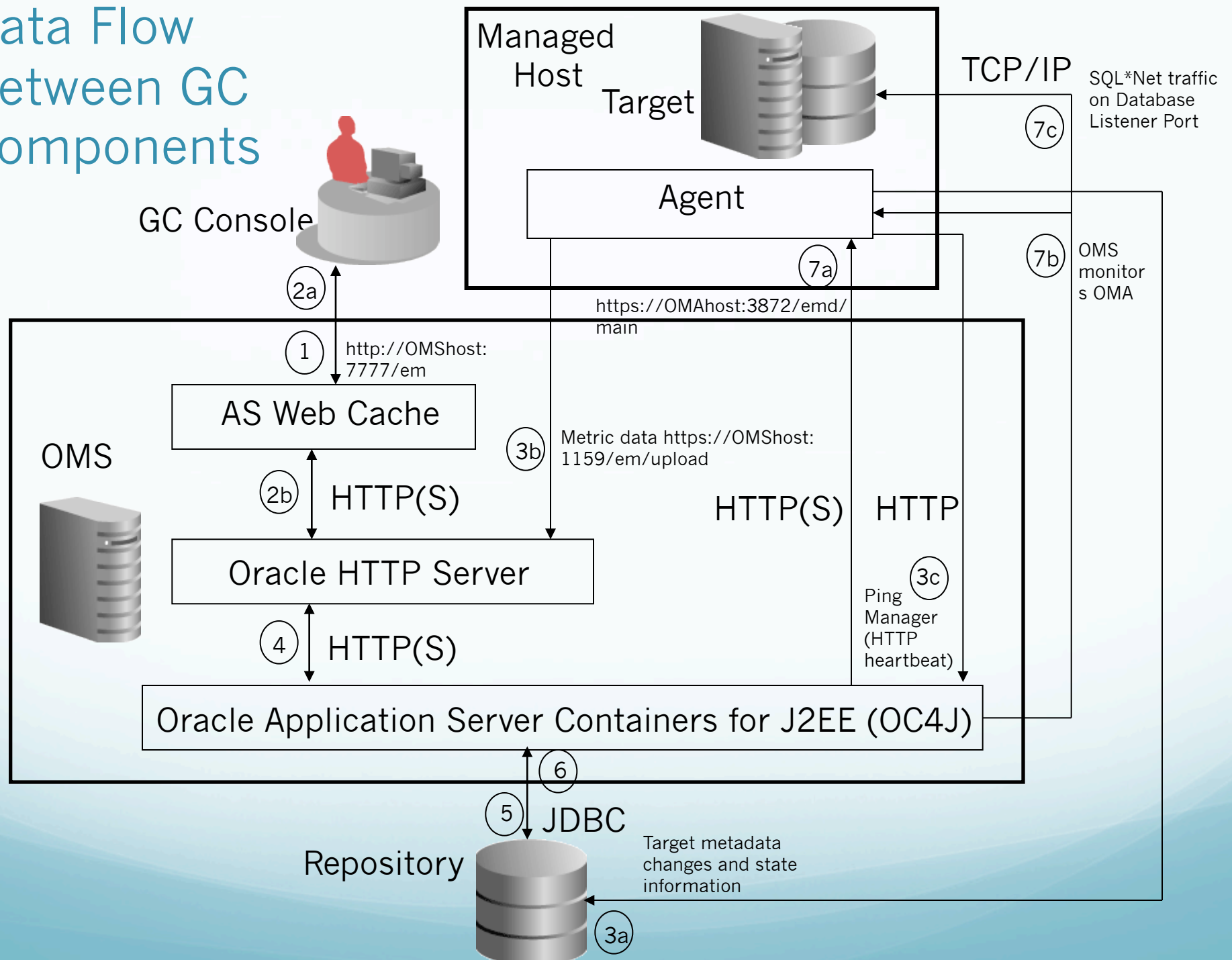


Note: WAN traffic managers, routers, and switches are redundant

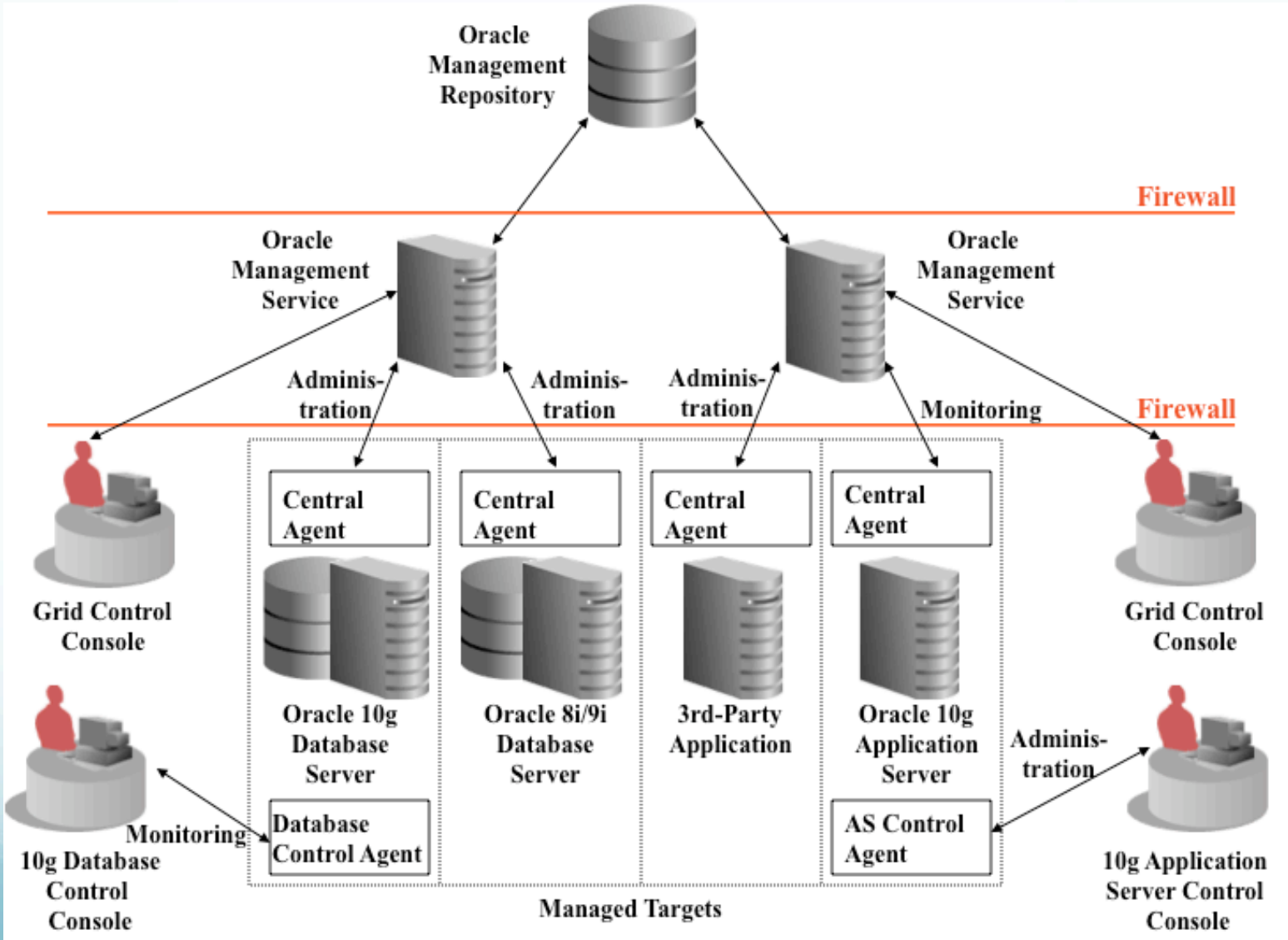
GC Topology



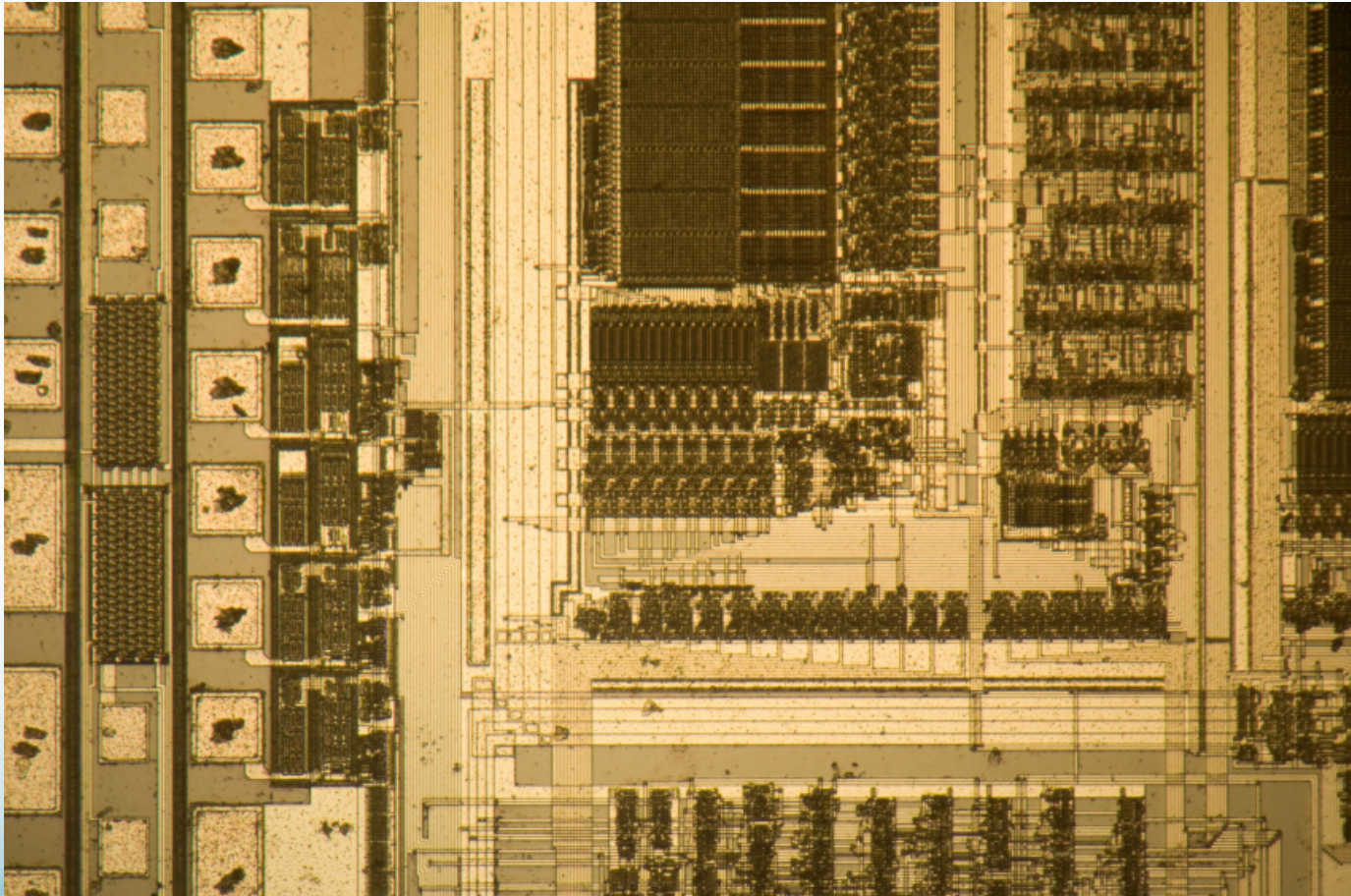
Data Flow Between GC Components



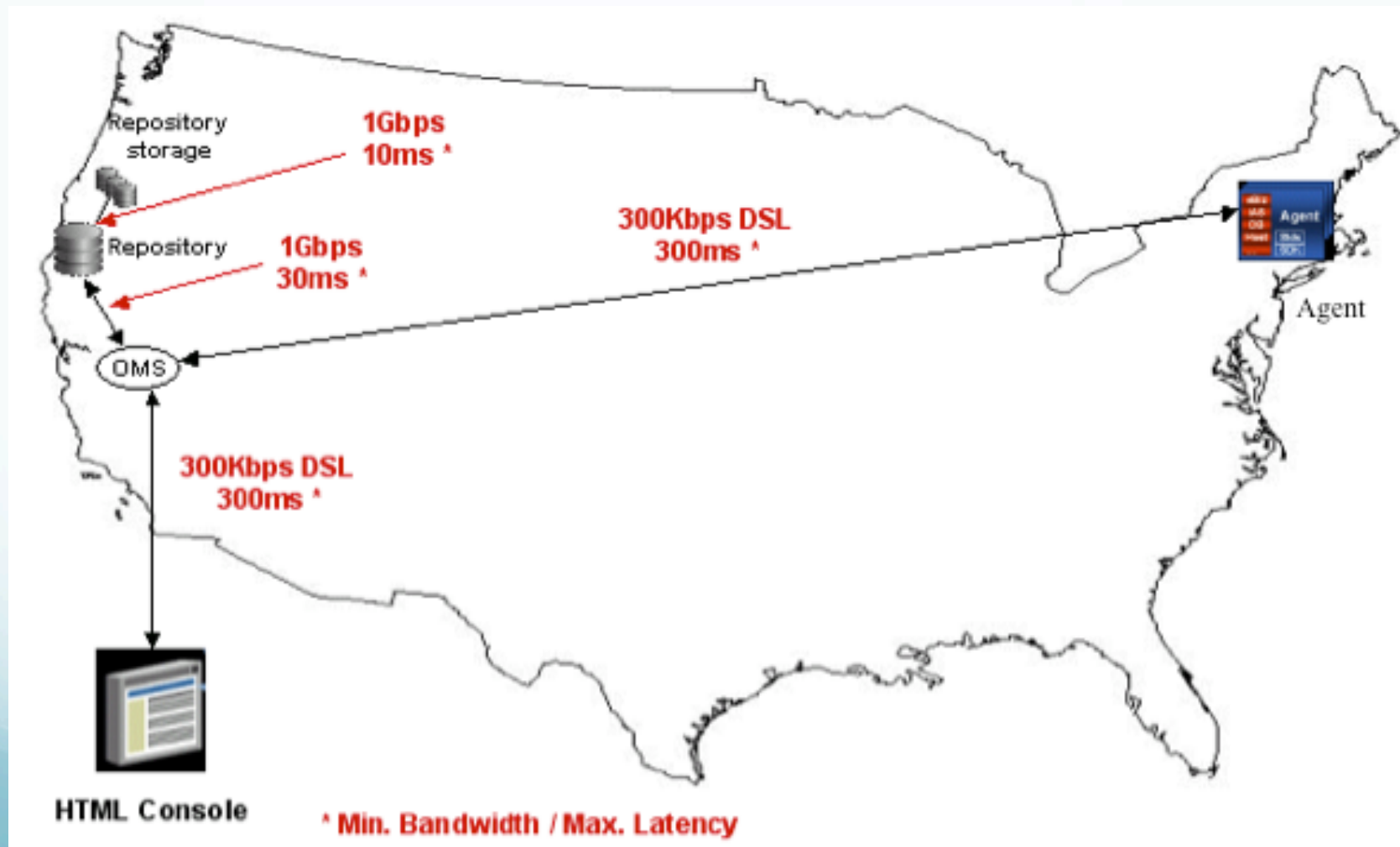
Grid/DB/AS Control



GC Infrastructure Design



GC Infrastructure Design: Bandwidth & Latency Specs



GC Infrastructure Design: OMS and OMR

- Environments and regional sites
 - One environment: for both prod & non-prod
 - Two environments: prod & non-prod
- Active/Active OMS, one at DR site
- Increase geographical coverage within bandwidth and latency specifications
 - String out all OMS hosts from Repository
 - Assign targets to closest OMS host
- DB 11g for OMR Database – use with caution

GC Infrastructure Design: Agent

- Select one Agent install method if possible
- Agent Deploy
 - Only method that mass deploys/upgrades local/NFS Agents
 - Pushes Agents to multiple Hosts of the same OS
 - Consider for sites with > 10 hosts
 - Avoid on Windows – buggy and need Cygwin Suite
- Use existing user, not a separate one
- Install cluster Agent, not local one
- Configure SLB first to avoid Agent reconfiguration
- Can use LDAP Agent user except
 - with Agent Deploy
 - With cluster Agent

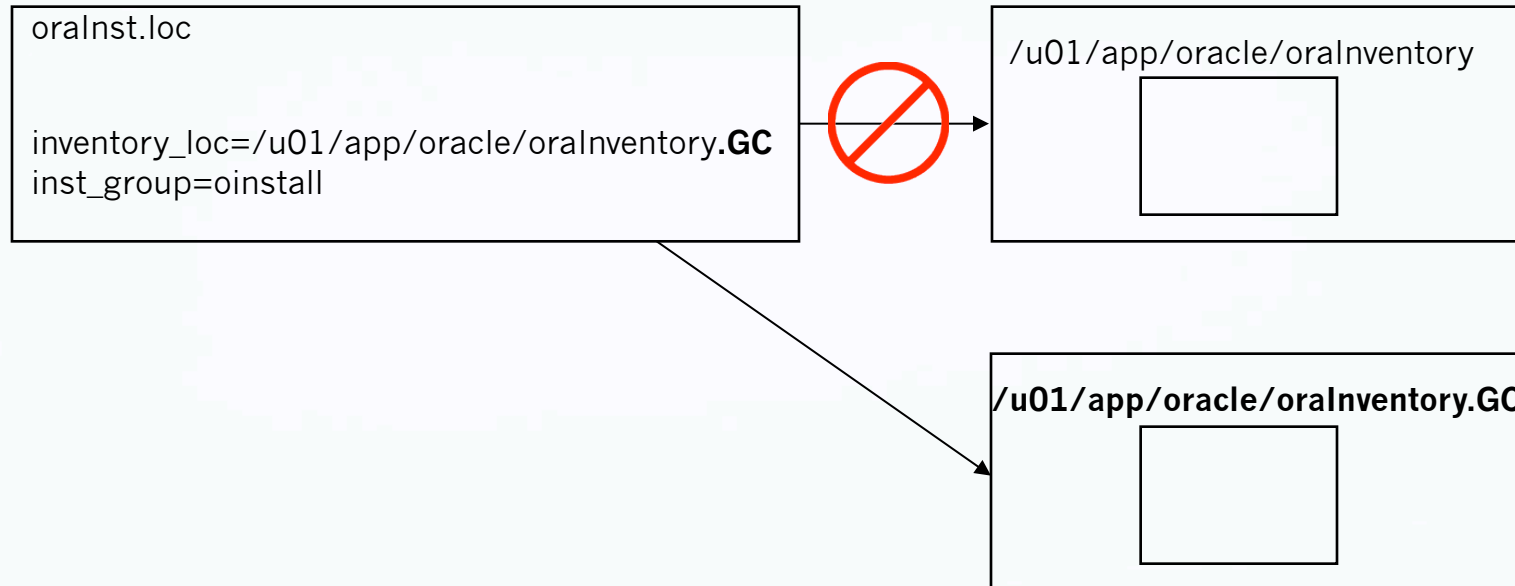
GC Install Requirements & Recommendations - 1

- Network
 - Request up front to give NA time to make changes
 - Open all firewall ports bet. GC components
 - Fully qualify host names – hostname, first alias in hosts file, DNS lookup
- Hardware
 - Fault-tolerant storage. At a minimum:
 - OMR – Database files
 - OMS - \$OMS_HOME/sysman/recv or shared receive dir
 - Agent - \$AGENT_HOME/sysman/emd/

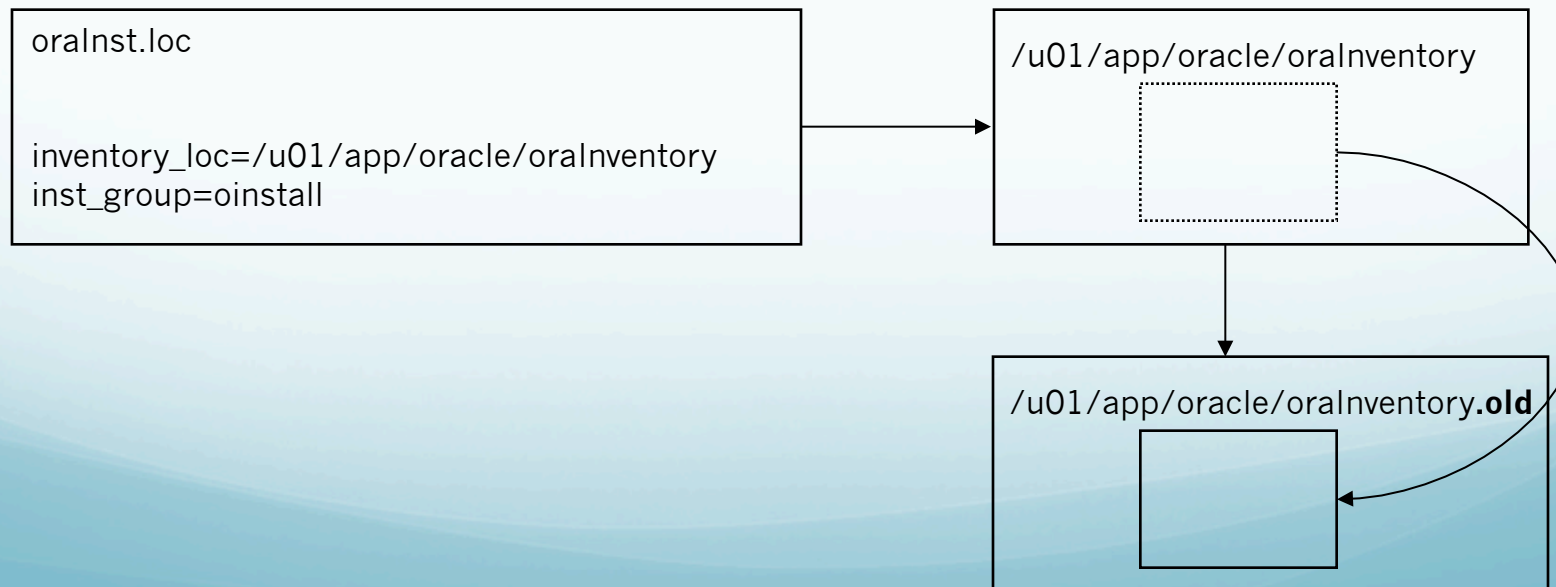
GC Install Requirements & Recommendations - 2

- Software
 - **Central vs. separate Inventory**
 - Make GC parent directory consistent across hosts
 - No symbolic links
 - Synch OS timestamps
 - Run NTP on all GC hosts, especially RAC nodes
 - Same ports for all OMS hosts - static ports feature
`./runInstaller -staticPortsIniFile <path>/staticports.ini`
- Use Prereqchecker in standalone mode to double-check requirements are met

Change inventory_loc value to point to new inventory for GC



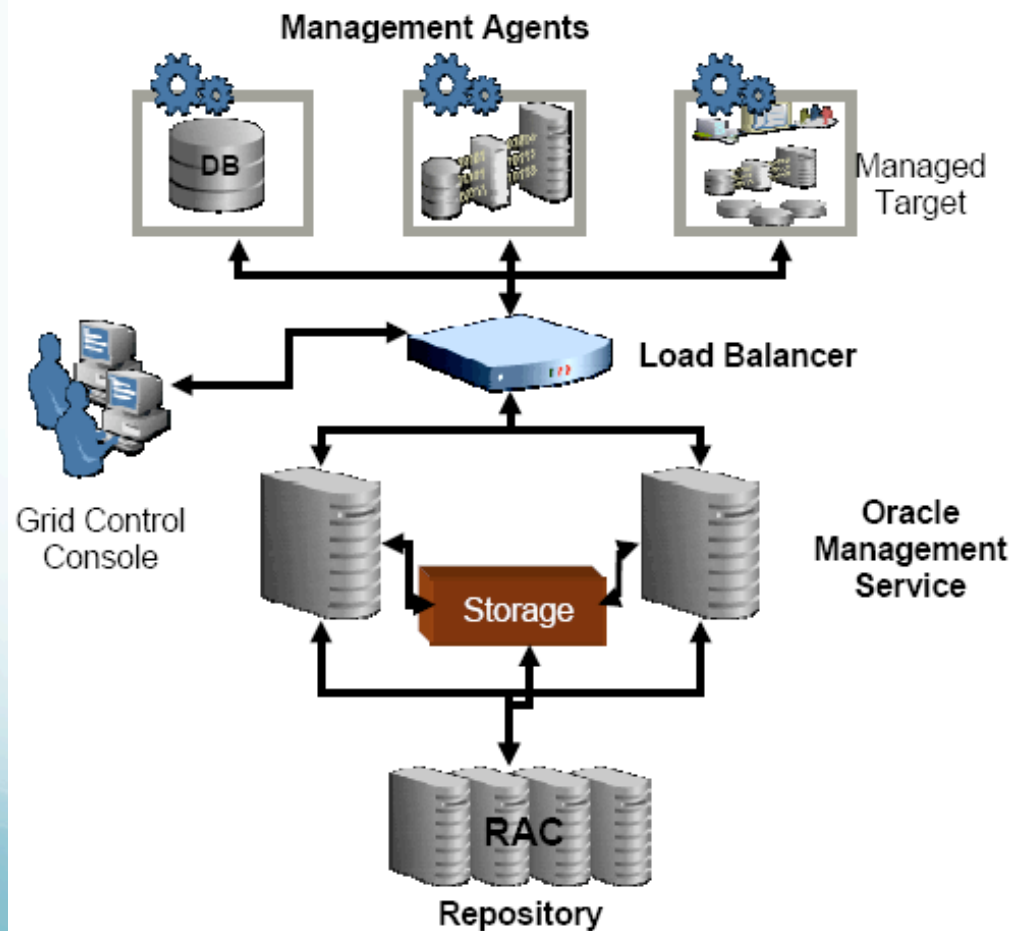
Move existing inventory to make room for new GC inventory



HA/DR Recommendations



Active/Active Architecture



- Agent <---> multiple OMS using SLB
- OMS <--> multiple RAC nodes using SQL*Net
- OMR: RAC with ASM

OMS HA Recommendations

- Install multiple Active/Active OMSs
 - SLB to front-end Agent and admin connections
 - Agents & admins use specific local OMS – requires more administration
- Locate OMS appropriately (network latency)
- Install OMS on fault-tolerant storage
- Set up Shared Filesystem Loader
- Configure connection string to RAC Repository
- Configure automatic OMS startup on boot

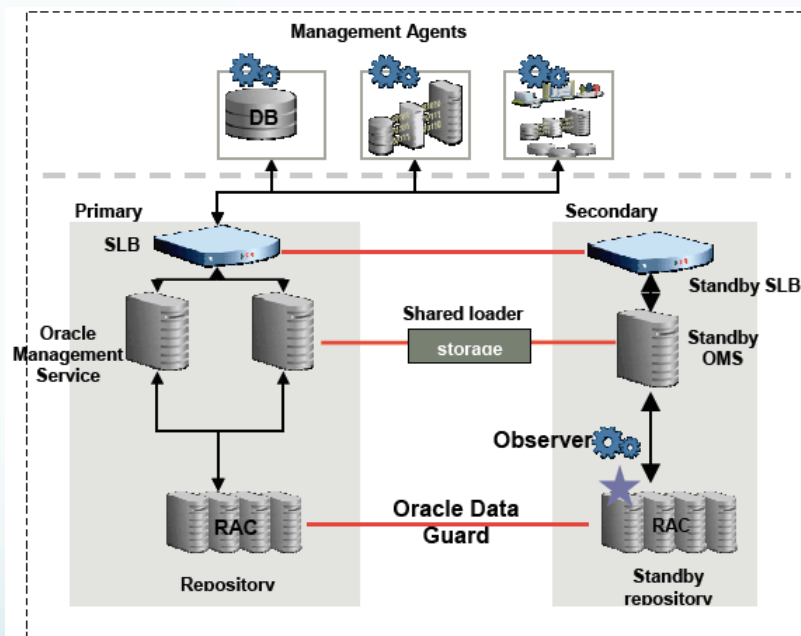
OMR Database HA Recommendations

- Use clustering for OMR Database
 - Install Repository in RAC Database (Active/Active)
 - Install Repository in CFC (Active/Passive)
- Patch to latest certified DB version
- Select ASM as storage technology
- Abide by Database MAA best practices
- Configure automatic OMR Database startup on boot

Agent HA Recommendations

- Configure Agent to communicate through SLB
- Can set up Agent in CFC (use Oracle Fail Safe on Windows CFC)
- Install Agent on fault-tolerant storage
- Provide redundant notification method
- Test Agent restart on failure (watchdog process)
- Verify automatic Agent startup on boot

GC DR Recommendations



- Physical standby DB
- Data Guard Observer with Fast Start Failover
- Data Guard broker
- Redundant OMS
- Replicate shared receive dir at standby site
- FCF/ONS to automate switchover
- Trigger standby OMS startup from standby OMR startup

OMR Database DR Recommendations

- Install standby OMR Database in Data Guard configuration
- Use Data Guard broker
- Configure Data Guard Observer for Fast-Start Failover for quickest DR (use with caution)

OMS DR Recommendations

- Install OMS at standby site
 - DR OMS online with primary OMS
 - DR OMS offline while primary OMS online
- Use standby SLB
- Replicate shared receive directory at standby site
 - Via 3rd party remote data replication software
 - Via recurring cron job that runs rdist/rsync command
- Set up Shared Filesystem Loader at standby site
- Trigger standby OMS startup from standby OMR startup

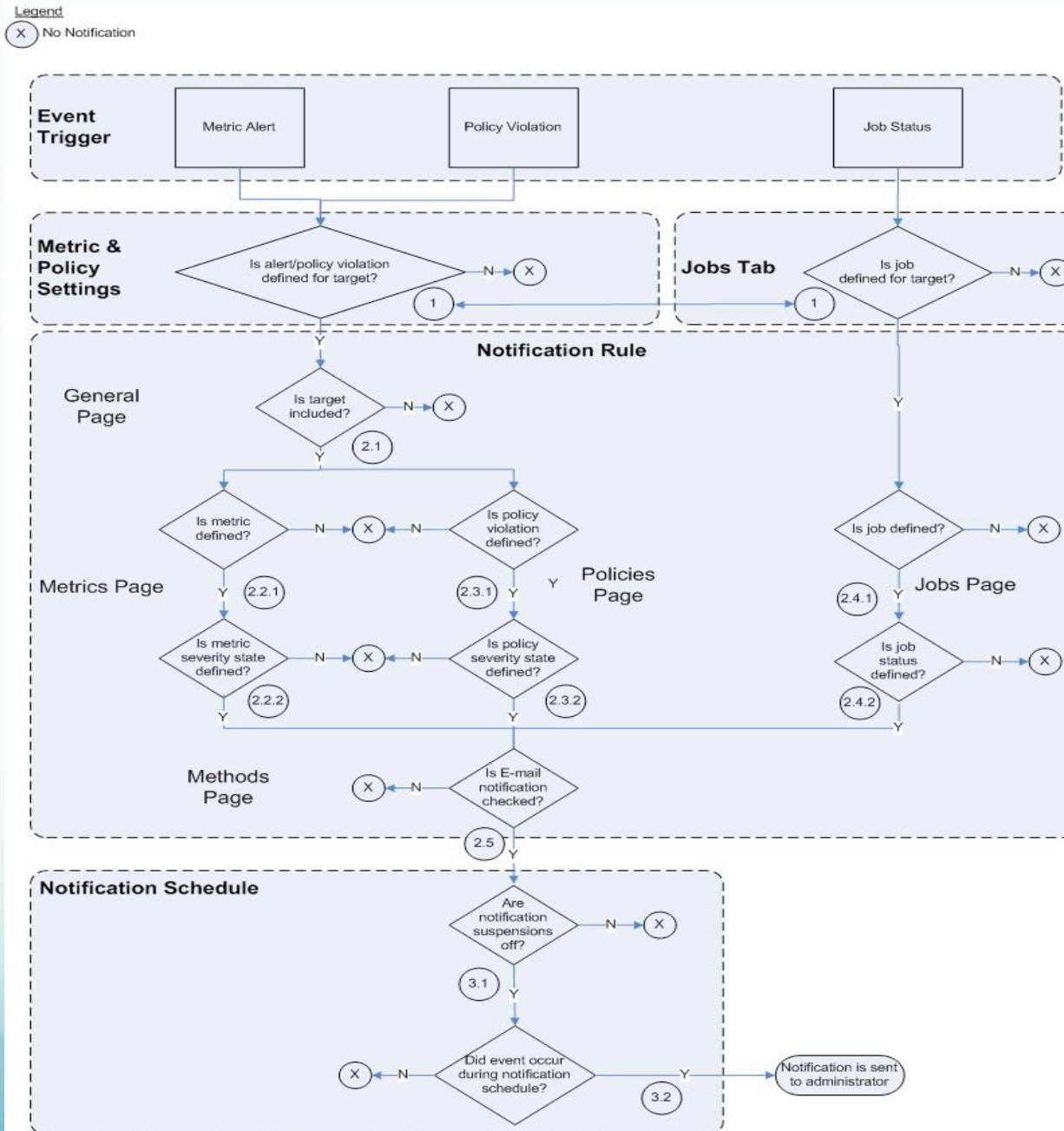
Agent DR Recommendations

- No Agent DR is an option – just reinstall Agent
- Preinstall a DR Agent against an online DR OMS
 - Start DR Agent and discover unique targets
 - Do not start DR Agent
 - Start DR Agent but only discover host (not targets)
- Preinstall a DR Agent against offline DR OMS

Notification Rules



Notification Rules - 1



Notification Rules - 2

- Log in as SYSMAN – public rules are removed if account that created them is deleted
- Use system-generated rules as templates only
- General page
 - Make public to share rules with other admins unless limited to specific targets
- Availability page
 - Availability State: Up (& Down) to notify all admins when someone restarts target
 - Corrective Actions on Target Down: Problem and Succeeded
 - Metric Error Detected/Resolved: for GC self-monitoring

Notification Rules - 3

- Metrics/Policies pages
 - Use Add, not Edit button to change multiple metrics/policies in one operation
 - Select all metrics/policies, Severity States, and Corrective Action States to enable notifications for all metrics/policies with thresholds set
- Jobs page
 - Add Job by Criteria
 - Jobs
 - Job Name: %
 - Job Type: All Job Types
 - Job Status: Suspended, Problem

Notification Rules - 4

- Methods
 - E-mail Notification: Send Me E-mail
 - Public rule: don't check – let each admin subscribe
 - On Notification Rules page - subscribe to multiple rules in one operation
 - On Administrators page – subscribe other admins to multiple public rules in one operation
 - Nonpublic rule: check
 - Advanced Notification Methods
 - Choose applicable methods as they are part of the rule's definition

Agent Configuration



Agent Configuration: EM CLI

- Perform Console functions directly from scripts or interactively from OS – targets, jobs, groups, blackouts, notifications, alerts
- Certification
 - Current - OS shell and SQL scripts
 - Future - SQL*Plus, Perl and Tcl scripts
- Efficient alternative to GUI entry at large sites with many targets/admins
 - Enter/change Preferred Credentials for many admins
 - Provide workflow in the business process
- Install instructions in Oracle Enterprise Manager Command Line Interface 10g Release 2 (10.2) Section 1.2.1
- Download EM CLI software at <http://<OMShost>:7777/em/console/emcli/download>

Agent Configuration: EM CLI Set Credentials

- Programmatically set/change preferred credentials

- Privileged host credential:

```
$OMS_HOME/bin/emcli set_credential \  
-target_type=host target_name=host.mycorp.com \  
-credential_set=HostCredsPriv -user=GC_ADMIN1 \  
-column="username:root;password:newPass"
```

- Normal database credential

```
$OMS_HOME/bin/emcli set_credential \  
-target_type=oracle_database target_name=db1.mycorp.com \  
-credential_set=DBCredsNormal -user=GC_SUPER1 \  
-column="username:dbsnmp;password:newPass"
```


Agent Configuration: Enable Multi-Inventory Support

1. Click Deployments tab – click link for Software Targets Without Inventory
2. Find nondefault oraInst.loc file. Example: EBS Database uses \$ORACLE_HOME/oraInst.loc

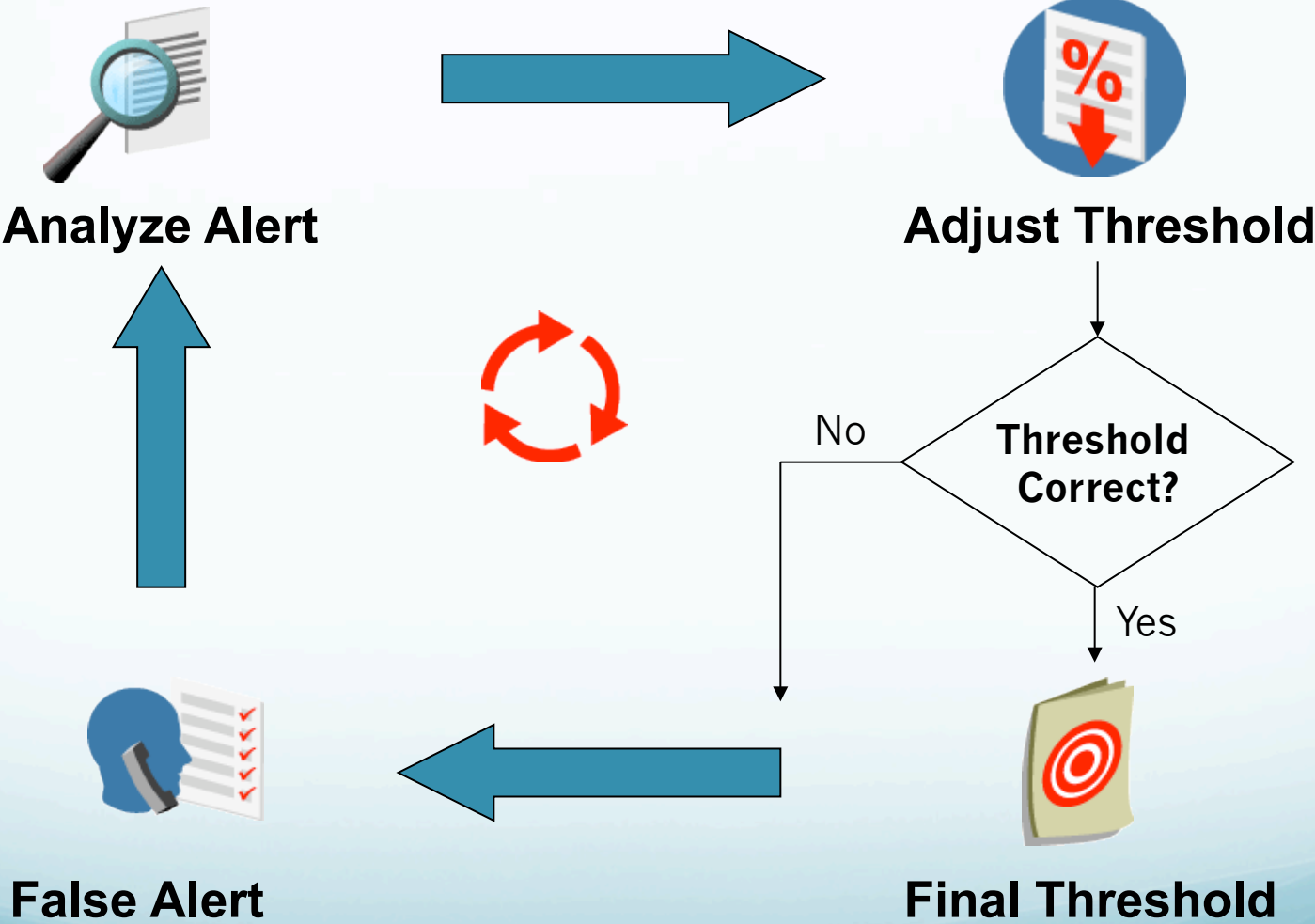
```
inventory_loc=<ORACLE_HOME>/admin/oui/  
<DB_NAME>_<hostname>/oraInventory  
inst_group=dba
```
3. In \$AGENT_HOME/sysman/config/OUIinventories.add:

```
inventory: <ORACLE_HOME>/oraInst.loc
```
4. Reload Agent - emctl reload agent
5. Manually refresh host configuration - on host Configuration subtab, click Refresh

Agent Configuration: Enable Notification if GC Goes Down

- Monitoring Agent on 1st OMS self-monitors
- Management Services and Repository is logical target for OMS and OMR
- Monitoring Agent runs emrepresp.pl every 5 mins as an OOB notification mechanism
- Calls emrepdwn.pl, which relies on mailx
- mailx is on Solaris, Intel Linux, HP-UX, Tru64, AIX
- On other platforms, replace mailx with mailto.exe or Postie

Metric Tuning



Metric Tuning: General Recommendations

- Add metrics for additional host monitoring
- Remove frequently firing metrics
- Choose all metrics for OMS and Repository target type
- Adjust thresholds for GC targets
- Add FRA errors to Generic Alert Log Error
- Set all disk space metrics under Host rather than Database target types
- Add network and RAC interconnect metrics
- Create prod & non-prod admins with different metrics

Metric Tuning: Additional Host Monitoring

- Generic log file monitoring – OS logs for abnormal conditions matching Perl expression patterns. Metric is Log File Pattern Matched Line Count
- Program resource utilization monitoring – CPU and memory for UNIX program/owner combo
- Dell Linux hardware monitoring – PowerEdge Linux host fans, memory, PCI, power supplies, CPU, BIOS, & temp. Need Dell OpenManage Server Administrator (OMSA)
- Generic file and directory monitoring – file/dir size, size change rate, and perms

Change Default Metrics - 1

Target Type	Metric	Operator	Original Thresholds Warning/Crit	New Thresholds Warning/Crit
Agent	Virtual Memory Utilization Growth (%)	>	0.5/2	5/20
Database Instance	Database Time Spent Waiting (%)	>	<value>/Unset	Unset/Unset
	Generic Alert Log Error		<default>/Unset	<default>/ORA-19815 ORA-16014 ORA-16038 ORA-19809 ORA-00312
	Interconnect Transfer Rate (MB/s)	>	Unset/Unset	107/Unset

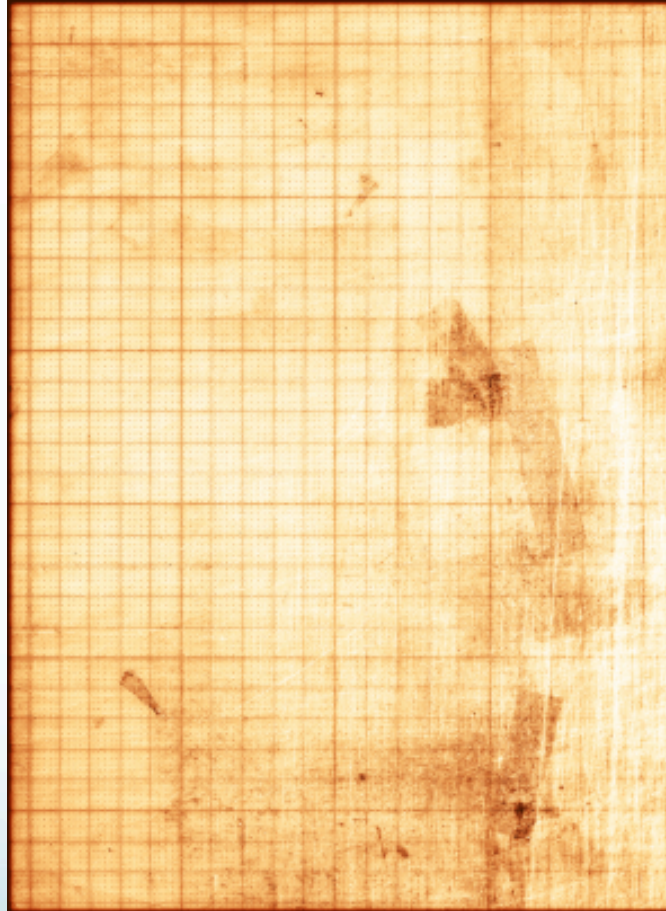
Change Default Metrics - 2

Target Type	Metric	Operator	Original Thresholds Warning/Crit	New Thresholds Warning/Crit
Host	Memory Page Scan Rate (per second)	>	Unset/Unset	300/Unset
	Memory Utilization (%)	>	99/Unset	95/Unset (except Linux) Unset/Unset (Linux)
	Network Interface Collisions (%)	>	Unset/Unset	150/Unset
	File or Directory Size (MB)	>	Unset/Unset	<as desired>
	Log File Pattern Matched Line Count	>	0/Unset	<as desired>

Change Default Metrics - 3

Target Type	Metric	Operator	Original Thresholds Warning/Crit	New Thresholds Warning/Crit
Management Services and Repository	Loader Throughput (rows per second)	>	2700/3000	Unset/Unset
Oracle HTTP Server (OMS)	Active HTTP Connections	>	7500/8000	100000/Unset
	Active Requests for a Virtual Host	>	7500/8000	100000/150000
Web Cache (OMS)	Hits (% of Requests)	<	30/20	Unset/Unset

Jobs and UDMs



Job and UDM Examples

- Jobs
 - Compile invalid objects
 - Purge temporary directories
- UDMs
 - List blocking lock activity
 - Identify GC tables to rebuild

Jobs: Examples

- Compile invalid objects
SQL Script: @\$ORACLE_HOME/rdbms/admin/utlrp.sql
- Purge temporary directories - files in /tmp & /var/tmp older than 30 days. Exclude .oracle, CVU*, and vip_* when Clusterware is installed

```
find /tmp /var/tmp -type f -mtime +30 | grep -v CVU |  
grep -v vip_ | xargs rm -f
```

UDM: Blocking Locks - 1

Oracle Enterprise Manager (SYSMAN) - Metric and Policy Settings

https://app02.gmpvt.net:1159/em/console/metrics/target/metricThresholds?type=rac_database&target=eveready.gmpvt.net#

ORACLE Enterprise Manager 10g

Grid Control

Home | **Targets** | Deployments | Alerts | Compliance | Jobs | Reports

Hosts | Databases | Application Servers | Web Applications | Services | Systems | Groups | All Targets

Cluster Database: eveready.gmpvt.net >

Metric and Policy Settings

Cancel OK

Metric Thresholds Policies

View Metrics with thresholds

Metric	Comparison Operator	Warning Threshold	Critical Threshold	Corrective Actions	Collection Schedule	Edit
Blocking Session Count	>	0		Warning Only	Every 3 Minutes	
Broken Job Count	>	0		None	Every 5 Minutes	
Corrupt Data Block Count	>		0	None	Every 15 Minutes	

Oracle Enterprise Manager (SYSMAN) - Edit Advanced Settings: Blocking Session Count

https://app02.gmpvt.net:1159/em/console/metrics/target/advancedSettingsTable?type=rac_database&target=eveready.gmpvt.net&metricColumn=count&metric=UserBlock&retu

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Grid Control

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Hosts | Databases | Application Servers | Web Applications | Services | Systems | Groups | All Targets

Cluster Database: eveready.gmpvt.net > Metric and Policy Settings >

Edit Advanced Settings: Blocking Session Count

Cancel Continue

Monitored Objects

The table lists all Instance Name - Blocking Session ID objects monitored for this metric. You can specify different threshold settings for each Instance Name - Blocking Session ID object.

Edit Remove

Select Instance Name - Blocking Session ID	Comparison Operator	Warning Threshold	Critical Threshold	Corrective Action
<input checked="" type="radio"/> All others	>	0		Warning Only

TIP You can optionally use "%" wildcard character to represent multiple objects. (Example: /u1% represents /u11, /u12 etc)

TIP If the object name contains "%", specify it as "%%" (Example: 'c:\temp' needs to be entered as 'c:\\temp')

Cancel Continue

Home | **Targets** | Deployments | Alerts | Compliance | Jobs | Reports | Setup | Preferences | Help | Logout

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UDM: Blocking Locks - 2

Oracle Enterprise Manager (SYSMAN) - Edit Advanced Settings: Blocking Session Count

Grid Control | Home | **Targets** | Deployments | Alerts | Compliance | Jobs | Reports

Hosts | Databases | Application Servers | Web Applications | Services | Systems | Groups | All Targets

Cluster Database: eveready.gmpvt.net > Metric and Policy Settings > Edit Advanced Settings: Blocking Session Count

Instance Name - Blocking Session ID All others Cancel Continue

Corrective Actions

Warning Remove

Critical Add

Allow only one corrective action for this metric to run at any given time

Advanced Threshold Settings

Comparison Operator >

Warning Threshold

Critical Threshold

Number of Occurrences

Collection Schedule **Every 3 Minutes**

Number of Occurrences

The Number of Occurrences determines the period of time a collected metric value must remain above the threshold value before an alert is triggered. For example, if a metric value is collected every 5 minutes, and the Number of Occurrences is set to 6, the metric values (collected successively) must stay above the threshold value for 30 minutes before an alert is triggered.

Template Override

Prevent metric settings on this page from being changed when a monitoring template is applied to the target

Cancel Continue

Oracle Enterprise Manager (SYSMAN) - Edit 'OS Command' Corrective Action: GET_BLOCKER_INFO

Grid Control | Home | **Targets** | Deployments | Alerts | Compliance | Jobs | Reports | Setup | Preferences | Help | Logout

Hosts | Databases | Application Servers | Web Applications | Services | Systems | Groups | All Targets

Cluster Database: eveready.gmpvt.net > Metric and Policy Settings > Edit Advanced Settings: Blocking Session Count > Edit 'OS Command' Corrective Action: GET_BLOCKER_INFO

Cancel Save to Library Continue

General | Parameters | Credentials

Name GET_BLOCKER_INFO

Description

Target Type **Cluster Database**

General | Parameters | Credentials

Cancel Save to Library Continue

Home | **Targets** | Deployments | Alerts | Compliance | Jobs | Reports | Setup | Preferences | Help | Logout

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UDM: Blocking Locks - 3

Oracle Enterprise Manager (SYSMAN) - Edit 'OS Command' Corrective Action: GET_BLOCKER_INFO

Grid Control

Hosts | Databases | Application Servers | Web Applications | Services | Systems | Groups | All Targets

Cluster Database: eveready.gmpvt.net > Metric and Policy Settings > Edit Advanced Settings: Blocking Session Count >

Edit 'OS Command' Corrective Action: GET_BLOCKER_INFO

Cancel Save to Library Continue

General Parameters Credentials

Command Type Script

* OS Script

```
$HOME/sql/run_block_udm.sh
```

Interpreter

If you change the interpreter to be used on the host instead of the default, it is recommended you provide the full path (Example: %perlbin%/perl)

Target Properties

Target properties can be used in parameters
Property names are case-sensitive. To escape '%', use '%%':

Name	Description
%emd_root%	location of Agent
%perlbin%	location of Perl binary used by Agent
%TargetName%	target name
%TargetType%	target type
%ClusterName%	Cluster Name
%DBVersion%	Version

Oracle Enterprise Manager (SYSMAN) - Edit 'OS Command' Corrective Action: GET_BLOCKER_INFO

Grid Control

Hosts | Databases | Application Servers | Web Applications | Services | Systems | Groups | All Targets

Cluster Database: eveready.gmpvt.net > Metric and Policy Settings > Edit Advanced Settings: Blocking Session Count >

Edit 'OS Command' Corrective Action: GET_BLOCKER_INFO

Cancel Save to Library Continue

General Parameters Credentials

If you choose Preferred Credentials, the corrective action will use your preferred credentials for each target at the time corrective action runs, and therefore requires credentials for all targets to be set. If you choose to override the preferred credentials, one set of credentials will be used for all targets of each type.

Type Use Preferred Credentials Override Preferred Credentials

Database Host Credentials

General Parameters Credentials

Cancel Save to Library Continue

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About Oracle Enterprise Manager

UDM: GC tables to Rebuild - 1

Tables >5MB allocated size and >2x actual size

Grid Control Home **Targets** Deployments Alerts Compli

Hosts | Databases | Application Servers | Web Applications | Services | Systems | Groups | **All Targets**

Database Instance: [emrep.perftuning.com](#) > [User-Defined Metrics](#) >

Create User-Defined Metric

Definition

* Metric Name

Metric Type Number String

SQL Query Output Single Value
Query is either (1) a SELECT statement that returns a single value (for example: SELECT sal FROM emp WHERE empno=7369) or (2) a function call (for example: myfunc(123, 'abc'))

Two Columns
Query is a SELECT statement that returns two columns (for example: SELECT ename, sal FROM emp). Each entry in the first column (the key column) must be a unique string. The second column (the value column) must be of the selected Metric Type.

* SQL Query

Database Credentials

* User Name

* Password

UDM: GC tables to rebuild - 2

Thresholds

You can have the metric be compared against thresholds you specify. If the thresholds are crossed, an alert will be generated and an optional Response Action could be performed. Only administrators with Super User privileges can edit Response Actions.

Comparison Operator Warning Critical

Warning Thresholds by Key
Use the format: key1:warning1;key2:warning2;... (Example) SMITH:100;JONES:200;CLARK:500

Critical Thresholds by Key
Use the format: key1:critical1;key2:critical2;... (Example) SMITH:250;JONES:400;CLARK:900

Consecutive Occurrences Preceding Notification

Response Action
Enter a fully qualified command or script (example: /bin/perl /u1/bin/myscript.pl).

Alert Message
You can use %Key% and %value% as variables in the alert message.

Schedule

Collection Schedule Enabled Disabled

Specify the frequency by which the metric will be evaluated.

Start

Immediately after creation

Date
(example: Dec 15, 2003)

Time AM PM GMT-05:00

Frequency

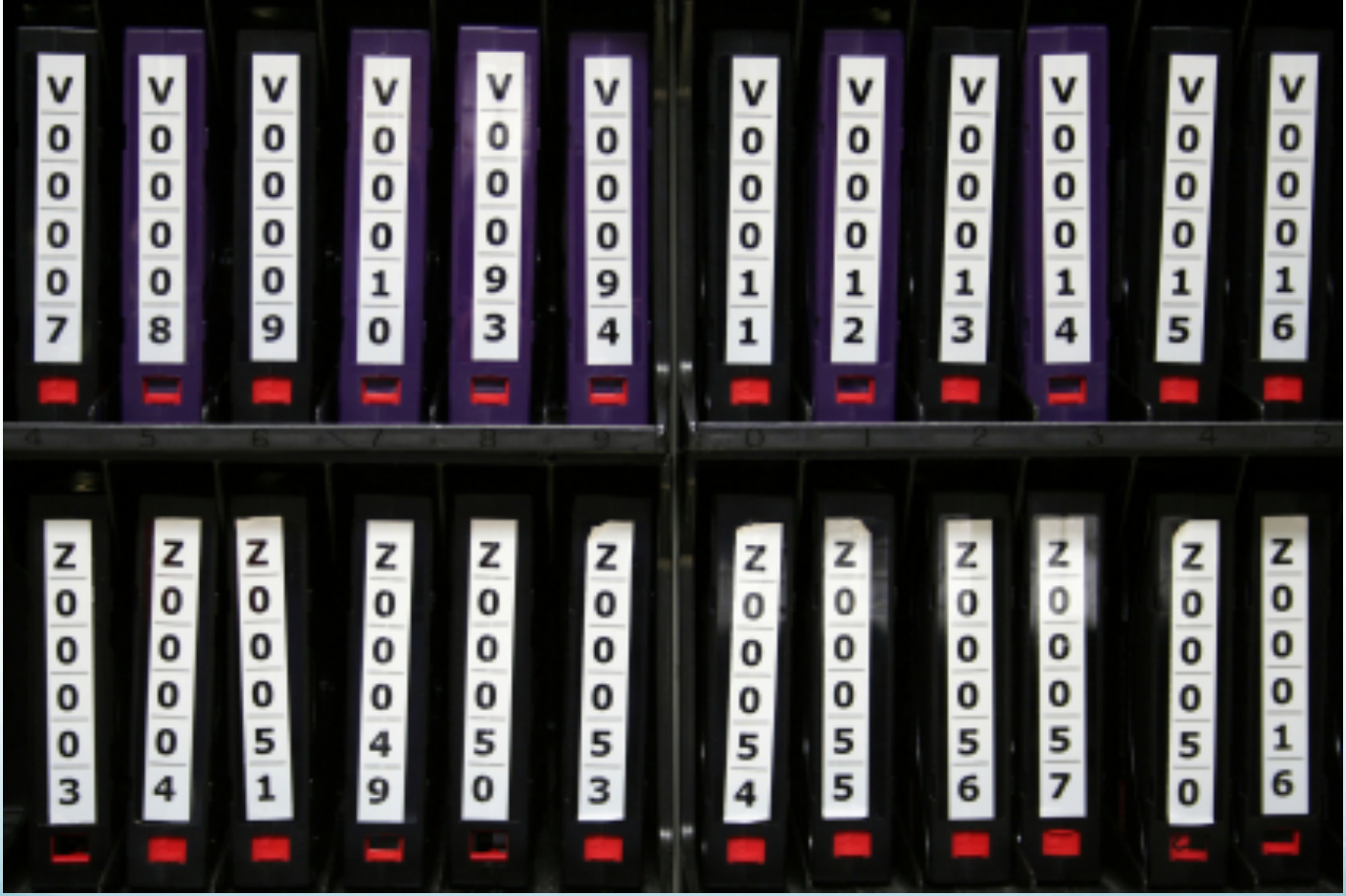
Repeat every

Weekly on Monday Tuesday Wednesday Thursday Friday Saturday Sunday

Monthly on

Enter days separated by commas. Use LAST for last day of month. Example: 1,4,LAST

GC B&R Recommendations



GC OMR DB Backup: Features

- Integrates with RMAN, ARCHIVELOG mode, Flashback Technology, automatic undo, restore points, and block change tracking
- Provides Oracle-Suggested and Customized Backup strategies, and RMAN Script job
- Offers backup administrative features

GC: Backups Recommended

What to Back Up	Schedule	Media to Use	Backup Type
OMR Database	Daily	Tape (and disk if possible)	Hot
GC components affected – OMR DB, OMR/OMS/OMA software	Before/after config change (patch, upgrade)	Tape (and disk if desired)	Hot (before/after)
GC servers (exclude disk backups and active DB files)	Daily or weekly	Tape	Hot

GC B&R: OMR Database

1. Direct OMR Database to use recovery catalog in GC
 - Configure recovery catalog in GC
 - Register OMR Database in recovery catalog
2. Configure OMR Database Backup Settings in GC
 - **Device, Backup Set, and Policy pages**
 - Input is database-specific and stored persistently
 - Backup settings are in effect for all RMAN backups (in or outside GC)
3. **Implement a GC backup method for OMR Database**
 - Oracle-Suggested Backup strategy
 - Customized Backup strategy
 - RMAN Script Job
4. Set up OMR Database exports

Backup Settings: Device Page - 1

https://reeves.gmpvt.net:1159 - Oracle Enterprise Manager (SYSMAN) - Microsoft Internet Explorer

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Grid Control

Home Targets Deployments Alerts Compliance Jobs Reports

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Cluster_ora > Cluster Database: emrep.gmpvt.net >

Backup Settings

Device Backup Set Policy

Disk Settings

Parallelism Concurrent streams to disk drives

Disk Backup Location
Flash recovery area is your current disk backup location. If you would like to override the disk backup location, specify an existing directory or diskgroup name.

Disk Backup Type

Backup Set
An Oracle backup file format that allows for more efficient backups by interleaving multiple backup files into one output file.

Compressed Backup Set
An Oracle backup set in which the data is compressed to reduce its size.

Image Copy
A bit-by-bit copy of database files that can be used as-is to perform recovery.

Tape Settings

Tape drives must be mounted before performing a backup. You should verify that the tape settings are valid by clicking on 'Test Tape Backup', before saving them.

Tape Drives Concurrent streams to tape drives

Tape Backup Type

Backup Set
An Oracle backup file format that allows for more efficient backups by interleaving multiple backup files into one output file.

Compressed Backup Set
An Oracle backup set in which the data is compressed to reduce its size.

Oracle Secure Backup

Version on Database Server	Unknown
Administrative Server	Not Defined
Backup Storage Selectors	<input type="button" value="Configure"/>

At least one backup storage selector is recommended to backup this database.

Media Management Settings

If you need to configure a media manager from a third-party vendor, specify the library parameters.

Backup Settings: Device Page - 2

https://reeves.gmpvt.net:1159 - Oracle Enterprise Manager (SYSMAN) - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Image Copy
A bit-by-bit copy of database files that can be used as-is to perform recovery.

Tape Settings

Tape drives must be mounted before performing a backup. You should verify that the tape settings are valid by clicking on 'Test Tape Backup', before saving them. Test Tape Backup

Tape Drives
Concurrent streams to tape drives

Tape Backup Type Backup Set
An Oracle backup file format that allows for more efficient backups by interleaving multiple backup files into one output file.

Compressed Backup Set
An Oracle backup set in which the data is compressed to reduce its size.

Oracle Secure Backup

Version on Database Server **Unknown**
Administrative Server **Not Defined**
Backup Storage Selectors Configure
At least one backup storage selector is recommended to backup this database.

Media Management Settings

If you need to configure a media manager from a third-party vendor, specify the library parameters.

Media Management Vendor Library Parameters

Host Credentials

To save the backup settings, supply operating system login credentials to access the target database.

* Username
* Password
 Save as Preferred Credential

Device **Backup Set** Policy

Cancel OK

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Backup Settings: Backup Set page

https://app02.gmpvt.net:1159 - Oracle Enterprise Manager (SYSMAN) - Microsoft Internet Explorer

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Hosts Databases Application Servers Web Applications Services Systems Groups All Targets Collaboration Suites

Cluster: crs > Cluster Database: emrep.gmpvt.net >

Backup Settings

Device Backup Set Policy

Maximum Backup Piece (File) Size MB
Specify a value to restrict the size of each backup piece.

Tape Settings

The following parameters require additional configuration on different media pools.

Copies of Datafile Backups
Specify the number of identical copies for datafile backups.

Copies of Archivelog Backups
Specify the number of identical copies for archivelog backups.

Host Credentials

To save the backup settings, supply operating system login credentials to access the target database.

* Username
* Password
 Save as Preferred Credential

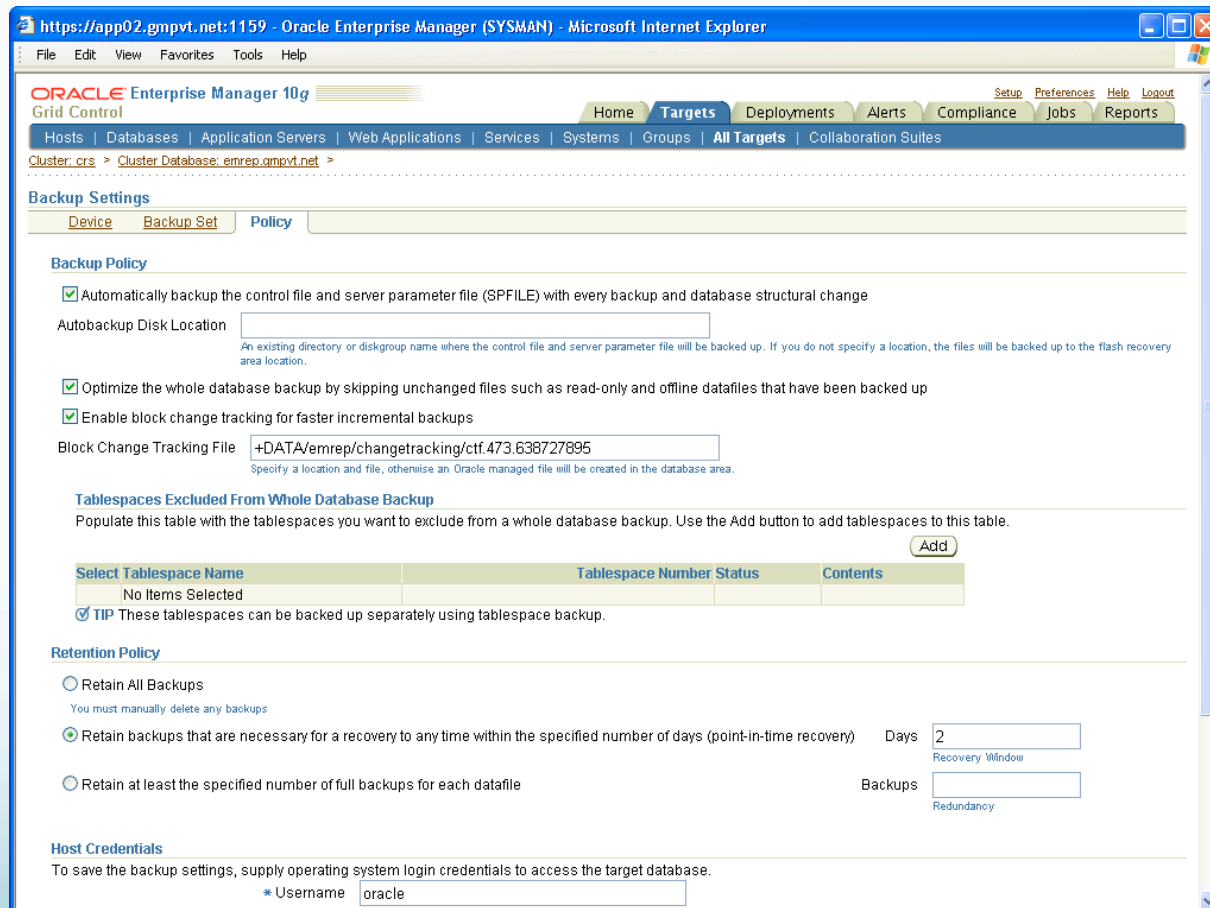
Device Backup Set Policy

Cancel OK

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Backup Settings: Policy Page



The screenshot shows the Oracle Enterprise Manager 10g interface. The browser address bar displays "https://app02.gmpvt.net:1159 - Oracle Enterprise Manager (SYSMAN) - Microsoft Internet Explorer". The page title is "Backup Settings" and the sub-tab is "Policy".

Backup Policy

- Automatically backup the control file and server parameter file (SPFILE) with every backup and database structural change
- Autobackup Disk Location:
An existing directory or diskgroup name where the control file and server parameter file will be backed up. If you do not specify a location, the files will be backed up to the flash recovery area location.
- Optimize the whole database backup by skipping unchanged files such as read-only and offline datafiles that have been backed up
- Enable block change tracking for faster incremental backups
- Block Change Tracking File:
Specify a location and file, otherwise an Oracle managed file will be created in the database area.

Tablespaces Excluded From Whole Database Backup

Populate this table with the tablespaces you want to exclude from a whole database backup. Use the Add button to add tablespaces to this table.

Select Tablespace Name	Tablespace Number	Status	Contents
No Items Selected			

TIP These tablespaces can be backed up separately using tablespace backup.

Retention Policy

- Retain All Backups
You must manually delete any backups
- Retain backups that are necessary for a recovery to any time within the specified number of days (point-in-time recovery)
Days:
Recovery Window
- Retain at least the specified number of full backups for each datafile
Backups:
Redundancy

Host Credentials

To save the backup settings, supply operating system login credentials to access the target database.

* Username:

GC Backup Methods: Advantages/Disadvantages

Advantage	Oracle-Suggested	Customized	RMAN Script Job
Automated	X	X	
Wizard UI	X	X	
All backup types (hot/cold, full/incremental, whole/partial)		X	X
Can override Backup Settings		X	X
Script is customizable		X	X
Schedule is customizable		X	X
Notification of backup job status			X
Can submit against multiple databases			X

Oracle-Suggested Backup: Variations

- Disk: daily incrementally updated
- Tape: daily cumulative incremental
- Both disk & tape:
 - Disk: daily incrementally updated
 - Tape:
 - Weekly full
 - Daily:
 - None: don't use if backup disks aren't redundant
 - Archivelogs: test RTO because doesn't do incremental tape backups
 - Archivelogs and the Incremental Backup: - consumes less tape
 - Archivelogs and the Full Database Copy: best option

Oracle-Suggested Backup: Disk

The screenshot displays the Oracle Enterprise Manager 10g web interface in Microsoft Internet Explorer. The browser address bar shows the URL: `https://reeves.gmpvt.net:1159 - Oracle Enterprise Manager (SYSMAN) - Schedule Oracle-Suggested - Microsoft Internet Explorer`. The page title is "Schedule Oracle-Suggested Backup: Setup".

The interface includes a navigation menu with tabs for Home, Targets, Deployments, Alerts, Compliance, Jobs, and Reports. Below the menu is a breadcrumb trail: Hosts | Databases | Application Servers | Web Applications | Services | Systems | Groups | All Targets. A progress indicator shows four steps: Destination, Setup (current), Schedule, and Review.

The main content area is titled "Schedule Oracle-Suggested Backup: Setup" and contains the following configuration details:

- Database: **emrep.gmpvt.net**
- Backup Strategy: **Oracle-Suggested Backup**
- Recovery Catalog Username: **rman**
- Recovery Catalog Database: **rman.gmpvt.net (Cluster Database)**

Navigation buttons include "Cancel", "Back", "Step 2 of 4", and "Next".

Daily Backup
A full database copy will be performed during the first backup. Subsequently, an incremental backup to disk will be performed everyday. The backups on disk will be retained so that you can always perform a full database recovery or a point-in-time recovery to any time within the past day.

Disk Settings
Flash Recovery Area **+FLASH**
 TIP Disk backups that are necessary for a recovery to any time within the past day are retained.

At the bottom, there is a "Return to Schedule Backup" link and another set of navigation buttons: "Cancel", "Back", "Step 2 of 4", and "Next".

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Oracle-Suggested Backup: Tape

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ORACLE Enterprise Manager 10g
Grid Control

Home | **Targets** | Deployments | Alerts | Compliance | Jobs | Reports

Hosts | Databases | Application Servers | Web Applications | Services | Systems | Groups | All Targets

Destination | **Setup** | Schedule | Review

Schedule Oracle-Suggested Backup: Setup

Database: **emrep.gmpvt.net** Cancel Back Step 2 of 4 Next

Backup Strategy: **Oracle-Suggested Backup**

Recovery Catalog Username: **rman**

Recovery Catalog Database: **rman.gmpvt.net (Cluster Database)**

Daily Backup

A full database backup to tape will be performed during the first backup. After that an incremental backup to tape will be performed everyday. Archivelogs will be backed up to tape everyday.

Weekly Backup

A full database backup to tape will be performed once a week.

Tape Settings

Tape Drives:

Recovery Window (Days):

Tape backups that are necessary for a recovery to any time within the specified number of days are retained.

Media Management Vendor(MMV) Library Parameters:

Any change to the library parameters will be saved into the database.

TIP Tape drives must be mounted before performing a backup.

[Return to Schedule Backup](#) Cancel Back Step 2 of 4 Next

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

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Oracle-Suggested Backup: Both Disk and Tape

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File Edit View Favorites Tools Help

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Destination Setup Schedule Review

Schedule Oracle-Suggested Backup: Setup

Database **emrep.gmpvt.net** Cancel Back Step 2 of 4 Next

Backup Strategy **Oracle-Suggested Backup**

Recovery Catalog Username **rman**

Recovery Catalog Database **rman.gmpvt.net (Cluster Database)**

Daily Backup

A full database copy will be performed during the first backup. After that an incremental backup to disk will be performed everyday. You can choose to back up archivelogs, incremental backup or the full database copy to tape everyday. The backups on disk will be retained so that you can always perform a full database recovery or a point-in-time recovery to any time within the past 1 day.

Select what you want to back up to tape everyday.

None

Archivelogs

Archivelogs and the Incremental Backup

Archivelogs and the Full Database Copy

Weekly Backup

All recovery related files on disk will be backed up to tape once a week.

Disk Settings

Flash Recovery Area **FLASH**

TIP Disk backups that are necessary for a recovery to any time within the past day are retained.

Tape Settings

Tape Drives

Recovery Window (Days)

Tape backups that are necessary for a recovery to any time within the specified number of days are retained.

Media Management Vendor(MMV) Library Parameters

Any change to the library parameters will be saved into the database.

TIP Tape drives must be mounted before performing a backup.

Customized Backup Strategy - 1

Oracle Enterprise Manager (SYSMAN) - Schedule Customized Backup: Options - Microsoft Internet Explorer

File Edit View Favorites Tools Help

ORACLE Enterprise Manager 10g Grid Control

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Hosts Databases Application Servers Web Applications Services Systems Groups All Targets

Options Settings Schedule Review

Schedule Customized Backup: Options

Database: **emrep.gmpvt.net** Cancel Step 1 of 4 Next

Backup Strategy: **Customized Backup**

Object Type: **Whole Database**

Recovery Catalog Username: **rman**

Recovery Catalog Database: **rman.gmpvt.net (Cluster Database)**

Backup Type

Full Backup

Use as the base of an incremental backup strategy

Incremental Backup (Level 1)
Level 1 incremental backup includes all the changed blocks since the most recent level 0 backup (cumulative).

Refresh the latest datafile copy on disk to the current time using the incremental backup

Backup Mode

Online Backup
The backup can be performed when the database is OPEN.

Offline Backup
If the database is OPEN at the time of backup, the database will be shut down and mounted before the backup. The database will be opened after the backup.

Advanced

Also back up all archived logs on disk

Delete all archived logs from disk after they are successfully backed up

Use proxy copy supported by media management software to perform a backup
If proxy copy of the selected files is not supported, Recovery Manager will perform a conventional backup.

Delete obsolete backups
Delete backups that are no longer required to satisfy the retention policy.

Maximum Files per Backup Set
The maximum number of input files in each backup set.

[Return to Schedule Backup](#) Cancel Step 1 of 4 Next

Customized Backup Strategy - 2

https://reeves.gmpvt.net:1159 - Oracle Enterprise Manager (SYSMAN) - Schedule Customized Backup - Microsoft Internet Explorer

ORACLE Enterprise Manager 10g
Grid Control

Home | **Targets** | Deployments | Alerts | Compliance | Jobs | Reports

Hosts | Databases | Application Servers | Web Applications | Services | Systems | Groups | **All Targets** | Collaboration Suites

Options | **Settings** | Schedule | Review

Schedule Customized Backup: Settings

Database **emrep.gmpvt.net** Cancel Back Step 2 of 4 Next

Backup Strategy **Customized Backup**

Object Type **Whole Database**

Recovery Catalog Username **rman**

Recovery Catalog Database **rman.gmpvt.net (Cluster Database)**

These are the settings for your current backup job. You can select your backup destination directly from this page. You can also view the default settings or override the settings by clicking the buttons below.

Disk

Disk Backup Location ***FLASH**

Tape

Media Management Vendor(MMV) Library Parameters **ENV=(OB2BARTYPE=Oracle8,OB2APPNAME=emrep)**

View Default Settings Override Current Settings
Changed settings will only apply to the current backup.

[Return to Schedule Backup](#) Cancel Back Step 2 of 4 Next

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

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Customized Backup Strategy - 3

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ORACLE Enterprise Manager 10g
Grid Control

Home | **Targets** | Deployments | Alerts | Compliance | Jobs | Reports

Hosts | Databases | Application Servers | Web Applications | Services | Systems | Groups | All Targets

Options | Settings | Schedule | **Review**

Schedule Customized Backup: Review

Database: **emrep.gmpvt.net** Step 4 of 4

Backup Strategy: **Customized Backup**

Object Type: **Whole Database**

Recovery Catalog Username: **rman**

Recovery Catalog Database: **rman.gmpvt.net (Cluster Database)**

Settings

Destination	Disk
Backup Type	Incremental Backup (Level 1)
Backup Mode	Online Backup
Flash Recovery Area	+FLASH
Disk Parallelism	8

RMAN Script

The RMAN script below is generated based on the user input from previous pages.

```
backup incremental level 1 cumulative device type disk tag '%TAG' database;  
recover copy of database;  
backup device type disk tag '%TAG' archivelog all not backed up;  
allocate channel for maintenance type 'SBT_TAPE' parms 'ENV=  
(OB2BARTYPE=Oracle8,OB2APPNAME=emrep)';
```

Step 4 of 4

Home | **Targets** | Deployments | Alerts | Compliance | Jobs | Reports | Setup | Preferences | Help | Logout

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RMAN Script Job: General

https://reeves.gmpvt.net:1159 - Oracle Enterprise Manager (SYSMAN) - Create 'RMAN Script' Libra - Microsoft Internet Explorer

ORACLE Enterprise Manager 10g
Grid Control

Home | Targets | Deployments | Alerts | Compliance | **Jobs** | Reports

Job Activity | Job Library

Create 'RMAN Script' Library Job

Cancel Save to Library

General | Parameters | Credentials | Schedule | Access

* Name:
Description:
Target Type:
Changing the target type will cause any specified Targets, Parameters and Credentials to be removed.

Targets
Add individual targets or one composite target, such as a Group.
 |
[Select All](#) | [Select None](#)

Select	Name	Type	Host	Time Zone
<input type="checkbox"/>	emrep.gmpvt.net	Cluster Database	db02.gmpvt.net	GMT-05:00

General | Parameters | Credentials | Schedule | Access

Cancel Save to Library

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

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RMAN Script Job: Parameters

The screenshot shows the Oracle Enterprise Manager 10g Grid Control interface. The browser address bar displays "https://reeves.gmpvt.net:1159 - Oracle Enterprise Manager (SYSMAN) - Create 'RMAN Script' Libra - Microsoft Internet Explorer". The page title is "Create 'RMAN Script' Library Job". The "Parameters" tab is selected, showing a text area for the RMAN script with the value "@home/oracle/script/backup_incr_update_disk.rcv". Below the text area is a small instruction: "Enter RMAN commands or a fully qualified script name on the remote hosts, for example, '@script.rcv'". The page includes navigation tabs for Home, Targets, Deployments, Alerts, Compliance, Jobs, and Reports. There are also buttons for "Cancel" and "Save to Library".

Oracle Enterprise Manager 10g
Grid Control

Home Targets Deployments Alerts Compliance Jobs Reports

Job Activity | Job Library

Create 'RMAN Script' Library Job

Cancel Save to Library

General Parameters Credentials Schedule Access

* RMAN Script @home/oracle/script/backup_incr_update_disk.rcv

Enter RMAN commands or a fully qualified script name on the remote hosts, for example, "@script.rcv"

General Parameters Credentials Schedule Access

Cancel Save to Library

Home | Targets | Deployments | Alerts | Compliance | Jobs | Reports | Setup | Preferences | Help | Logout

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RMAN Script Job: Schedule

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Grid Control

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Job Activity | Job Library

Create 'RMAN Script' Library Job

Cancel Save to Library

General Parameters Credentials **Schedule** Access

Type One Time (Immediately) One Time (Later) Repeating

Frequency Type By Days

Repeat Every 1 Days

Time Zone Each target's timezone

Start Date May 11, 2008

Start Time 2:00 AM

Grace Period Indefinite
 End After Hours Minutes

Repeat Until Indefinite
 Specified Date
Date
(example: May 11, 2008)
Time AM PM

General Parameters Credentials **Schedule** Access

Cancel Save to Library

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

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OMR Database Recovery Settings - 1

https://reeves.gmpvt.net:1159 - Oracle Enterprise Manager (SYSMAN) - Recovery Settings - Microsoft Internet Explorer

ORACLE Enterprise Manager 10g
Grid Control

Home Targets Deployments Alerts Compliance Jobs Reports

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Cluster: crs > Cluster Database: emrep.gmpvt.net > Logged in As DBSNMP

You are not logged on with SYSDBA privileges. Only controls for dynamic parameters are editable.

Recovery Settings

Show SQL Revert Apply

Instance Recovery

The FAST_START_MTTR_TARGET initialization parameter specifies the number of seconds estimated for crash recovery. Oracle converts this number into a set of internal parameters and sets the recovery time as close as possible to these parameters. Setting FAST_START_MTTR_TARGET to 0 will disable this functionality.

Current Estimated Mean Time To Recover (seconds) 25

Desired Mean Time To Recover 5 Minutes

MTR Advice

Target Mean Time To Recover (Seconds)	Relative change in total I/O
0	3.8
100	2.5
150	1.0
200	1.0
300	1.0
400	1.0
500	1.0
600	1.0

■ Change in total I/O for various values of MTTR
* Current MTR setting

Media Recovery

The database is currently in ARCHIVELOG mode. In ARCHIVELOG mode, hot backups and recovery to the latest time is possible, but you must provide space for logs. If you change the database to ARCHIVELOG mode, you should make a backup immediately. In NOARCHIVELOG mode, you can make only cold backups and data may be lost in the event of database corruption.

ARCHIVELOG Mode*

Log Archive Filename Format* %t_%s_%r.dbf

The naming convention for the archived log files. %s: log sequence number; %t: thread number; %S and %T: padding the filename to the left with zeroes.

OMR Database Recovery Settings - 2

https://reeves.gmpvt.net:1159 - Oracle Enterprise Manager (SYSMAN) - Recovery Settings - Microsoft Internet Explorer

Number	Archive Log Destination	Quota (512B)	Status	Type
1				Local
2				Local
3				Local
4				Local
5				Local
6				Local
7				Local
8				Local
9				Local
10	USE_DB_RECOVERY_FILE_DEST	n/a	VALID	Local

TIP It is recommended that archive log files be written to multiple locations spread across the different disks.
 TIP You can specify up to 10 archive log destinations.

Flash Recovery

Flash Recovery Area is enabled for this database. The chart shows space used by each file type that is not reclaimable by Oracle. Performing backups to a tertiary storage is one way to make space reclaimable. Usable Flash Recovery Area includes free and reclaimable space.

Flash Recovery Area Location

Flash Recovery Area Size GB

Flash Recovery Area Size must be set when the location is set

Reclaimable Flash Recovery Area (GB) **41.96**
Free Flash Recovery Area (GB) **2,155.74**

Enable Flashback Database - flashback logging can be used for fast database point-in-time recovery*

The flash recovery area must be set to enable flashback logging. When using flashback logs, you may recover your entire database to a prior point-in-time without restoring files. Flashback is the preferred point-in-time recovery method in the recovery wizard when appropriate.

Specify how far back you wish to flash the database in the future

Flashback Retention Time Hours

Current size of the flashback logs(GB) **6.969**
Lowest SCN in the flashback data **238336140**
Flashback Time **May 10, 2008 12:32:46 AM**

Apply changes to SPFILE only. Otherwise the changes will be made to both SPFILE and the running instance which requires that you restart the database to invoke static parameters.

Flash Recovery Area Usage

File Type	Size (GB)	Percentage
Archive Log	204.42	8.9%
Control File	0	0%
Online Log	0.69	0%
Backup Piece	0.69	0%
Image Copy	5.76	0.2%
Flashback Log	0	0%

GC Complete Recovery Procedure

1. Shutdown OMS: `opmnctl stopall`
2. Completely restore/recover OMR Database
 - Flashback Database
 - RMAN

```
STARTUP MOUNT;  
RESTORE DATABASE;  
RECOVER DATABASE;  
ALTER DATABASE OPEN;
```
3. Restart OMS: `opmnctl startall`
4. Test Agents: `emctl upload`

GC Incomplete Recovery Procedure

- Shutdown OMS: `opmnctl stopall`
- Incompletely recover OMR Database
 - Flashback Database
 - DBPITR
- Restart OMS: `opmnctl startall`
- Reset Agents

Reset Agents: Summary

- Needed when recovering a GC component from backup to an earlier state
 - After incomplete DB recovery
 - When OMS recv dir not on redundant storage
 - When Agent emd dir not on redundant storage
- Process is to manually remove Agent files to force metric re-evaluation on host
- Not the same as clean starting an Agent (to point Agent to another OMS and/or Repository)

Reset Agent Procedure

1. `emctl upload` (if command fails, continue)
2. `emctl stop agent`
3. `cd $AGENT_HOME/sysman/emd`
4. `rm agntstmp.txt lastupld.xml`
5. `rm state/* upload/*`
6. `emctl start agent`
7. `emctl upload`

Restore OMS Procedure

1. Create full blackout of all Agent hosts uploading specifically to failed OMS
2. Stop/kill remaining OMS and chain-installed Agent processes
3. Restore backup of OMS and chain-installed Agent homes
4. If not using shared receive directory, remove all files under `$OMS_HOME/sysman/recv/`
5. Reset Agents not able to upload to OMS
6. Start OMS: `opmnctl startall`
7. Manually upload Agents: `emctl upload`
8. Stop full blackout of Agent hosts

Restore Agent Procedure

1. Stop/kill remaining Agent processes
2. Restore backup of Agent home
3. Reset Agent

GC Installation

- Architecture
 - Grid Computing infrastructure
 - GC topology
 - Data flow between components
 - Grid/DB/AS Control
- Infrastructure design
- HA/DR recommendations

GC Configuration

- Notification rules
- Agent configuration
 - EM CLI
 - Enable multi-inventory support
 - Enable notification if GC goes down
- Metric tuning
 - Jobs
 - Compile invalid objects
 - Purge temporary directories
 - UDMs
 - List blocking lock activity
 - Identify GC tables to rebuild
- B&R
 - Backup procedures, recommendations, settings, methods (Oracle-Suggested/Custom strategies, RMAN Script Job)
 - Recovery - OMR Database (settings, complete, incomplete), reset Agents, OMS, Agent

Q & A