

This is KAOS We Do Not SNMP Here

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**Chief: Mahanee
gonga ghee.
Max: Gonga ghee?
Don't you mean
gonga gai?
Chief: No...gonga
ghee.
Max: Really? I
thought it was gai
after gonga except
before goo.**



Douglas Scherer - Core Paradigm

- **Introduction to SNMP**
- **Introduction to the Oracle Intelligent Agent (OIA)**
- **Tips on manually configuring the OIA**
- **Problems with the OIA Documentation**
- **Environment**
 - ◆ **RDBMS: Oracle v 7.3.2 / 7.3.3**
 - ◆ **OS: AIX**
 - ◆ **Management Application: NetView/6000**

The Role Of The OIA

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- **Monitor database**
- **Send SNMP traps**
- **Maintain a job queue**
 - ◆ **When used with Oracle Enterprise Manager**

Missed it by that much...

Instructions We're Provided

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- **In Unix (AIX) installation guide for the 7.3.2.1 Oracle Server**
 - ◆ **“Task 8: Complete Installation for the Oracle Intelligent Agent”**
 - (pg. 5-23 - Completing Oracle Installation chapter)
- **Many issues are not covered and task list is incomplete**
- **Not all parameters for snmp.ora are provided in the sample of “A Fully Configured snmp.ora File”**
 - ◆ (pg. 5-31)
- **Differences of Opinion**
 - ◆ **Oracle Developers in IOUW'96 campground recommend not configuring the OIA manually**
 - **Needs Oracle Network Manager and Oracle Enterprise Manager**
 - ◆ **Oracle Support and Documentation say that it is possible**

- **Simple Network Management Protocol**
 - ◆ Originally created to monitor hosts and nodes
- **Various vendors provide tools (Management Applications) to receive information via SNMP**
- **Management Applications can send messages to an individual or perform an automatic recovery action**
- **A subagent sends a message to the Management Application via SNMP**
 - ◆ Polling
 - ◆ Traps

The Internet-Standard Management Framework:

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- **SNMP (protocol)**
- **Structure of Management Information (SMI)**
- **Management Information Base (MIB)**

Structure Of Management Information (SMI)

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- **Specification that supports the definition of object types**
- **An object type supports the definition of a managed object**
- **A managed object is something about which information is desired**
 - ◆ **Ex. Managed object may show the size of the SGA**

Management Information Base (MIB)

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- **A MIB is a file that contains the definition of a group of managed objects**
- **Points of confusion**
 - ◆ **The MIB is loaded into the Management Application (not the subagent)**
 - ◆ **Users must write their own MIBs**
 - **Many RDBMS vendors provide the MIB for you**
 - **There are also standard MIBs provided by the Internet Engineering Task Force (IETF)**
 - ◇ **Ex: rdbmsMIB**

Sample Of a MIB

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oraDbSGATable OBJECT-TYPE

SYNTAX SEQUENCE OF OraDbSGAEntry

ACCESS not-accessible

STATUS mandatory

DESCRIPTION

"Summary information on the System Global Area"

::= { oraDbObjects 6 }

oraDbSGAEntry OBJECT-TYPE

SYNTAX OraDbSGAEntry

ACCESS not-accessible

STATUS mandatory

DESCRIPTION

"A single entry from the v\$sga table"

INDEX { rdbmsDbIndex }

::= { oraDbSGATable 1 }

Object Identifier (OID)

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- Each description is identified to the Management Application by an OID
- OIDs are organized Hierarchically
- Ex:

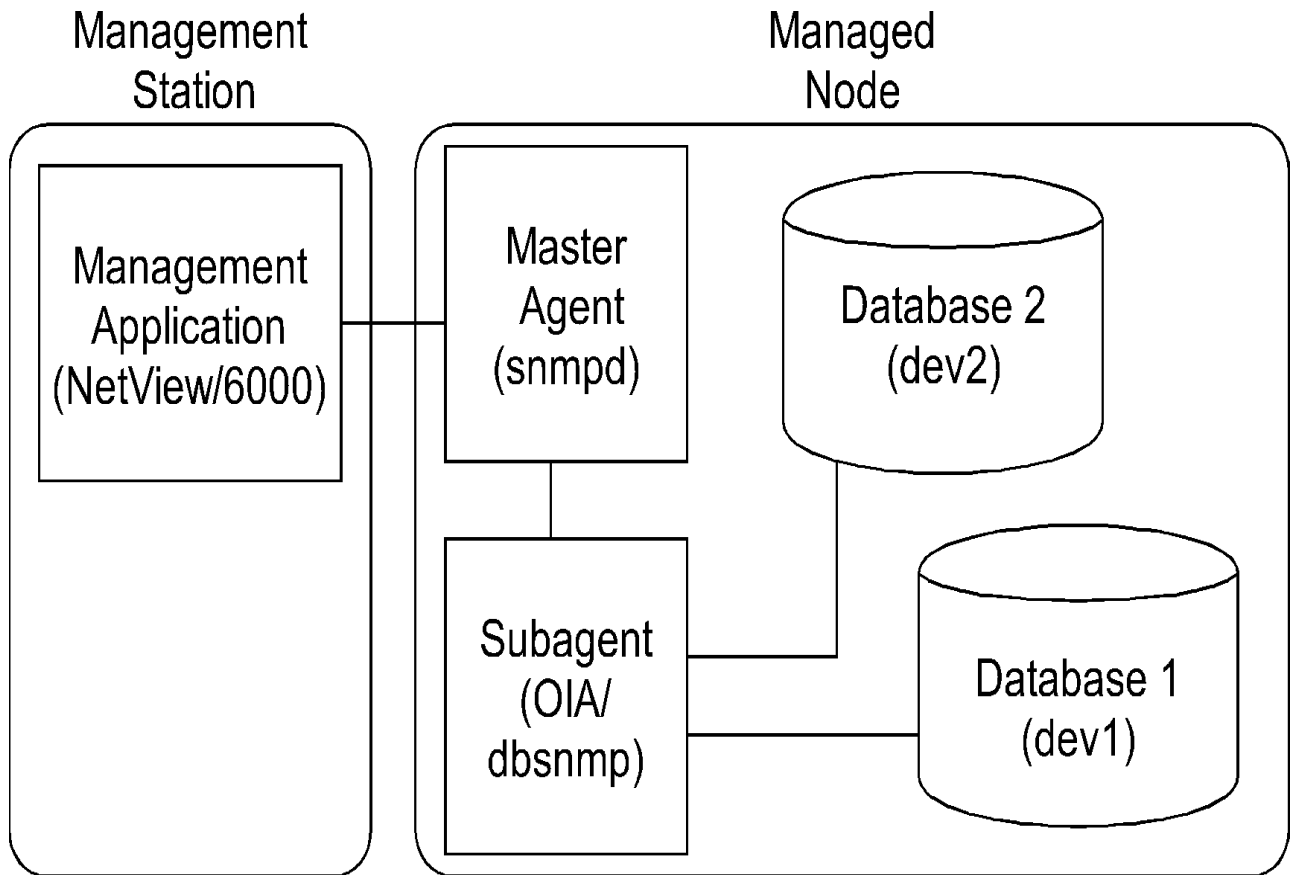
"oraDbMIB",	"1.3.6.1.4.1.111.4",	
"oraDbObjects",	"1.3.6.1.4.1.111.4.1",	
"oraDbSGATable",	"1.3.6.1.4.1.111.4.1.6",	} Object Types }
"oraDbSGAEntry",	"1.3.6.1.4.1.111.4.1.6.1",	
"oraDbSGAFixedSize",	"1.3.6.1.4.1.111.4.1.6.1.1",	
"oraDbSGAVariableSize",	"1.3.6.1.4.1.111.4.1.6.1.2",	
"oraDbSGADatabaseBuffers",	"1.3.6.1.4.1.111.4.1.6.1.3",	
"oraDbSGARedoBuffers",	"1.3.6.1.4.1.111.4.1.6.1.4",	

- N.B. the number 111 in the seventh position indicates an Oracle OID
- The names on the left are descriptors

Chief, do you have another one of those headaches?

SNMP and OIA

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OIA Through The Eyes Of NetView/6000

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- The results of a NetView/6000 query against the OIA

The screenshot shows the 'Browse MIB' window in NetView/6000. The window title is 'Browse MIB'. It has a header bar with 'Name or IP Address' and 'Community Name' fields. Below that is the 'MIB Object ID' field, which contains the path: '.iso.org.dod.internet.private.enterprises.oracle.oraDbMIB.oraDbObjects'. A list of MIB objects is displayed, with 'oraDbSGATable' selected. To the right of the list are buttons: 'Up Tree', 'Down Tree', 'Describe', 'Start Query', 'Stop Query', and 'Graph'. Below the list is the 'MIB Instance' and 'SNMP Set Value' section, with 'Entry.oraDbSGAVariableSize.3' selected and a 'Set' button. The 'MIB Values' section shows the following data:

oraDbSGAEntry.oraDbSGAFixedSize.1	: 37
oraDbSGAEntry.oraDbSGAFixedSize.3	: 37
oraDbSGAEntry.oraDbSGAVariableSize.1	: 10689
oraDbSGAEntry.oraDbSGAVariableSize.3	: 4257
oraDbSGAEntry.oraDbSGADatabaseBuffers.1	: 2252800
oraDbSGAEntry.oraDbSGADatabaseBuffers.3	: 245760
oraDbSGAEntry.oraDbSGARedoBuffers.1	: 32768
oraDbSGAEntry.oraDbSGARedoBuffers.3	: 16384

The 'Messages' section is empty. At the bottom of the window are buttons: 'Close', 'Reselect', 'Save As...', and 'Help'.

OIA Through The Eyes Of NetView/6000

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- **The results of a trap received by NetView/6000 from the OIA**



SNMP Through The Eyes Of Oracle



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- **Systems Management Tools Initiative (SMTI)**
 - ◆ Vendors supply tools
 - ◆ With NetView/6000 IBM is a SMTI participant
- **Oracle provides information to SNMP compliant Management Applications from the OIA**
- **N.B. When OEM communicates with OIA it uses SQL*Net, not SNMP**

Overview of the OIA: Looking At The OS Environment

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- The OIA = dbsnmp
- dbsnmp is a subagent
- Two process are started
 - ◆ See slide later on how to run dbsnmp

```
SQL> host ps -ef
```

UID	PID	PPID	C	STIME	TTY	TIME	CMD
oracle	14506	1	0	Jan 31	pts/1	0:06	dbsnmp
oracle	24040	14506	0	21:34:37	pts/1	0:01	dbsnmp

```
SQL> select username, osuser, program, process
2*   from v$session
3*   where username = 'DBSNMP';
```

USERNAME	OSUSER	PROGRAM	PROCESS
DBSNMP	oracle	? @machine01 (TNS V1-V2)	14506
DBSNMP	oracle	? @machine01 (TNS V1-V2)	24040

Overview of the OIA: The Two Processes

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- **The Work process**
 - ◆ Runs under root process
 - ◆ Communicates with the Comm process (below) via IPC
 - ◆ Restarts Comm process if it should die
 - ◆ Contains a TCL event engine that manages TCL jobs
- **The Comm process**
 - ◆ Is forked off from the Work process
 - ◆ receives RPCs from the Management Application
- **There is little information about these two**

Max, that was wonderful. How did you do that?; I sneezed.

Installing And Configuring The OIA

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- **OEM and Oracle Network Manager (ONM) needed for configuration**
 - ◆ Yes and No
- **In theory, there's no need to use OEM with the OIA**
 - ◆ OIA is an SNMP subagent which can be used with any SMTI compliant Management Application
- **The documentation contained in the Server Installation Guide is incomplete**
- **Review sources listed in the final slide**
- **Three main areas**
 - ◆ Installing the OIA
 - ◆ Configuring the Master Agent
 - ◆ Configuring the OIA

What to Choose From The Oracle Installer

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- **Do as UNIX user: oracle**
- **First step is to Install the OIA from the distribution medium**
 - ◆ **Choose Oracle Intelligent Agent 7**
- **N.B. For AIX version of the database up to v. 7.3.2 there is a patch which must be requested separately**
- **In 7.3.3**
 - ◆ **The DBSNMP user gets created automatically**
 - ◆ **Choosing Oracle Intelligent Agent from Installer**
 - **Installs the MIBs**
 - **Installs the dbsnmp program in \$ORACLE_HOME/bin**

Configuring The Master Agent: Configuring The OS Environment

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- **Do as UNIX user root**
- **Put two lines in /etc/snmpd.conf**
 - ◆ `smux 0.0 "" IP_address`
 - Use the IP Address - not the host name
 - This line must be present for the OIA to run, even if not using SNMP
 - ◆ `trap public hostname_or_IP_address`
 - The trap line need only be present if you intend for the OIA to send traps
- **Recycle the Master Agent**
 - ◆ This allows the Master Agent (snmpd) to pick up the new entries
 - ◆ `# stop -s snmpd`
 - ◆ `# start -s snmpd`

Configuring The Master Agent: MIBbing The Master Management Site

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- **Oracle provided MIBS are in
\$ORACLE_HOME/network/admin**
 - ◆ Server Installation Guide incorrectly lists this as
\$ORACLE_HOME/network/doc
 - ◆ ~~In 7.3.3 moved to \$ORACLE_HOME/rdbms/admin~~
- **Copy the *.v1 files to /usr/OV/snmp-
mibs at the Management Application
site.**
 - ◆ Installation Guide says to copy all the files in
\$ORACLE_HOME/network/admin, but this will add
many unnecessary files
- **Load the MIBS into NetView/6000**
 - ◆ The MIBs cannot be loaded without alteration
 - Remove the comments from the top of the
MIBS!
- **All is now set for the Master Agent and
Application Site**
 - ◆ A query at this point will not yield correct results
since the OIA is not configured

Configuring The Master Agent: MIBbing The Master Management Site

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● Which MIBs should be loaded?

◆ Choose from the list below

File	MIB	Description
database.v1	rdbmsMIB	standard/public RDBMS
listener.v1	oraListenerMIB	Oracle Listener
netserv.v1	application	Network Services
nrs.v1	oraInterchangeMIB	Oracle Multi-Protocol Interchange
oemtraps.v1	oraAgent	Oracle Enterprise Manager
onrs.v1	oraNamesMIB	Oracle Names Server
oradb.v1	oraDbMIB	Oracle Database
replication.v1	oraRepObjects	Symmetric Replication

Configuring The OIA: Create the snmp.ora File

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- **This is the trickiest part**
- **Oracle Support recommendations differ from the Server documentation**
 - ◆ Oracle Support recommends using ONM to configure snmp.ora
 - ◆ ONM is only available in the Windows environments
- **snmp.ora resides on the Managed Node in \$ORACLE_HOME/network/admin or \$TNS_ADMIN**
- **Configure these BEFORE configuring snmp.ora**
 - ◆ listener.ora
 - ◆ tnsnames.ora
 - ◆ Oracle Names Server

Configuring The OIA: Create the snmp.ora file

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● snmp.ora parameters

- ◆ difficult to determine from documentation which are required
- ◆ Problems with sample "fully configured" snmp.ora
 - includes optional parameters
 - excludes some required parameters

● Required parameters shown in sample file

◆ snmp.visible_services

- List of named services you wish to monitor
- Must be service names as found in listener.ora, tnsnames.ora, Oracles Names
- Ex:

```
snmp.visible_services=(dev1 , LISTENER , dev2)
```

- The listener must be included in the list otherwise the listener will not start properly
 - ✧ Bug # 333704
- I.E. must tell the OIA to monitor the Listener whether or not you want to monitor it

Configuring The OIA: Create the snmp.ora file

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◆ snmp.index

- Must be unique within snmp.ora file
- Identifies an instance of a variable
- Must have one entry per service listed in snmp.visible services
- Ex:

```
snmp.index.dev1=1
```

```
snmp.index.LISTENER=2
```

```
snmp.index.dev2=3
```

◆ snmp.sid

- Identifies the Oracle instance associated with a service name listed in snmp.visible services
- Ex:

```
snmp.sid.dev1=dev1
```

```
snmp.sid.dev2=dev2
```

Configuring The OIA: Create the snmp.ora file

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● Required parameters not shown in the Server Installation Guide

◆ snmp.oraclehome

- one ORACLE_HOME entry for each database service listed in snmp.visible services

- Ex:

```
snmp.oraclehome.dev1=/app/home/oracle/product/7.3.2
```

```
snmp.oraclehome.dev2=/app/home/oracle/product/7.3.2
```

◆ db snmp.address

- Identifies the address on which the Comm process listens for incoming requests

- Ex: (N.B. shown on multiple lines for presentation only)

```
db snmp.address=(DESCRIPTION=(ADDRESS=(PROTOCOL=tcp)  
(HOST=machine01)(PORT=1528)))
```

Configuring The OIA: Create the snmp.ora file

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◆ db snmp.spawnaddress

- Identifies the TNS address that the agent can use to accept RPCs
- OEM documentation shows this as optional

✧ Oracle Support differs

- Ex: (N.B. shown on multiple lines for presentation only)

```
db snmp.spawnaddress= (DESCRIPTION= (ADDRESS=
  (PROTOCOL=tcp) (HOST=machine01) (PORT=1538
  )))
```

- Check to make sure that the port numbers you choose are not in use

✧ # netstat -an | grep 1538

◆ nmi.register_with_names

- Tells the OIA whether or not to communicate with an Oracle Names Server
- If you are not using Oracle Names a non-fatal error occurs each time the OIA is started
- To avoid error use:

```
nmi.register_with_names=false
```

Configuring The OIA: Create the snmp.ora file

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● Optional parameters shown in the sample file

◆ snmp.connect

- Identifies the account name in the database to which the OIA should connect
- By default the connect string is dbsnmp/dbsnmp
- Only need to change it for security reasons
- Ex:

```
snmp.connect.dev1.name=agent99
```

```
snmp.connect.dev1.password=control
```

```
snmp.connect.dev2.name=maxwell
```

```
snmp.connect.dev2.password=smart
```

◆ snmp.contact

- Identifies who should be contacted in case of a problem
- Ex:

```
snmp.contact.dev1="Siegfried 800-555-1212"
```

```
snmpcontact.LISTENER="The Chief 800-555-1212"
```

```
snmp.contact.dev2="Agent 99 800-555-1212"
```

Configuring The OIA: Create the snmp.ora file

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◆ snmp.dbpolltime

- Identifies the amount of time (in seconds) between "database up" checks
- N.B. the time between polling of SNMP variable information is fixed
- Refers to ALL databases in snmp.visible services
- Default = every 30 seconds
- Ex: (2 minutes)

```
snmp.dbpolltime=120
```

● Optional parameters not shown in the sample snmp.ora file

◆ dbsnmp.log_file

- Identifies a log file for the dbsnmp process
- Log file is supposed to be created by default

✧ Per Understanding SQL*Net Release 2.3

- Neither of the above two work

◆ nmi.log_file

- Does produce a log file of minimal interest

```
nmi.log_file=nmi log.log
```

Configuring The OIA: Create the snmp.ora file

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```
snmp.visibleServices=(dev1,dev2,LISTENER)
snmp.index.dev1=1
snmp.index.dev2=2
snmp.index.LISTENER=3
snmp.sid.dev1=dev1
snmp.sid.dev2=dev2
snmp.contact.dev1=" Siegfried 800-555-1212"
snmp.contact.dev2="Agent 99 800-555-1212"
snmp.contact.LISTENER="The Chief 800-555-1212"
snmp.connect.dev1.name=agent99
snmp.connect.dev1.password=control
snmp.connect.dev2.name=maxwell
snmp.connect.dev2.password=smart
snmp.dbpolltime=120
snmp.oraclehome.dev1=/app/home/oracle/product/7.3.2
snmp.oraclehome.dev2=/app/home/oracle/product/7.3.2
dbsnmp.address=(DESCRIPTION=(ADDRESS=(PROTOCOL=tcp)
(HOST=machine01)(PORT=1528)))
dbsnmp.spawnaddress=(DESCRIPTION=(ADDRESS=
(PROTOCOL=tcp)(HOST=machine01)(PORT=1538)))
nmi.register_with_names=false
nmi.log_file=nmilog.log
```

Configuring The OIA: Run The .sql Scripts

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- In **\$ORACLE_HOME/network/admin**
 - ◆ Run **catsnmp.sql** against each potentially monitored database
 - You may wish to change the name of the user accounts before running the script
 - ✧ See **snmp.connect** on previous slide
 - **N.B. Server Installation Guide error**
 - ✧ **catsnmp.sql** is called **dbsnmp.sql** in documentation
 - ◆ In **7.3.3**
 - Scripts in **\$ORACLE_HOME/rdbms/admin**
 - Script gets run at DB installation via **catalog.sql**
 - ◆ To uninstall OIA db objects run **catsnmp.sql**
 - **catsnmp.sql**
 - ✧ Installs additional OIA db objects to support OIA monitoring of Oracle Replication
 - ✧ Entire script is commented out with a note that replication MIB is not yet production ready.
 - ✧ Oracle Support differs
 - ✧ You make the call
 - ~~In 7.3.3 use catsnmp.sql~~

- **Starting the OIA**
 - ◆ **Isnrctl dbsnmp_start**
- **Stopping the OIA**
 - ◆ **Isnrctl dbsnmp_stop**
- **Getting status information**
 - ◆ **Isnrctl dbsnmp_stat**
 - **Tells whether or not the OIA is running**
 - ◆ **Isnrctl stat**
 - **SNMP {ON|OFF}**
 - **Refers to the Master Agent, not the OIA**

I demand the Cone of Silence!

What To Do After Installation

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- **Query and describe MIBs or variables from the Management Application**

Describe MIB Variable	
NAME	s.oraDbSGATable.oraDbSGAEntry.oraDbSGAVariableSize
OBJECT ID	.1.3.6.1.4.1.111.4.1.6.1.2
TYPE	Integer
ACCESS	Read-Only
<input type="button" value="Close"/>	

- **Use a proactive monitoring solution**
- **Make sure a system is place not only to receive problem notification, but also to pass it on**
- **Set up responsibility list**
- **Look at the enterprise wide solution**
- **Review all additional readings**
- **Keep an eye out for SMTI releases**

Once again the forces of niceness and goodness have triumphed
over the forces of evil and rottenness.

Contact, Additional Readings, Acknowledgements

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- **Contact**

- ◆ **Douglas Scherer**

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- **www.coreparadigm.com**

- **Additional Readings (details in the proceedings)**

- ◆ **How To Manage Your SNMP Network Using SNMP**

- ◆ **Oracle Enterprise Manager Installation Guide**

- ◆ **Oracle 7 Installation Guide For AIX, Release 7.3**

- ◆ **Oracle Names Administrator's Guide**

- ◆ **Oracle Network Manager Administrator's Guide**

- ◆ **Oracle Network Products Manual**

- ◆ **Oracle SNMP Support Reference Guide**

- ◆ **Understanding SNMP MIBs**

- ◆ **Understanding SQL*Net 2.3**

- **Acknowledgments (Thanks)**

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