Extending Oracle 10g Grid Control Using Management Plug-Ins

NoCOUG

08.17.06

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BEZ Systems, Inc.

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ORACLE PARTNER

AGENDA

- OEM 10g Overview
- OEM 10g Grid Control Data Collection
- Options for Extending Grid Control
- Defining Management Plug-Ins
- Deploying Management Plug-Ins

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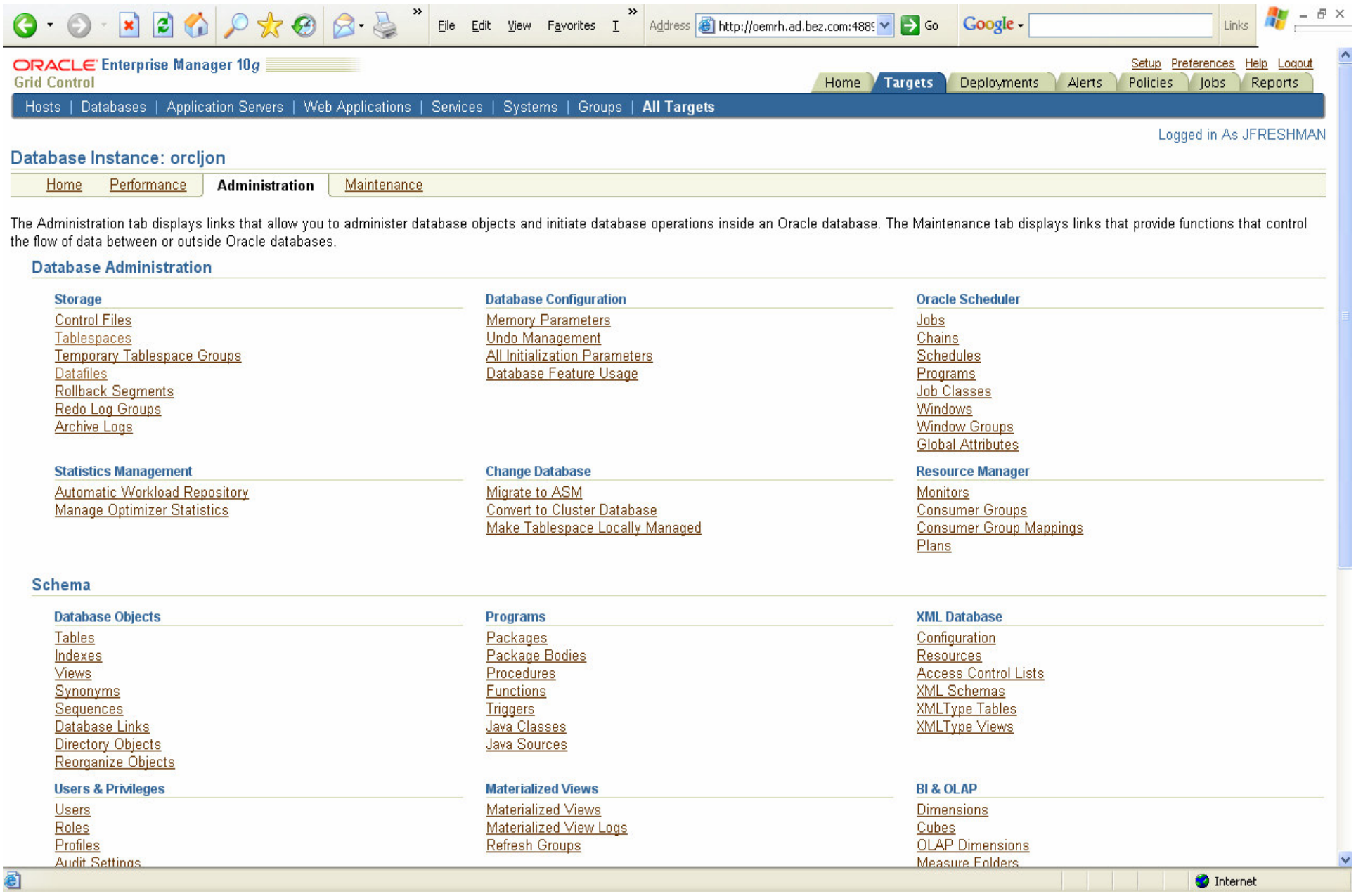
OEM Administration

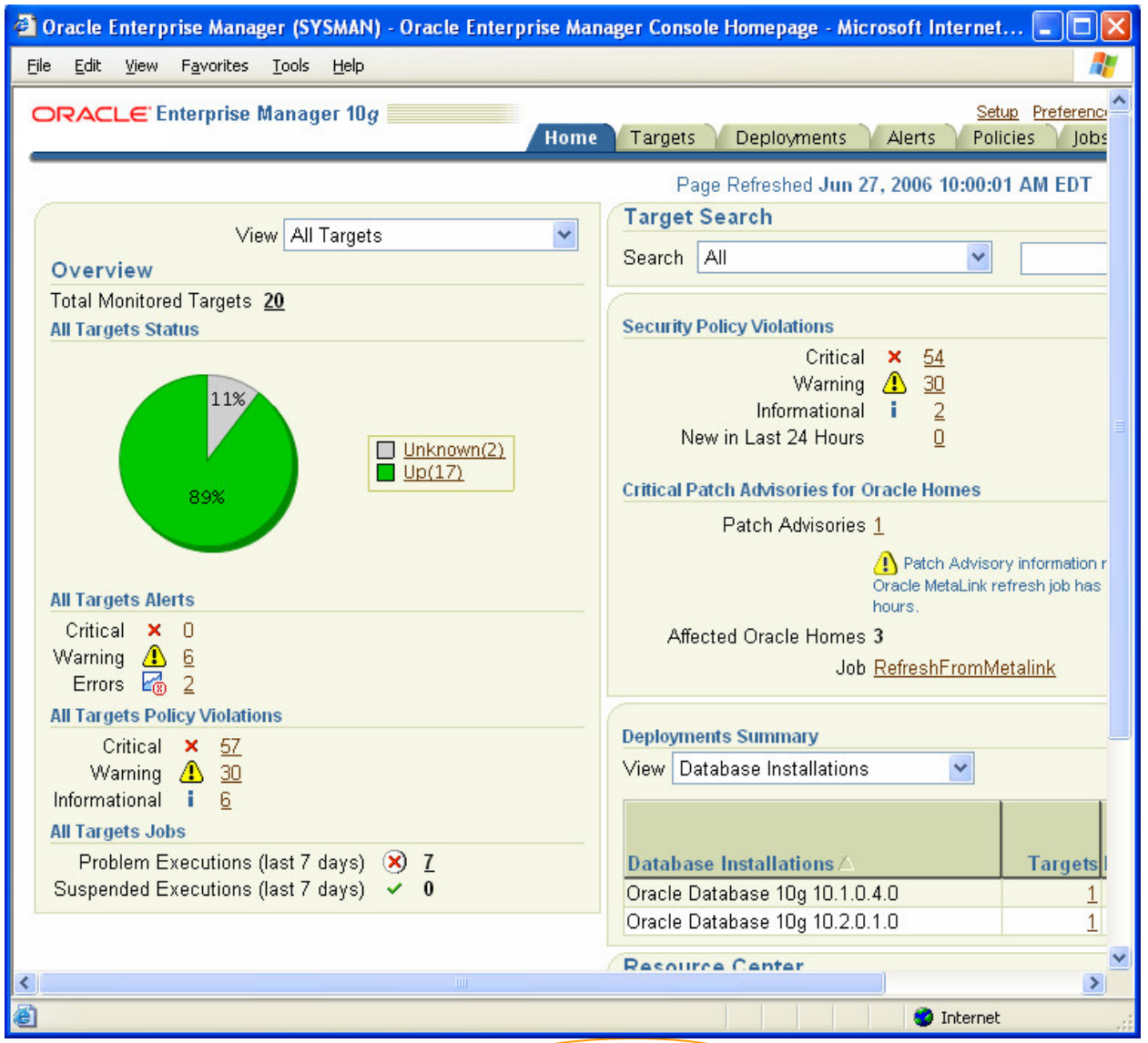


OEM 10g Product Options

- ✓ **OEM 10g Database Control**
- ✓ **OEM 10g Grid Control**

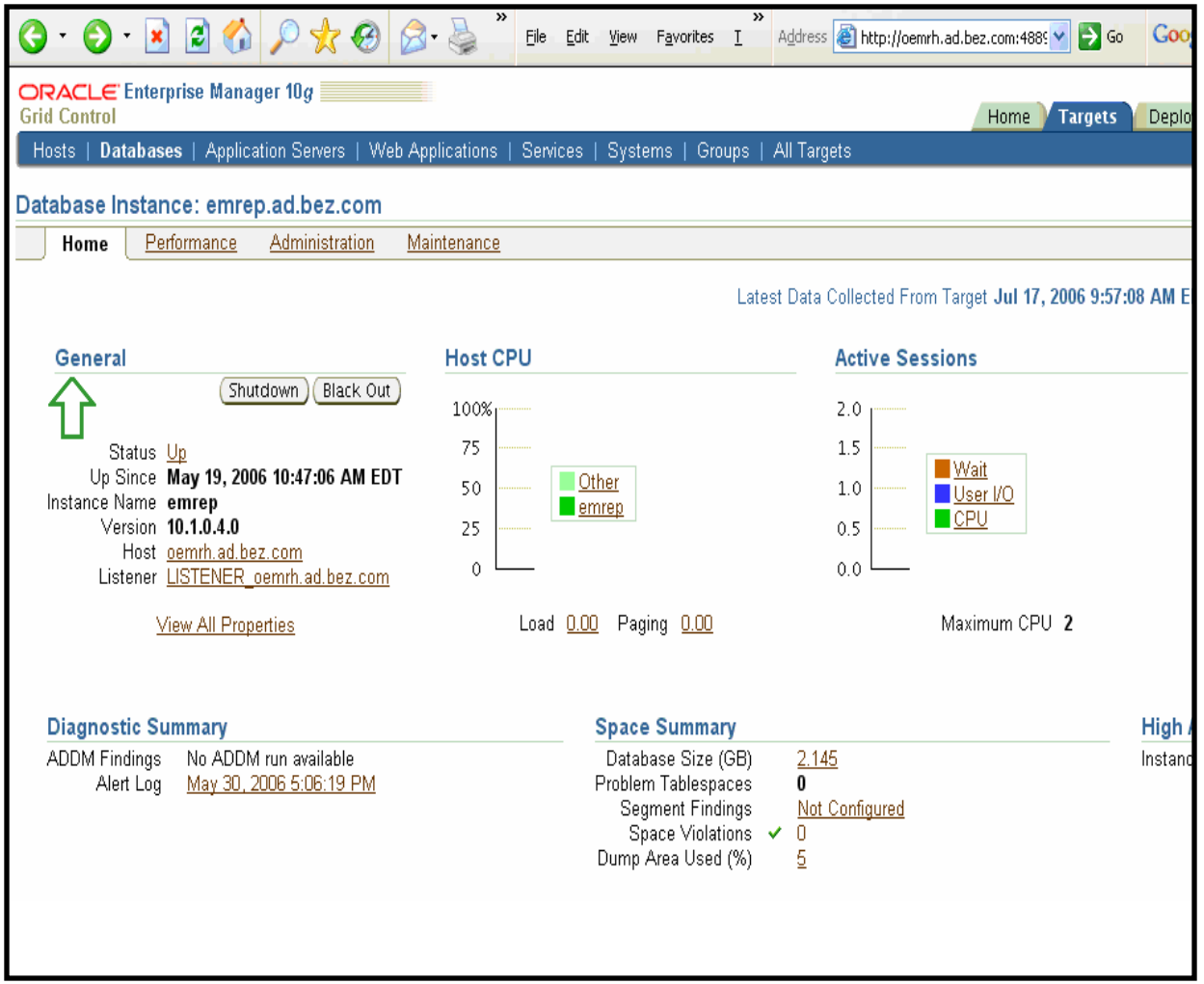
OEM 10g Database Control

- Database Instance monitoring only (8i, 9i and 10g)
- No central collection repository
- Similar to Oracle 9i OEM
- No support for extensions or Plug-In capability

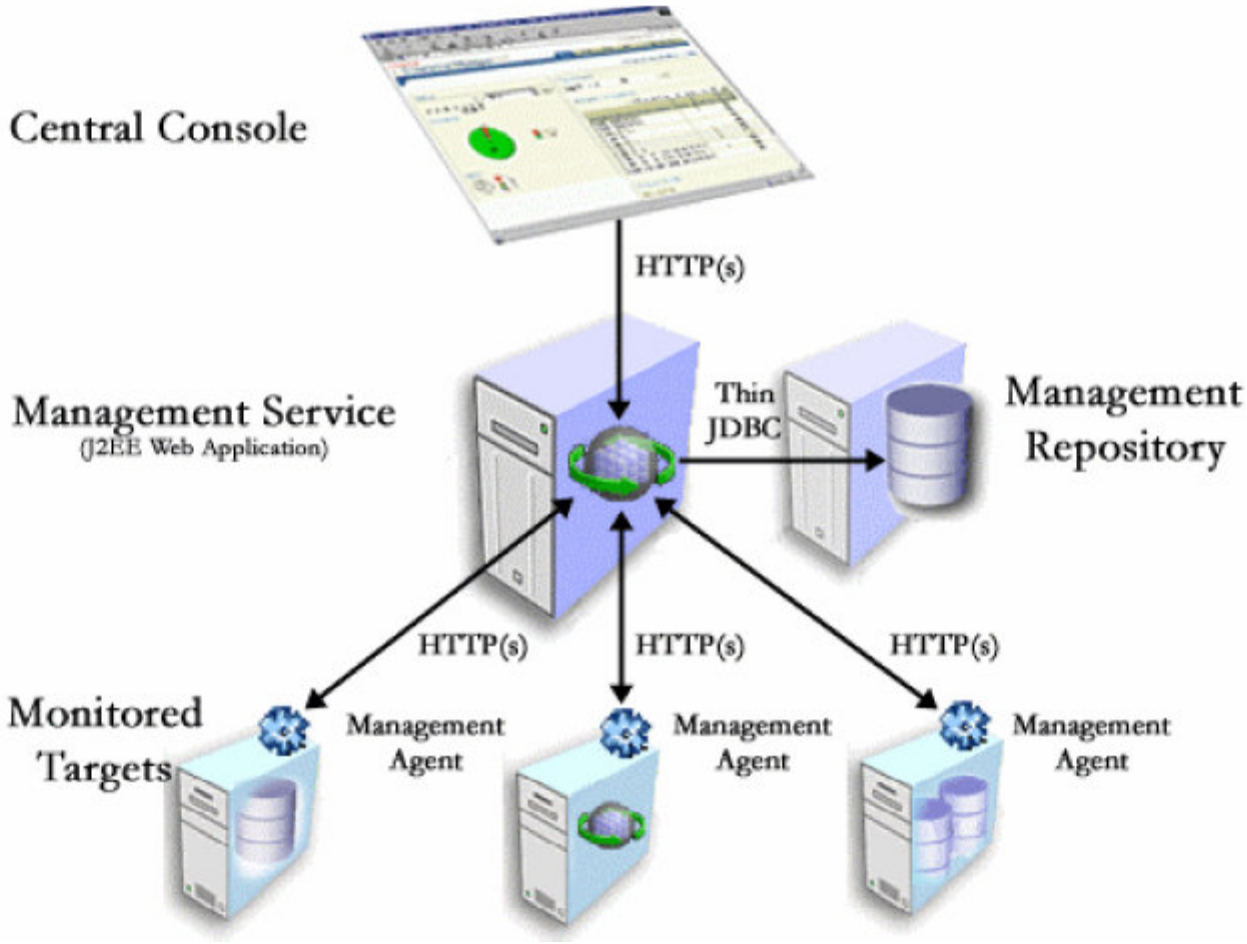


OEM 10g Grid Control

- Provides central management for heterogeneous environments
- Allows partners/third parties to extend Grid Control capabilities via an open framework



OEM Grid Control Architecture



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OEM 10g Grid Control

Native Monitoring/Administration of:

- Databases – Oracle 8i, 9i, 10g; MS SQL Server, IBM DB2
- Web Servers
- Application Servers – Oracle, WebSphere, WebLogic
- Storage

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OEM 10g Grid Control

- Introduced in 10g
- Superset of OEM 10g Database Control product
- Currently two releases available:
  10g Rev 1 | 10g Rev 2
- Free (downloadable from Oracle)
- Licensing required for some “premium” functionality

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OEM 10g GC - O/S Certification

O/S	Platform	Version
Linux	x86 32-bit x86 64-bit	RH Enterprise AS/ES 3.0 RH Enterprise AS/ES 4.0
Solaris	SPARC 64-bit	Solaris 8 Update 7+ Solaris 9 Update 6+ Solaris 10
MS Windows (32-bit)	NT 2000 XP	NT 2002 XP SP-2
HP-UX PA-RISC (64-bit)	PA-RISC 64-bit	HP-UX 11i V1 (11.1) HP-UX 11i V2 (11.23)
AIX	AIX 5L	V5.2 V5.3

OEM 10g GC - Target Certification

Supported Targets	Release
Oracle Application Server	9.0.4.2 and later patchsets 10.1.2.0.0 (Phase 1) 10.1.0.2.0.1 (SEONE) 10.1.2.0.2 (Phase 2) 10.2.0.2.1 Patchset 10.1.3 (standalone OC4J)
Oracle Database[1], Listener	8.1.7.4 9.0.1.5 9.2.0.7 and later patchsets 10.1.0.4 and later patchsets 10.2
Oracle RAC Database	9.2.0.6 10.1.0.4 10.1.0.5 10.2
Oracle Collaboration Suite	9.0.4.2 and later 10.1.1
Management Service & Repository	10.2
Management Agent	10.1.0.2 10.2
Enterprise Manager Web Site	10.2

[1] Enterprise, Standard or Personal Editions

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OEM 10g Grid Control: Agents

- Typically, one agent per monitored server
- Lightweight and generic
- Agents can be installed locally or remotely using the OEM console
- Agents store data as XML and upload to OMS via HTTP or HTTPS

OEM 10*g* Grid Control: Target Types

- A target type is a logical or physical entity (either hardware or software)
- Target types define the *type* of data to collect as well as the *frequency* of collection
- Each agent is configured through the Management Console to collect metrics for one or more target types
- There are a series of target types monitored, by default, out of the box.

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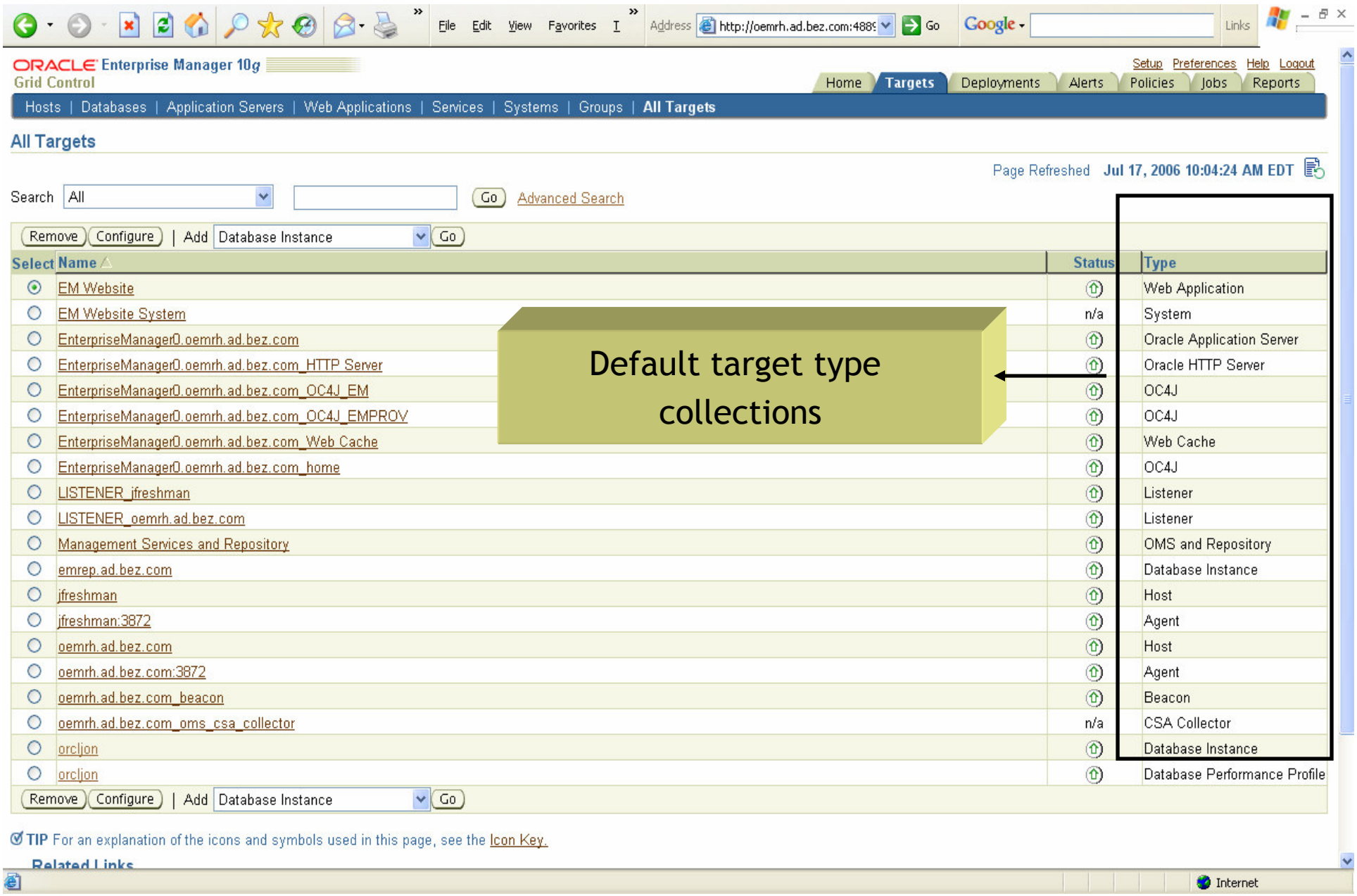
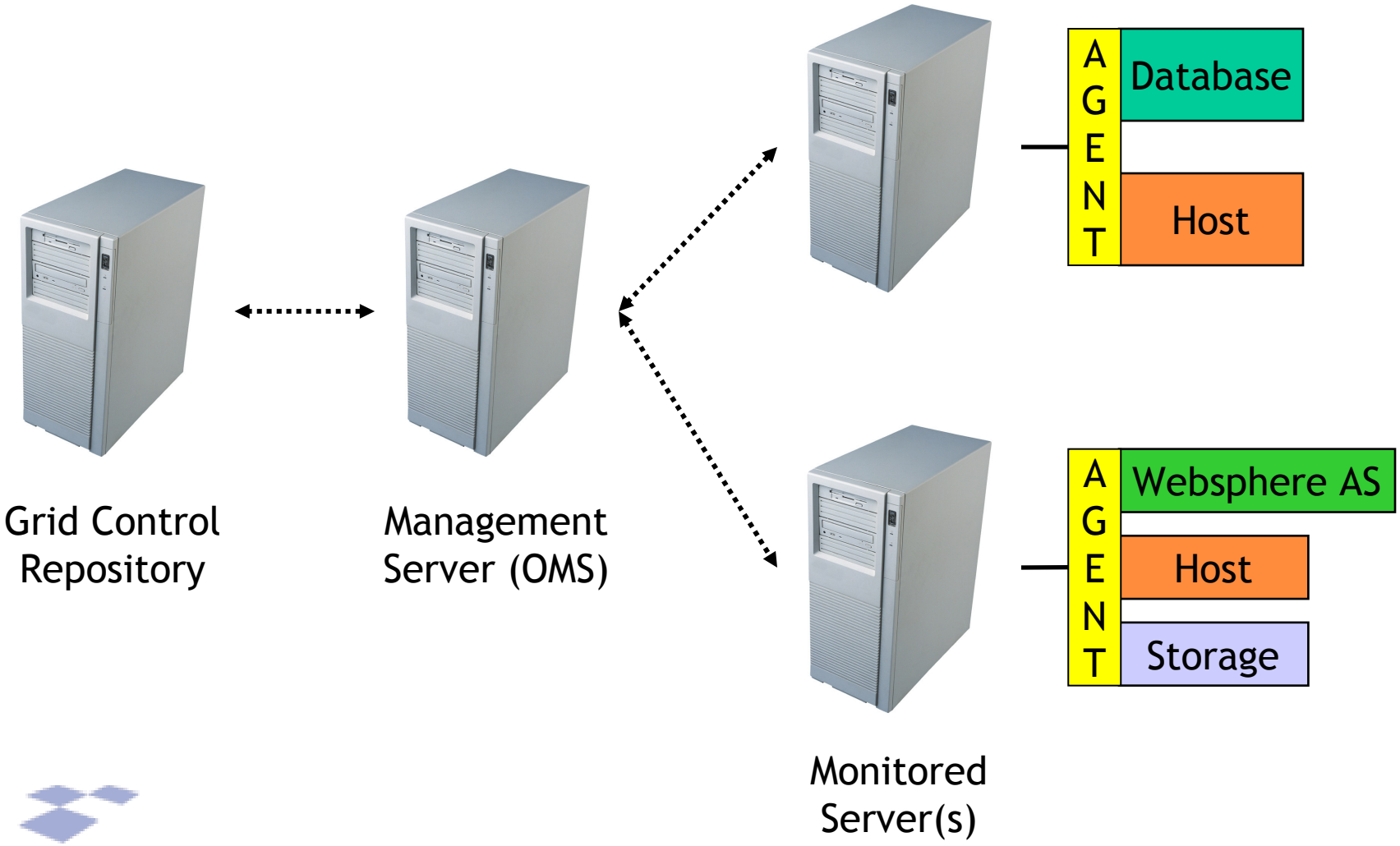
OEM 10g Grid Control: Target Types



OEM 10g Grid Control Collection



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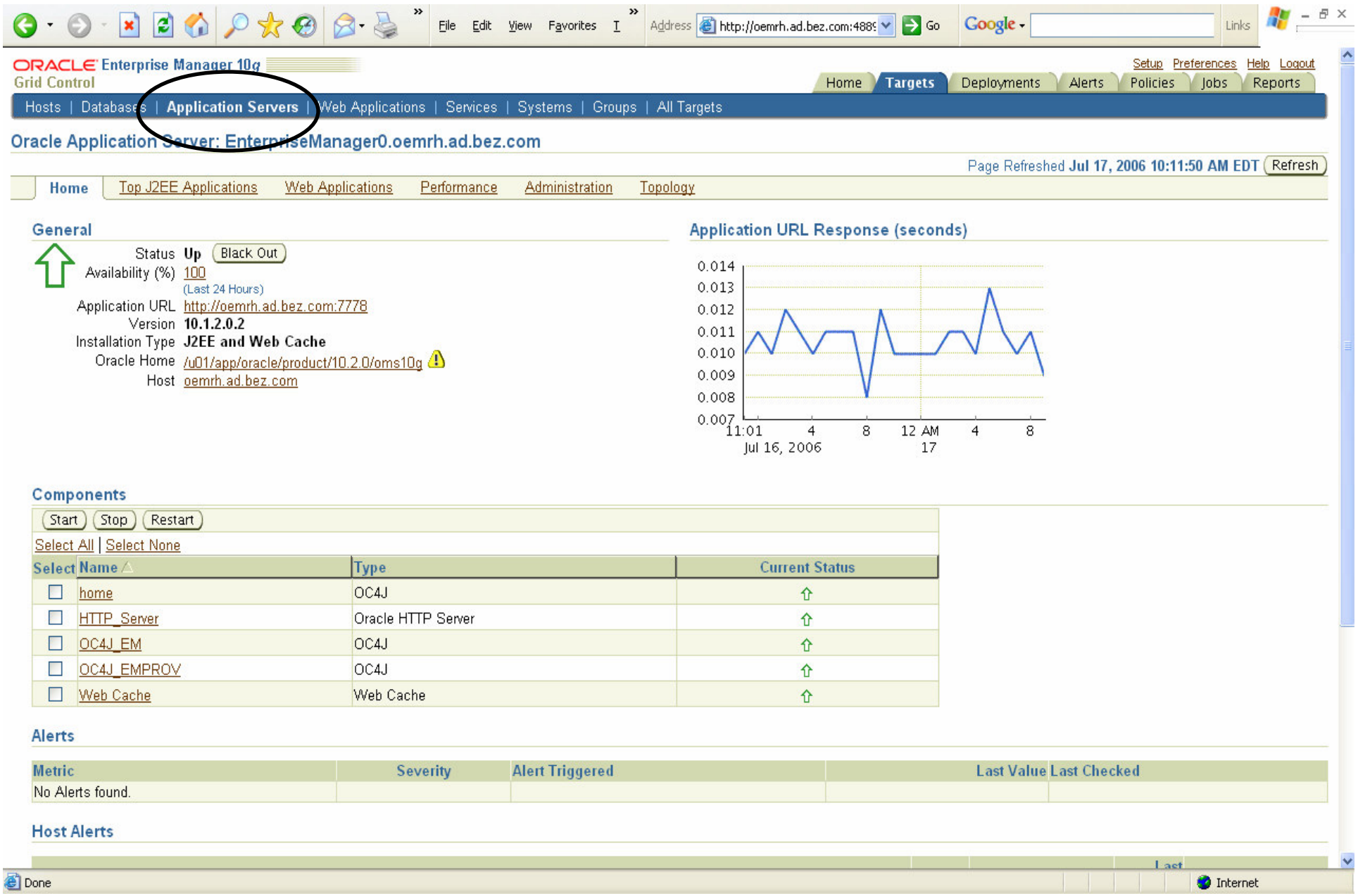
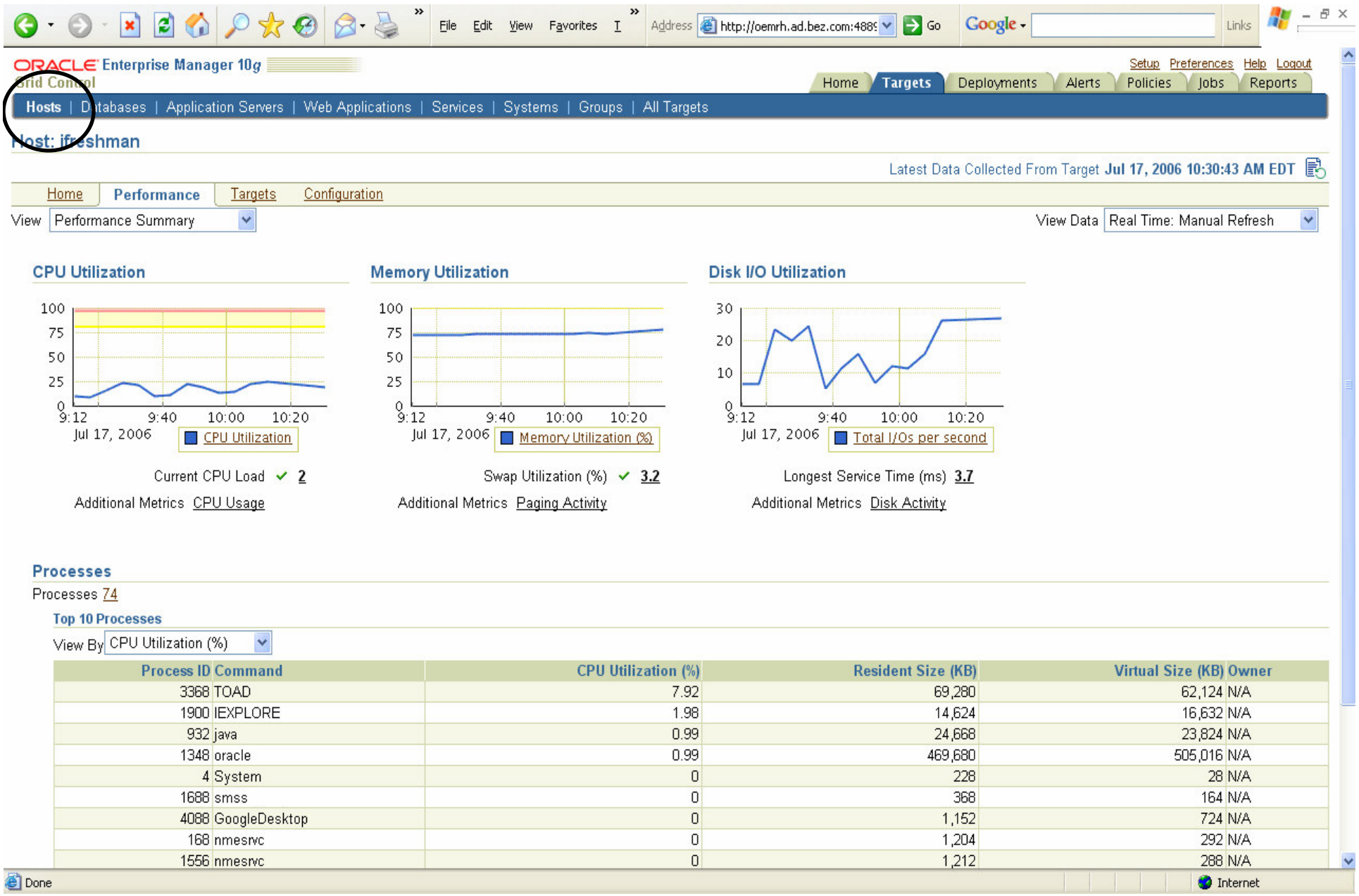
Grid Control Collection: App Server



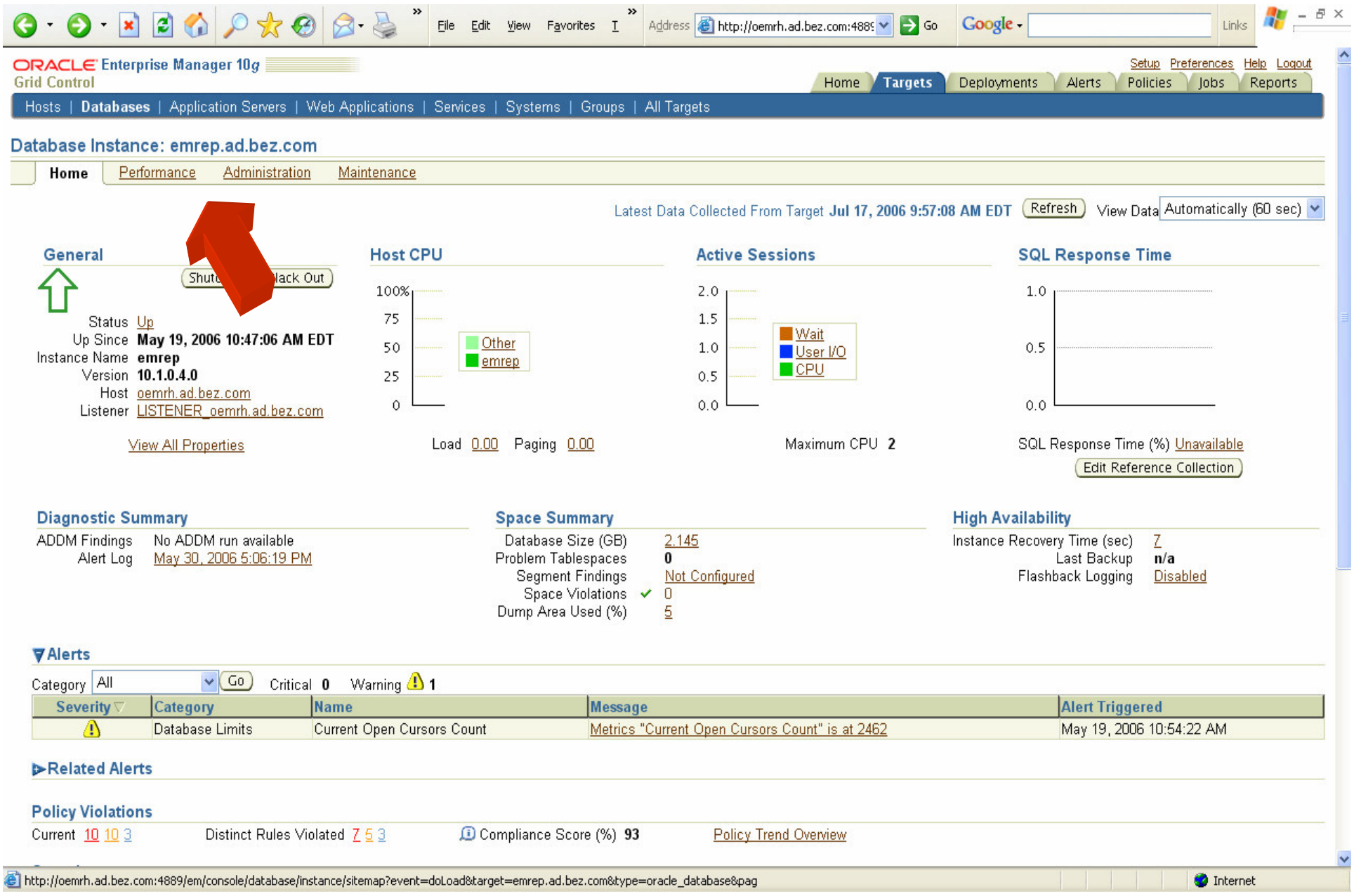
Grid Control Collection: Host



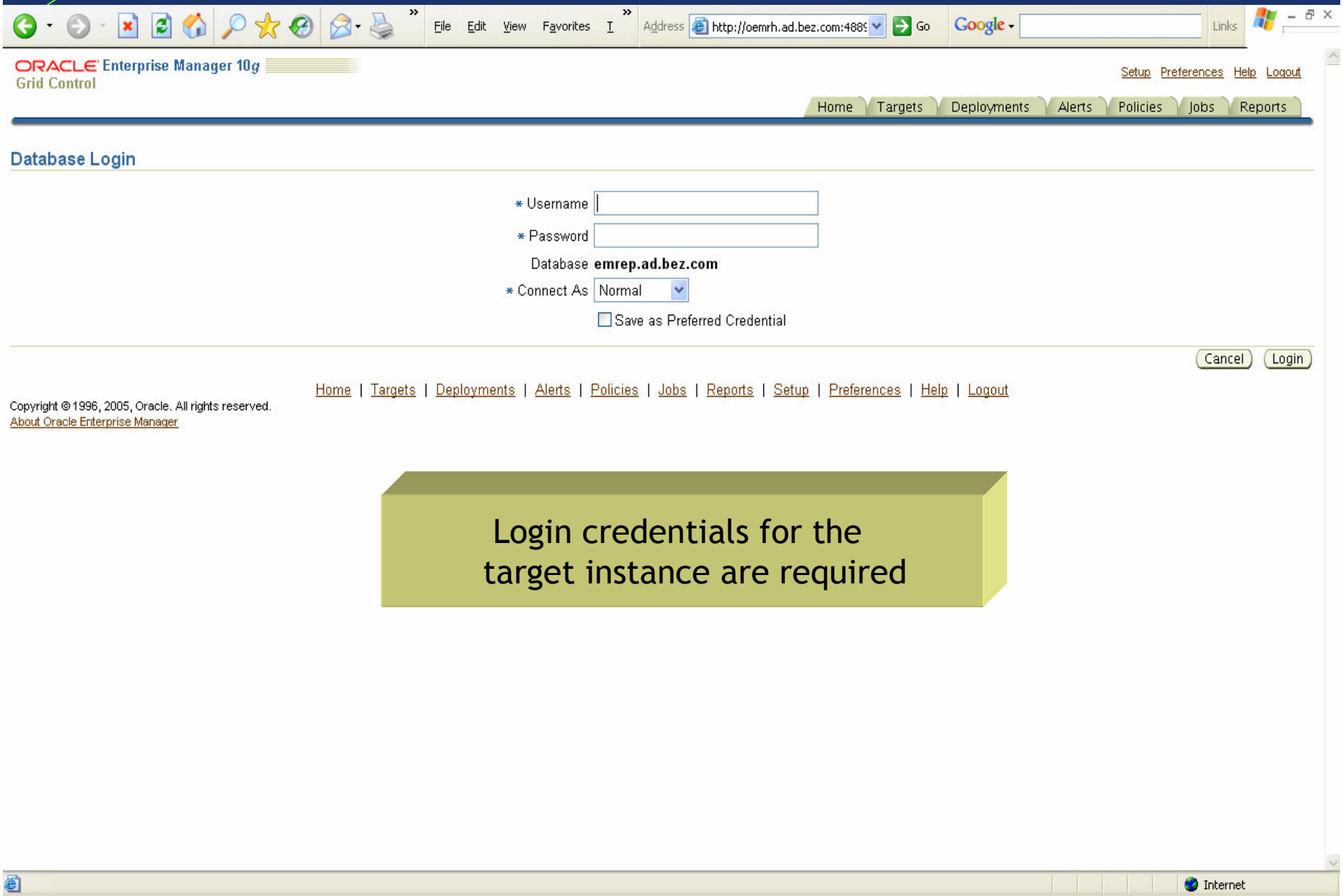
Database Instance Data Collection

- Primarily instance-level data collected and persisted in the Grid Control repository
- Performance data (ASH & AWR), Diagnostics (ADDM) and 'Top X' reporting is achieved by querying the monitored instance directly
- Alert events and threshold settings are collected and persisted by the default agent
- Extensions (to be discussed later) are available to enhance the type and scope of data persisted within the EMGC repository

Database Instance Data Collection

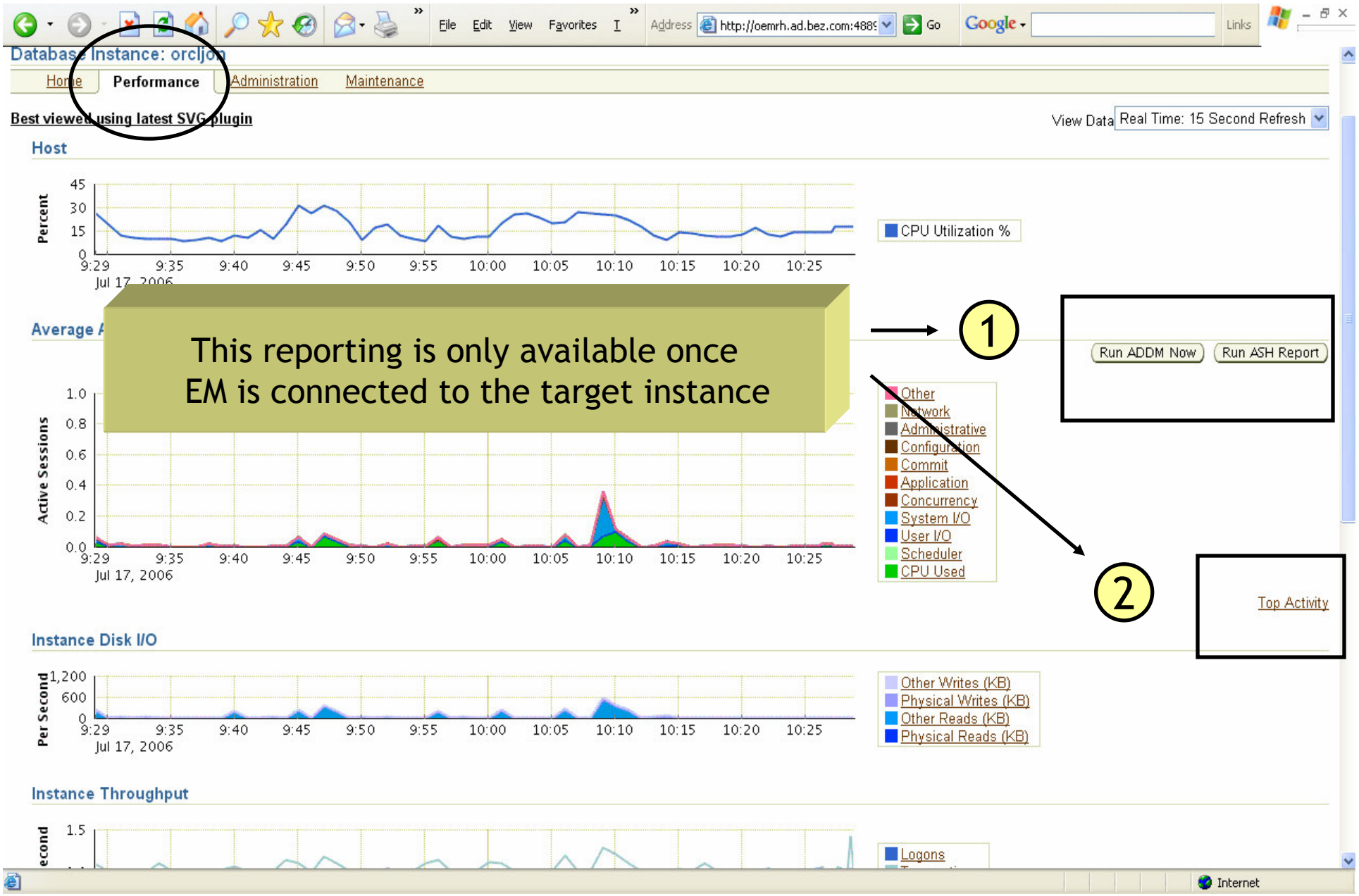


Database Instance Data Collection

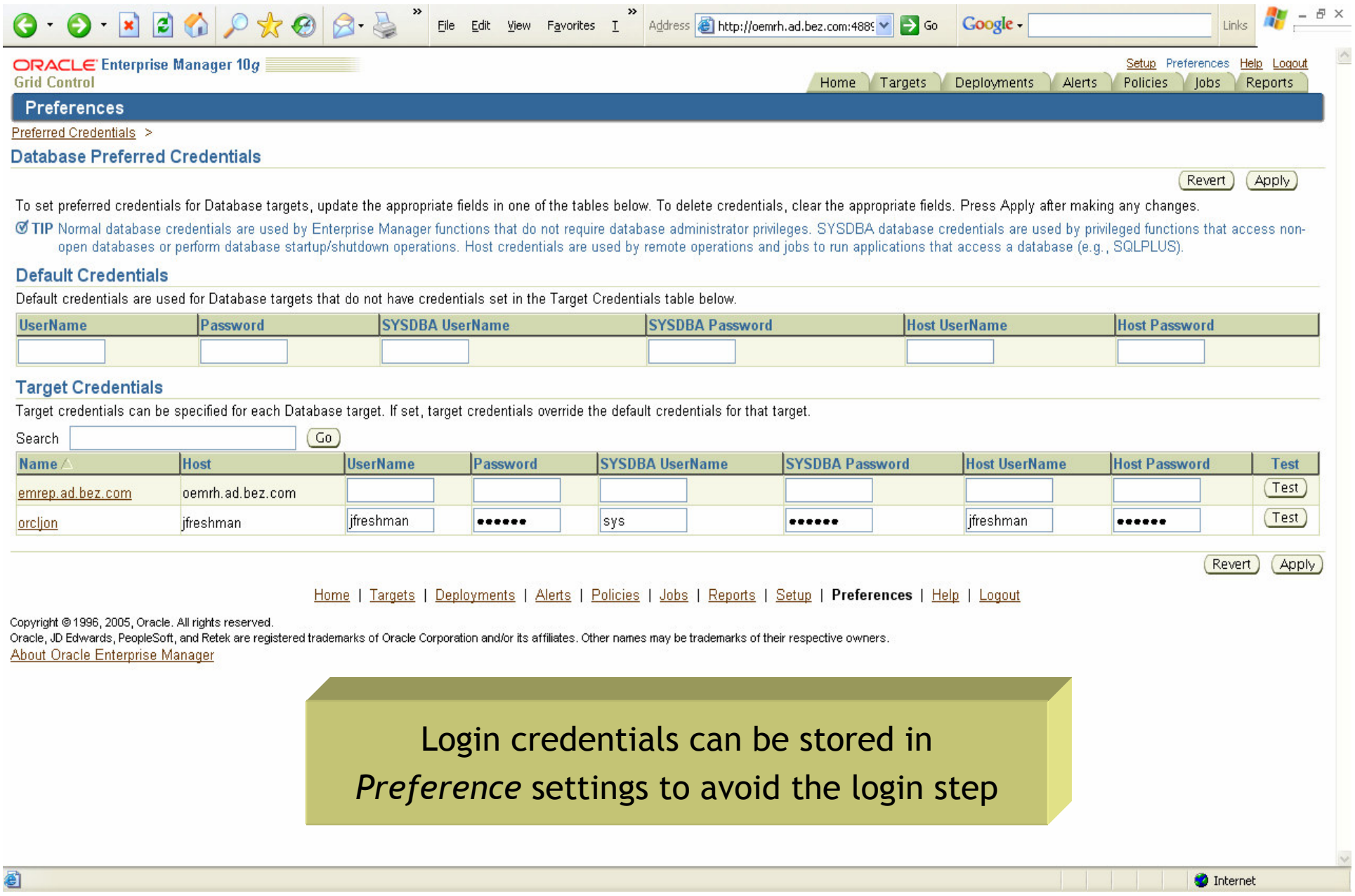


Login credentials for the target instance are required

Database Instance Data Collection



Database Instance Data Collection



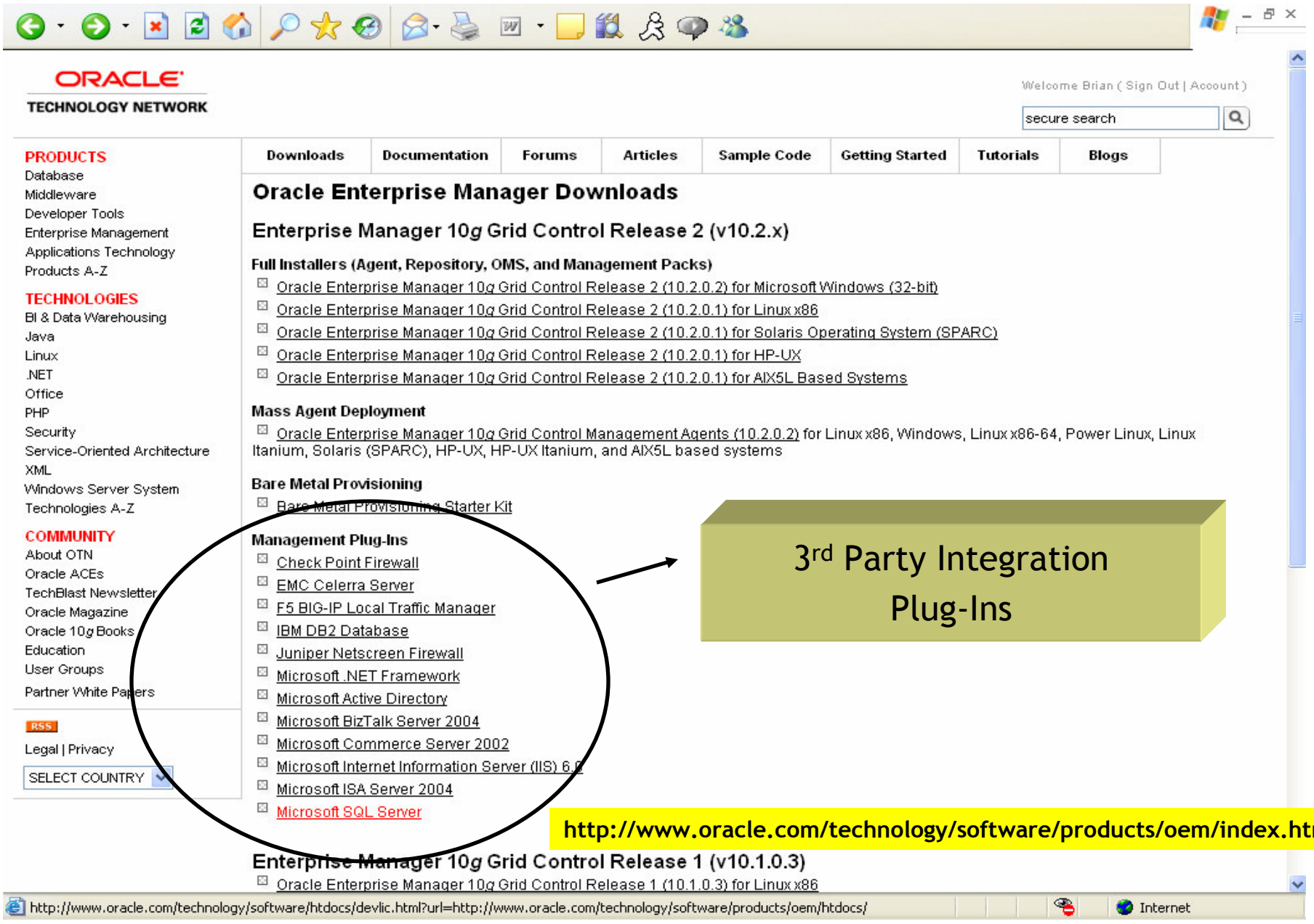
Login credentials can be stored in *Preference* settings to avoid the login step

Extending EM: *Management Plug-Ins*

Grid Control features an open architecture designed to allow third parties to develop new target types, called Management Plug-Ins

- Imported and exported from the Grid Control console
- Deployed/Undeployed to any number of existing agents at once via Groups

Download From www.oracle.com



3rd Party Integration Plug-Ins

Options for custom extensions to OEM

- Modify existing database instance collection
- **Create a collection of User Defined Metrics**
- **Create a Management Plug-In (also known as a target type)**

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User Defined Metrics

- Add a custom metric for an existing target type (only at the *same level* of collection aggregation)
- Supports the return of results in a Key - Value pair set
- Can support multi-column Key values
- *Concatenating multiple columns in a result set renders the data difficult to visualize/analyze within OEM*

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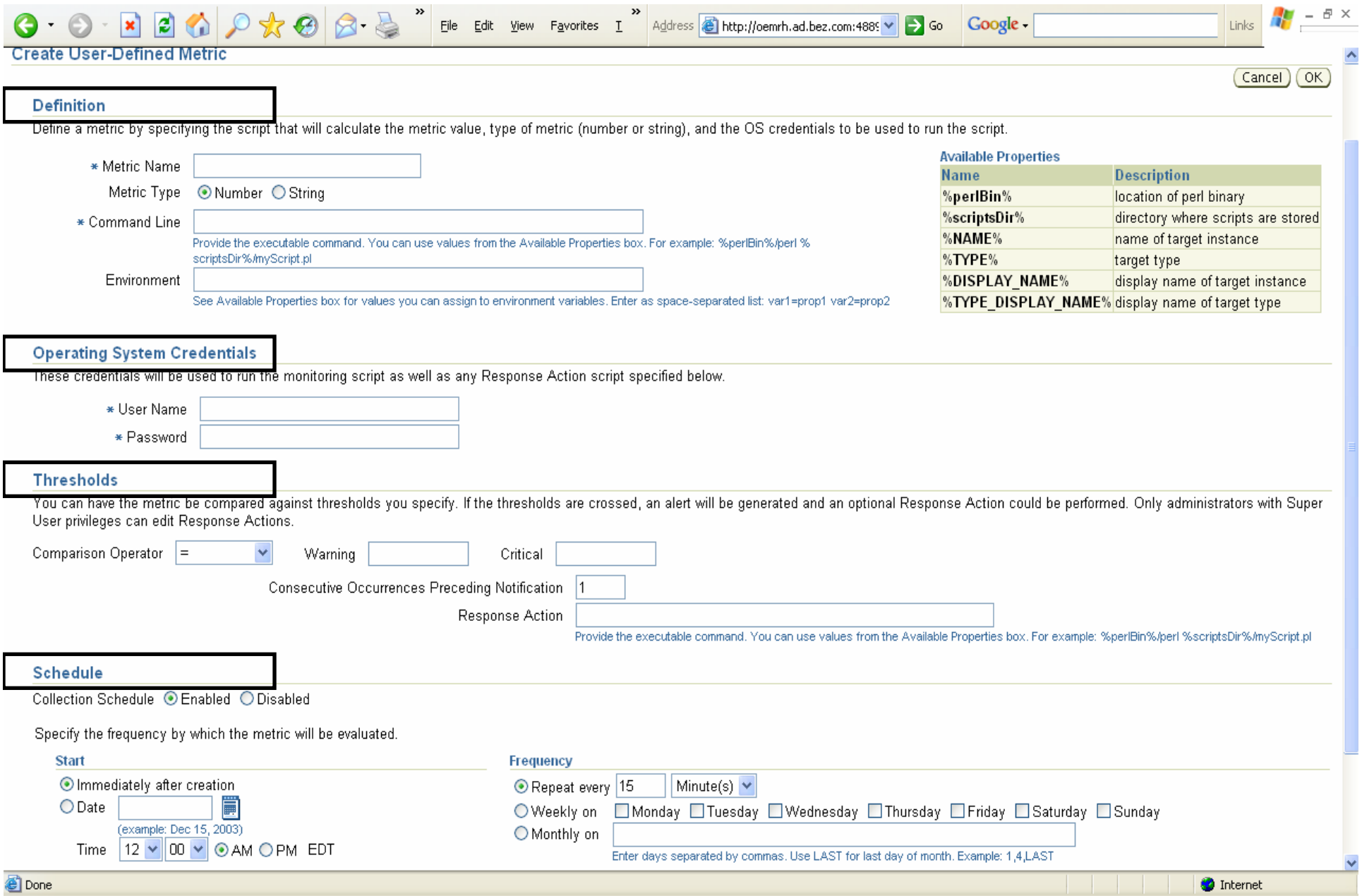
User Defined Metrics



User Defined Metrics

Pros

- Can be used to instruct existing target type how to collect additional information

Cons

- Not designed for complex queries (multi-column queries)
- Unable to push User Defined Metrics to multiple agents

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Management Plug-Ins

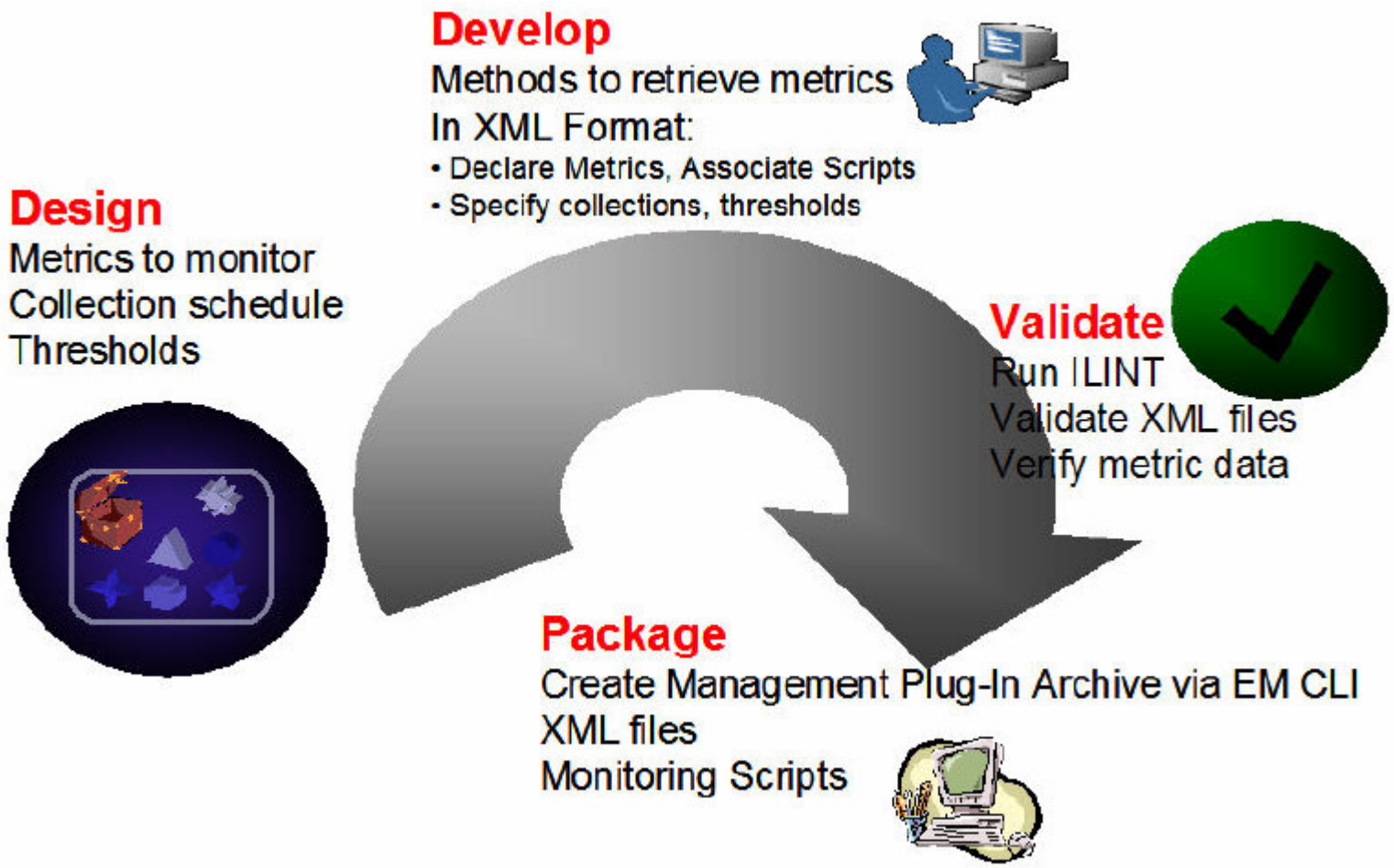
Pros

- Supports complex queries
- Tight integration with OEM UI
- Can deploy Plug-In to multiple agents through the OEM console
- Total flexibility

Cons

- Total flexibility (can swamp agent)
- Can severely impact the Agent operation without careful consideration.

Management Plug-In Development Cycle



End result is the creation of an MPA (Management Plug-In Archive) file which can be deployed to the Agents

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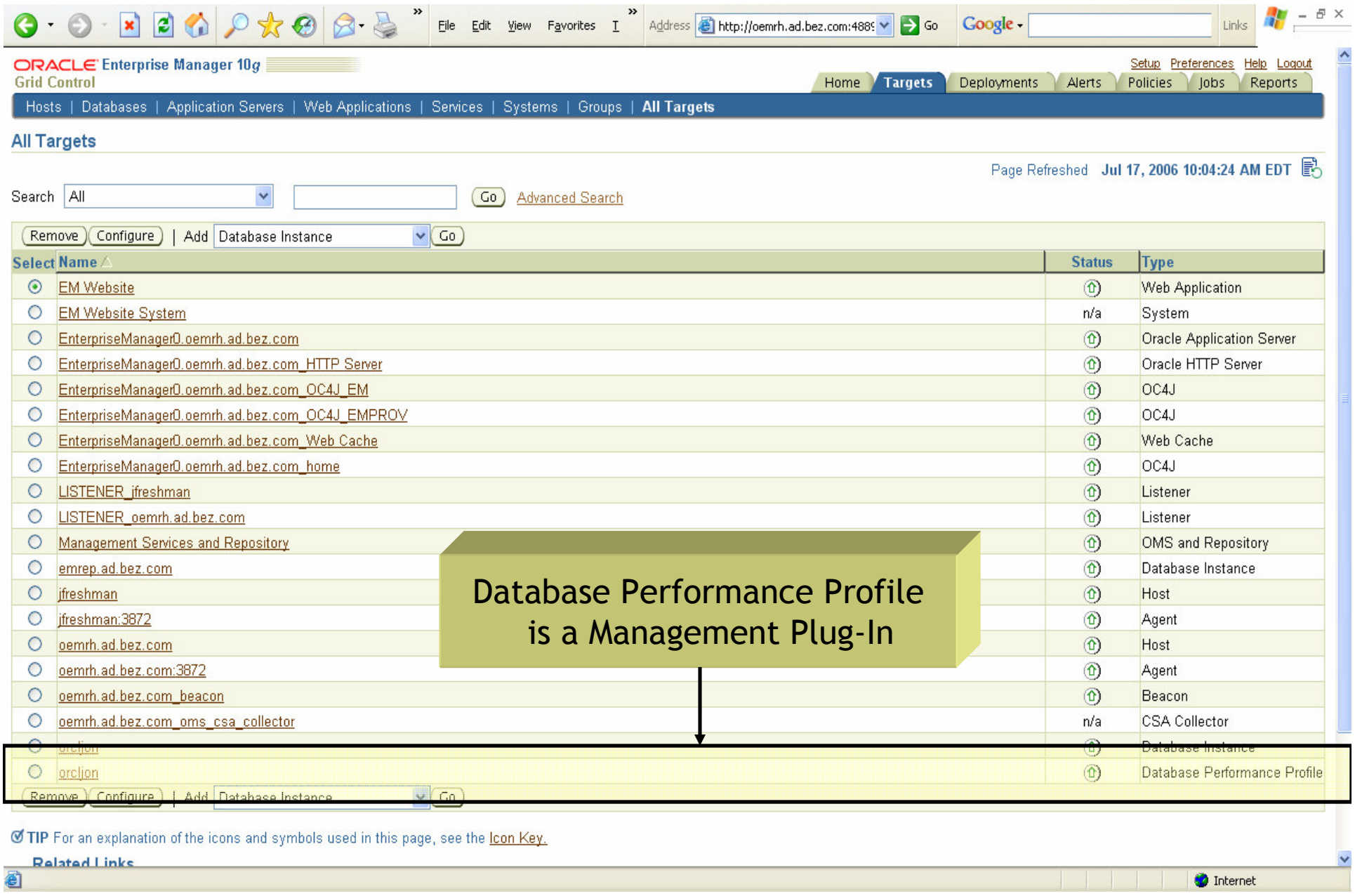
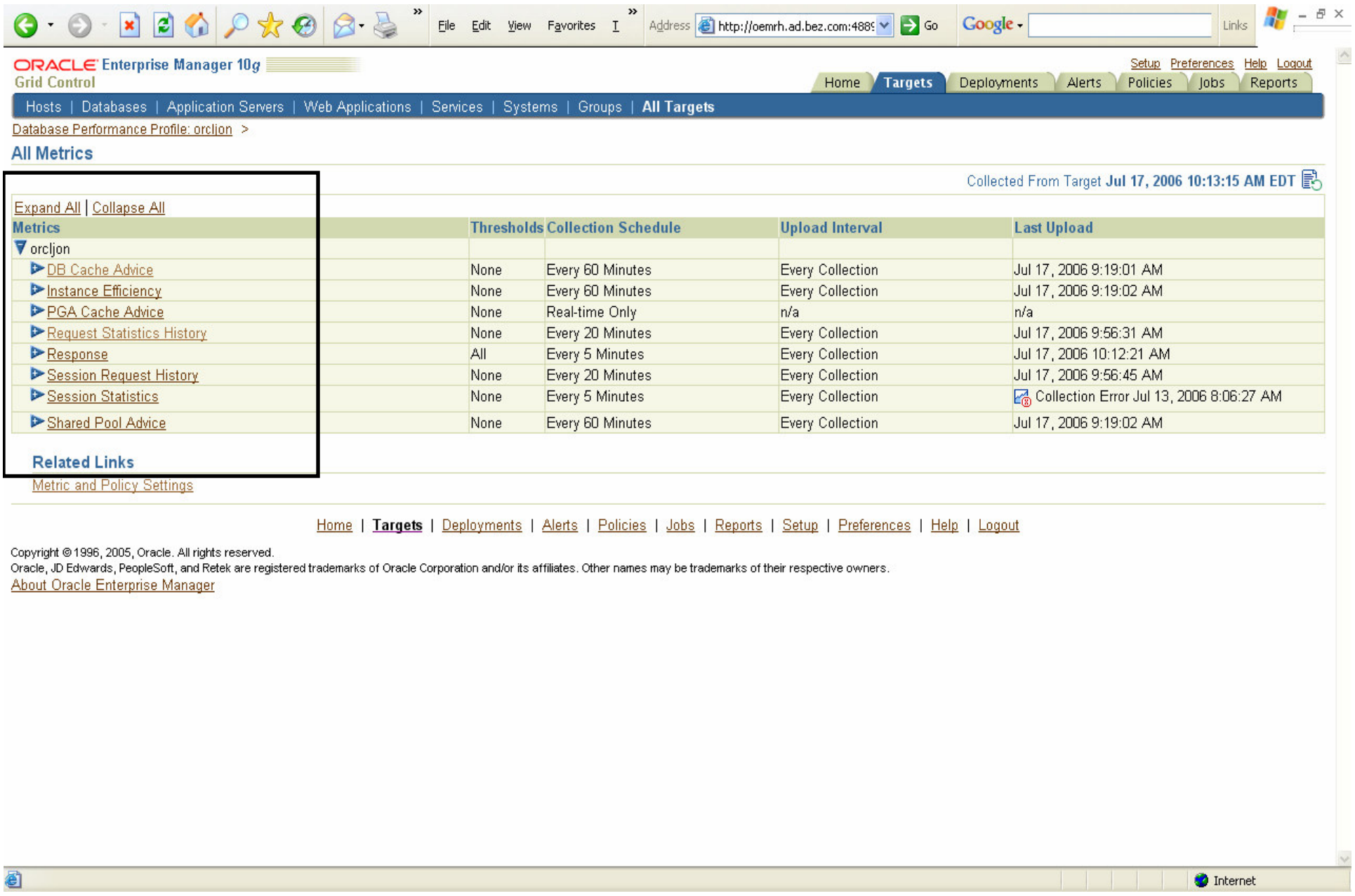
Creating a Management Plug-In

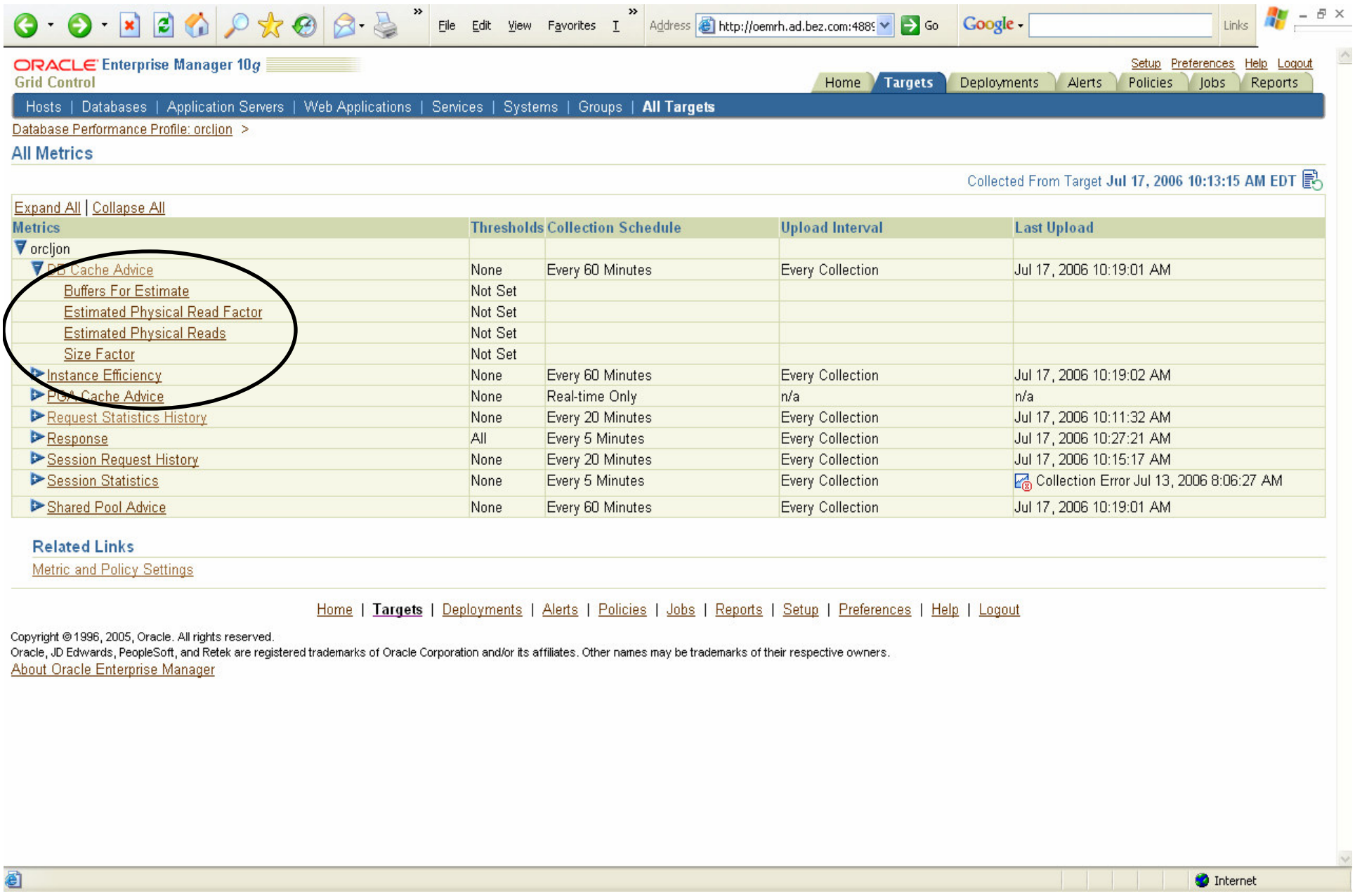


Database Performance Profile is a Management Plug-In

… consisting of Metrics



… and Data Elements



Raw Collection Data

ORACLE Enterprise Manager 10g
Grid Control

Setup | Preferences | Help | Logout

Home | Targets | Deployments | Alerts | Policies | Jobs | Reports

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

Database Performance Profile: orcljon > All Metrics >

DB Cache Advice

Page Refreshed Jul 17, 2006 10:32:53 AM EDT

Buffer Pool Identifier	Buffer Pool Name	Block Size (bytes)	Size For Estimate (MB)	Size Factor	Buffers For Estimate	Estimated Physical Read Factor	Estimated Physical Reads
3.000000	DEFAULT	8192.000000	32.000000	0.098800	3992.000000	4.635400	132608.000000
3.000000	DEFAULT	8192.000000	64.000000	0.197500	7984.000000	2.636500	75424.000000
3.000000	DEFAULT	8192.000000	96.000000	0.296300	11976.000000	2.003700	57321.000000
3.000000	DEFAULT	8192.000000	128.000000	0.395100	15968.000000	1.629800	46626.000000
3.000000	DEFAULT	8192.000000	160.000000	0.493800	19960.000000	1.363500	39008.000000
3.000000	DEFAULT	8192.000000	192.000000	0.592600	23952.000000	1.232800	35267.000000
3.000000	DEFAULT	8192.000000	224.000000	0.691400	27944.000000	1.128900	32296.000000
3.000000	DEFAULT	8192.000000	256.000000	0.790100	31936.000000	1.014700	29029.000000
3.000000	DEFAULT	8192.000000	288.000000	0.888900	35928.000000	1.000400	28619.000000
3.000000	DEFAULT	8192.000000	320.000000	0.987700	39920.000000	1.000000	28608.000000
3.000000	DEFAULT	8192.000000	324.000000	1.000000	40419.000000	1.000000	28608.000000
3.000000	DEFAULT	8192.000000	352.000000	1.086400	43912.000000	1.000000	28608.000000
3.000000	DEFAULT	8192.000000	384.000000	1.185200	47904.000000	1.000000	28608.000000
3.000000	DEFAULT	8192.000000	416.000000	1.284000	51896.000000	1.000000	28608.000000
3.000000	DEFAULT	8192.000000	448.000000	1.382700	55888.000000	1.000000	28608.000000
3.000000	DEFAULT	8192.000000	480.000000	1.481500	59880.000000	1.000000	28608.000000
3.000000	DEFAULT	8192.000000	512.000000	1.580200	63872.000000	1.000000	28608.000000
3.000000	DEFAULT	8192.000000	544.000000	1.679000	67864.000000	1.000000	28608.000000
3.000000	DEFAULT	8192.000000	576.000000	1.777800	71856.000000	1.000000	28608.000000
3.000000	DEFAULT	8192.000000	608.000000	1.876500	75848.000000	1.000000	28608.000000
3.000000	DEFAULT	8192.000000	640.000000	1.975300	79840.000000	0.966500	27649.000000

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

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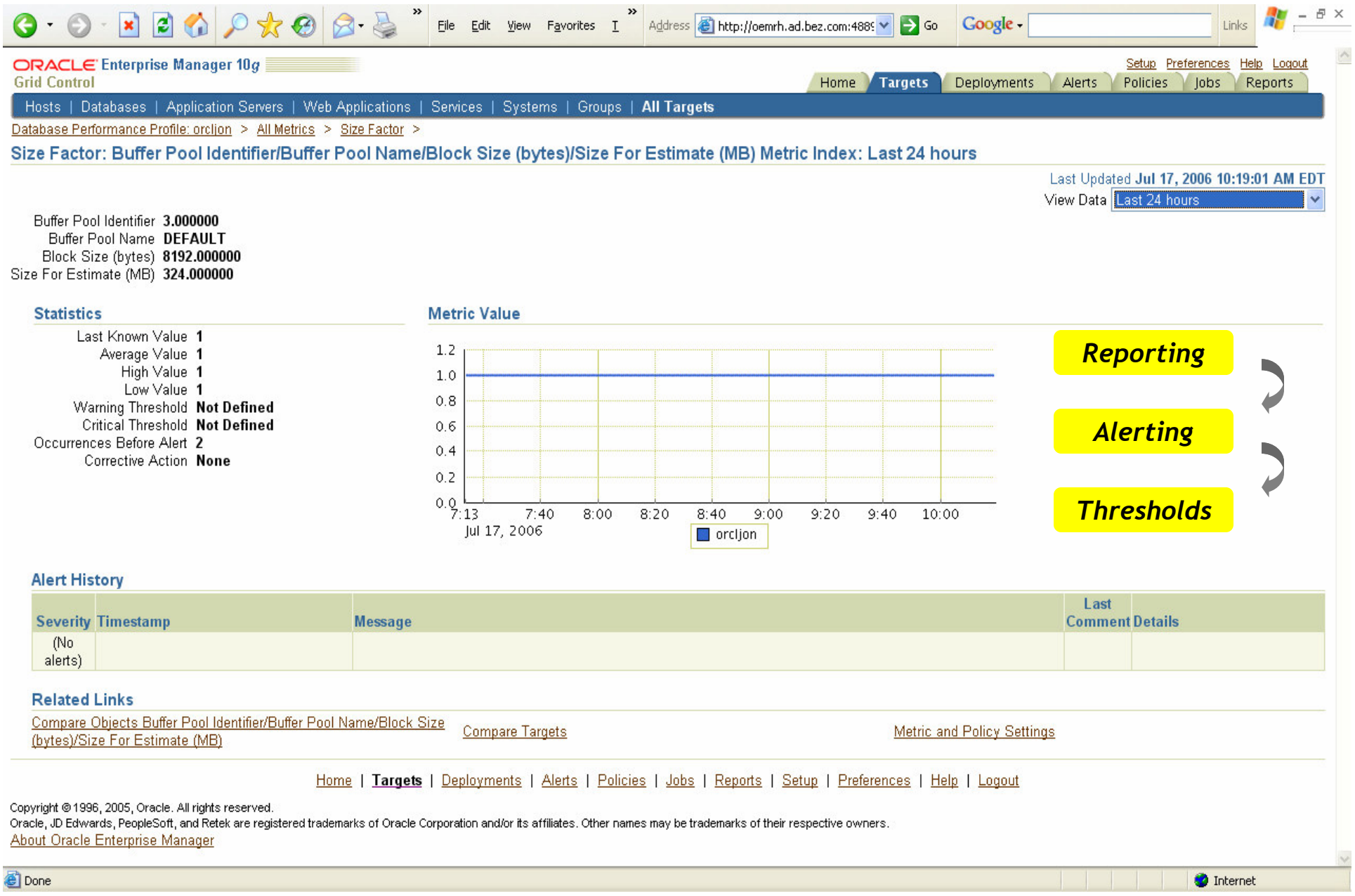
About Oracle Enterprise Manager

Fits directly into the OEM Framework



Coding a Management Plug-In

There are two components to a Plug-In:

1. **Target Type Definition file**
   - Defining the metrics
   - Agent instructions for data collection

2. **Default Collections file**
   - Scheduling
   - Thresholds
   - Alerting

***** both files are created in XML format***

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Target Type Definition - Metrics

oracle_perf_profile.xml | oracle_perf_profile.xml

```
<!DOCTYPE TargetMetadata SYSTEM "../dtds/TargetMetadata.dtd" [
<!ENTITY dynamic_properties SYSTEM "./dyn_props.xmlp">
]>

<TargetMetadata META_VER="0.12" TYPE="oracle_perf_profile" REQUIRED_AGENT_VERSION="10.2.0.0.0" CATEGORY_PROPERTIES=
    <Display>
        <Label NLSID="name">Database Performance Profile</Label>
    </Display>

    <AltSkipCondition METRIC="Response" COLUMN="State"/>

    <Metric NAME="Response" TYPE="TABLE">
        <Display>
            <Label NLSID="resp">Response</Label>
        </Display>
        <TableDescriptor>
            <ColumnDescriptor NAME="userLogon" TYPE="NUMBER" IS_KEY="FALSE">
                <Display FOR_SUMMARY_UI="TRUE">
                    <Label NLSID="resp_userLogon">User Logon Time (msec)</Label>
                    <ShortName NLSID="resp_userLogon_short">Logon Time(ms)</ShortName>
                </Display>
            </ColumnDescriptor>
            <ColumnDescriptor NAME="Status" TYPE="NUMBER" IS_KEY="FALSE">
                <Display>
                    <Label NLSID="resp_status">Status</Label>

                </Display>
            </ColumnDescriptor>
```

Target Type Definition - How To

oracle_perf_profile.xml | oracle_perf_profile.xml

```
            </Display>
        </ColumnDescriptor>
        <ColumnDescriptor NAME="SQL_ID" TYPE="STRING" IS_KEY="FALSE" TRANSIENT="FALSE" IS_LONG_TEXT="F
            <Display>
                <Label NLSID="active_session_history_sql_id">SQL ID</Label>
            </Display>
        </ColumnDescriptor>
        <ColumnDescriptor NAME="QC_SESSION_ID" TYPE="STRING" IS_KEY="FALSE" TRANSIENT="FALSE" IS_LONG_
            <Display>
                <Label NLSID="active_session_history_qc_session_id">QC Session ID</Label>
            </Display>
        </ColumnDescriptor>
        <ColumnDescriptor NAME="QC_INSTANCE_ID" TYPE="STRING" IS_KEY="FALSE" TRANSIENT="FALSE" IS_LONG
            <Display>
                <Label NLSID="active_session_history_qc_instance_id">QC Instance ID</Label>
            </Display>
        </ColumnDescriptor>
    </TableDescriptor>

    <QueryDescriptor FETCHLET_ID="SQL" NEED_CHARSET_CONVERT="TRUE">
        <Property NAME="STATEMENT" SCOPE="GLOBAL" OPTIONAL="FALSE">
            <![CDATA[   select  sample_id, session_id, session_serial#,
                                TO_CHAR(sample_time AT TIME ZONE 'GMT','YYYY-MM-DD HH24:MI:SS TZD') sa
                                username, program, module, sql_id,
                                qc_session_id, qc_instance_id
                        from    v$active_session_history ash,
                                dba_users
                        where   ash.USER_ID=dba_users.USER_ID and
                                session_type='FOREGROUND' and sample_time > sysdate-((1/24) * (10/60))
        </Property>
        <Property NAME="MachineName" SCOPE="INSTANCE" OPTIONAL="FALSE">MachineName</Property>
        <Property NAME="Port" SCOPE="INSTANCE" OPTIONAL="FALSE">Port</Property>
```

Default Collections - When

oracle_perf_profile.xml | oracle_perf_profile.xml

```
        == Response
        == Fetchlet: Perl (Warning - This category must remain first.)
        ===================================================================
  -->
<CollectionItem NAME="Response">
  <Schedule>
    <IntervalSchedule INTERVAL="5" TIME_UNIT="Min"/>
  </Schedule>
  <MetricColl NAME="Response">

      <Condition COLUMN_NAME="Status"
                 CRITICAL="0" OPERATOR="EQ"
                 CLEAR_MESSAGE="Able to connect to database instance"
                 CLEAR_MESSAGE_NLSID="Response_Status_clearalertmessage"
                 MESSAGE="Failed to connect to database instance."
                 MESSAGE_NLSID="Response_Status_alertmessage" />

      <Condition COLUMN_NAME="userLogon"
                 WARNING="1000" OPERATOR="GT"
                 OCCURRENCES="6"
                 MESSAGE="User logon time is %value% msecs."
                 MESSAGE_NLSID="Response_userLogon_alertmessage"  />

      <Condition COLUMN_NAME="State"
                 WARNING="MOUNTED" OPERATOR="CONTAINS"
                 MESSAGE="The database status is %value%."
                 MESSAGE_NLSID="Response_state_alertmessage"  />
  </MetricColl>

</CollectionItem>
```

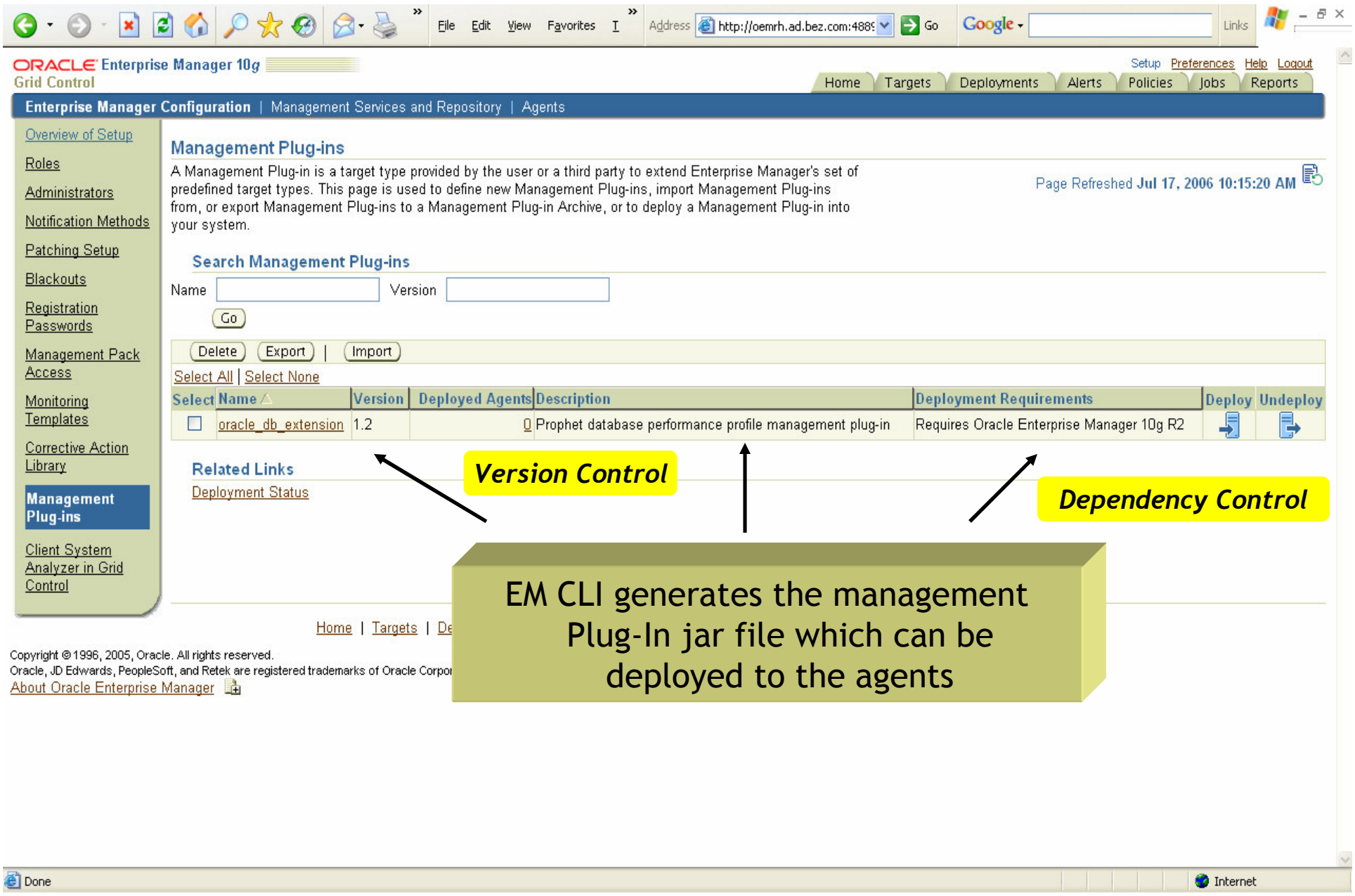
Validation Utility

1. Validates XML structures

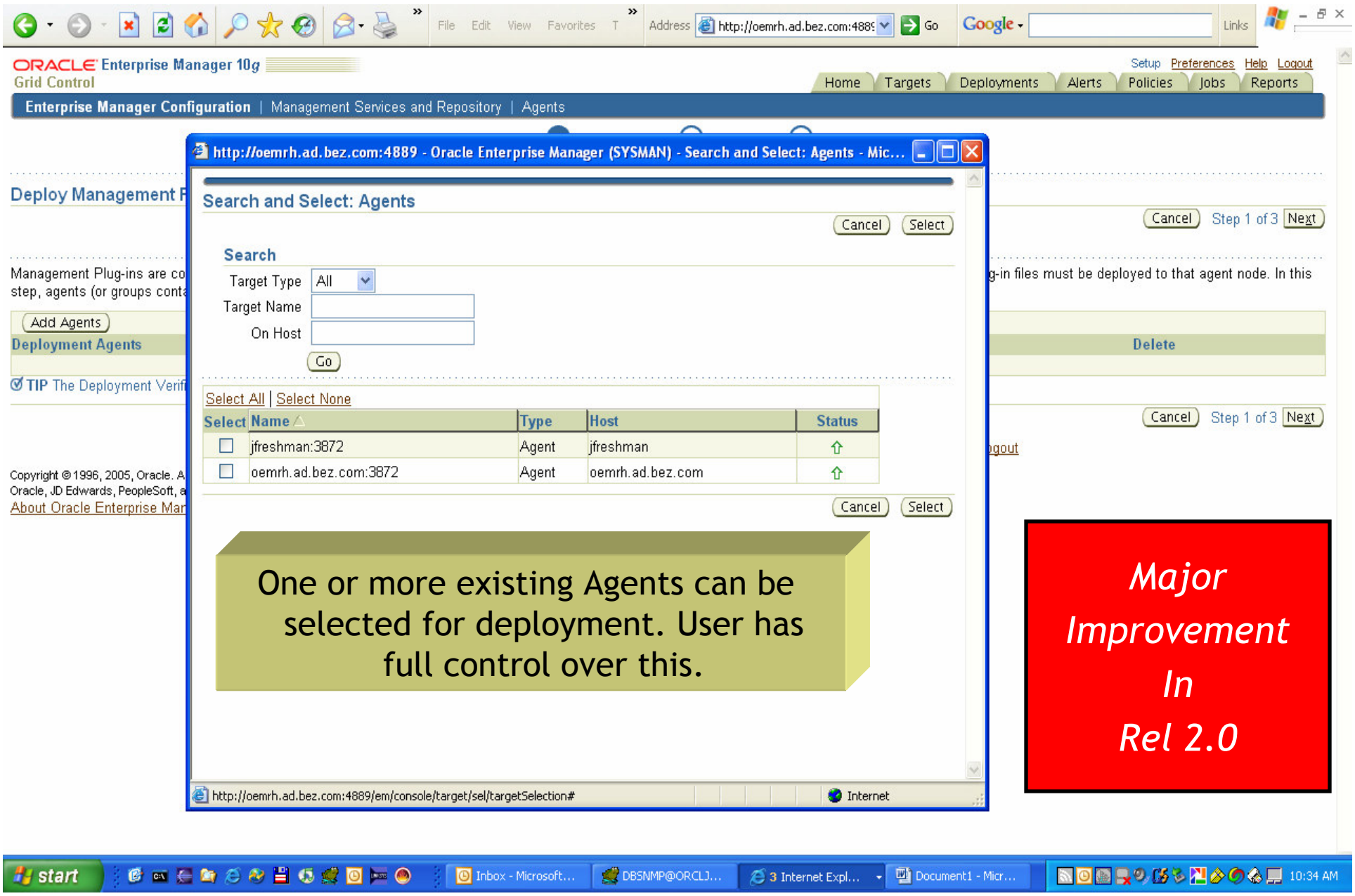
2. Verifies collection schedules are appropriate
   - Warning generated if collection is < 5 minutes

3. Performs dynamic XML validation by executing all defined metrics

Compiled Object



Deploying the Plug-In to the Agents



In Summary: Key Advantages

- User-Driven Customizations
- Collect Data From Virtually Any Source
- Seamless Integration With EM Functionality
- No Connection Credentials Required – Agent Controls This Activity
- Version Control
- Easy to Develop and Deploy

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In Summary: Key Considerations

- Impact of New Collection Plug-In on the Existing Agent
- Volume of Data To Be Returned and Persisted in the EMGC Repository
- Scheduling Frequency of the Data Collection
- Into Which Agents Should the Plug-In Be Deployed?
- Avoid Duplication of Effort – Check To See If An Existing Target Type or 3rd Party Plug-In Already Exists

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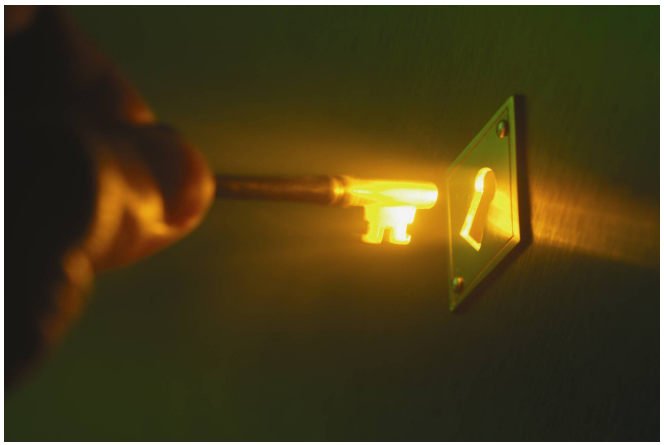
Thank You!

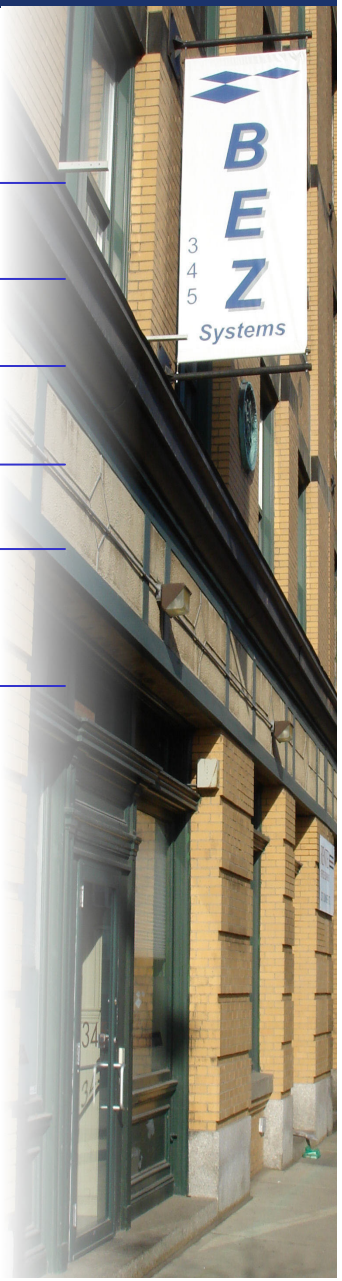


BEZ Systems & Oracle

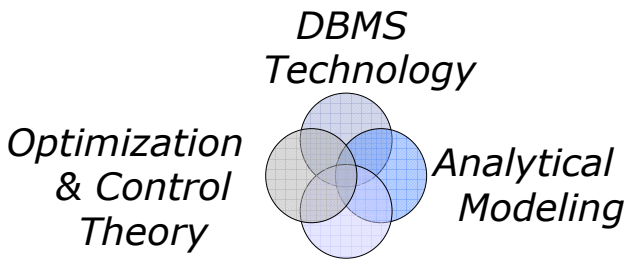
.... solutions that fit

BEZ Systems - Background

Founded	**Services 1983, Software 1993**
Offices	**Boston, Chicago, Minneapolis**
Web Site	**www.bez.com**
CEO	**F. Daniel Haley**
Chairman & CTO	**Dr. Boris Zibitsker**
Our Business	**Predictive Performance Management**



Unique Technology



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Some Customers …

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VISA

it's all inside: JCPenney

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Office DEPOT
What you need. What you need to know.