

# Design Document

## Open HA Cluster agent for Informix Dynamic Server

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### Revision History

<i>Version</i>	<i>Comments</i>	<i>Date</i>	<i>Author</i>
1.0	Initial draft	31/07/07	Neil Garthwaite
1.1	Review comments added	19/10/07	Neil Garthwaite

## 1 Introduction

Informix Dynamic Server (IDS) is a database IBM acquired from Informix in 2001 and is part of IBM's Information Management suite of products.

The Open HA Cluster (OHAC) agent for Informix Dynamic Server (IDS) will be designed as a failover agent so that IDS can failover between OHAC nodes. Failover will either be between global zones or non-global zones or within a failover zone across OHAC nodes. A failover zone is simply a non-global zone that can be relocated between OHAC nodes where the relocation is managed by the Sun Cluster Data Service for Solaris Containers.

The OHAC agent for IDS is based on the Generic Data Service (GDS) which is an existing Solaris Cluster Resource Type. In addition to using GDS, the OHAC agent for IDS will also utilize the Service Management Facility (SMF) when deployed within a failover zone.

- The following description is an extract from the SUNW.gds(5) man page,

### NAME

SUNW.gds - resource type for making simple network-aware and non network-aware applications highly available or scalable

### DESCRIPTION

The Generic Data Service (GDS) is a mechanism that enables you to make simple network-aware and non network-aware applications highly available or scalable by logging them into the Sun Cluster Resource Group Manager (RGM) framework.

The GDS contains a fully functional Sun Cluster resource type, complete with callback methods (rt\_callbacks(1HA)) and a Resource Type Registration (RTR) file rt\_reg(4).

- The following description is an extract from the smf(5) man page,

### NAME

smf - service management facility

### DESCRIPTION

The Solaris service management facility defines a programming model for providing persistently running applications called services. The facility also provides the infrastructure in which to run services. A service can represent a running application, the software state of a device, or a set of other services. Services are represented in the framework by service instance objects, which are children of service objects. Instance objects can inherit or override the configuration of the parent service object, which allows multiple service instances to share configuration information. All service and instance objects are contained in a scope that represents a collection of configuration information. The configuration of the local Solaris instance is called the "localhost" scope, and is the only currently supported scope.

A separate presentation entitled Caller Sequence provides an overview of how the OHAC agent for IDS is called by GDS and SMF. In particular the presentation will explain how the "caller" of the OHAC agent for IDS interacts with the Resource Group Manager (RGM) and with the Sun Cluster

Data Service for Solaris Containers when failover zones are used.

This design document should therefore be read along side the Caller Sequence presentation as the remainder of this document assumes the components that interact with each other are known.

Finally, the design of the OHAC agent for IDS will allow for deployment on OHAC on SPARC based platforms or on 32-bit or 64-bit x86 based platforms.

## **2 Control script**

As shown within the Caller Sequence presentation, the OHAC agent for IDS can be called by GDS or SMF. In order to determine the caller and subsequently provide the appropriate code path a control script will be provided.

This script will be responsible for the following,

- Determining the caller, i.e. GDS or SMF.
- Retrieve any required resource properties.
- Determine the method to execute, i.e. Validate, Start, Stop or Probe.
- Execute the appropriate function for the method.
- Allow for variable substitution so that different IDS instances can be validated, started, stopped or probed, regardless if the caller is GDS or SMF.
- Allow for execution in the global zone, non-global zone or failover zone.

It is proposed that this control script will be located and named as `/opt/SUNWscids/bin/control-ids`.

## **3 Validate function**

The validate function is called from the control script and determines if the runtime environment is acceptable in which to start IDS. The runtime environment is determined by values that are supplied by the administrator when the resource is registered. Please see “7. Configuration File” for more information.

The validate function is called whenever an OHAC agent for IDS is registered or whenever the agent is about to start IDS. Failure from the validate function will result in either the OHAC IDS resource not being registered or a start failure to occur.

It is proposed that the validate function will be located within a functions file and named as `/opt/SUNWscids/bin/functions`.

## **4 Start function**

The start function is called from the control script and is responsible for starting IDS. This function is called whenever the OHAC IDS resource is started or restarted.

The start function will perform the following,

- Ensure a clean environment from which to start IDS. A clean environment is simply an environment that will always allow IDS to start, for example this may require temporary files to be deleted or IPC shared memory to be removed.

NOTE: A clean environment will be determined within the Stop function, however some elements of clean up may still reside within the start function.

- Start IDS using standard IDS commands.

If a non-clean environment is discovered, clean up steps will only be performed if,

- They are recognized DBA steps for clean up as identified by IDS.
- Any non-recognized DBA steps for clean up as identified by IDS will only be performed if the administrator requests such action when registering the OHAC agent for IDS.
- Call the validate function.

It is proposed that the start function will be located within a functions file and named as /opt/SUNWscids/bin/functions.

## 5 *Stop function*

The stop function is called from the control script and is responsible for stopping IDS. This function is called whenever the OHAC IDS resource is stopped or restarted.

The stop function will perform the following,

- Adopt a phased shutdown of IDS.
- Stop IDS using standard IDS commands.
- Ensure a clean environment from which to start IDS. A clean environment is simply an environment that will always allow IDS to start, for example this may require temporary files to be deleted or IPC shared memory to be removed.

If a non-clean environment is discovered, clean up steps will only be performed if,

- They are recognized DBA steps for clean up as identified by IDS.
- Any non-recognized DBA steps for clean up as identified by IDS will only be performed if the administrator requests such action when registering the OHAC agent for IDS.

It is proposed that the stop function will be located within a functions file and named as /opt/SUNWscids/bin/functions.

## 6 *Probe function*

The probe function is called from the control script and is responsible for probing IDS. This function is called periodically to check the state of IDS.

While this function is called periodically, it is important to note that this function is also called by the GDS START method during “wait\_for\_online” processing. This ensures that the OHAC IDS resource is ready for work, as determined by the probe function, and therefore “online” versus just being started.

The probe function will perform the following,

- A short probe until the start function has completed after which a more detailed probe will be performed. This ensures “wait\_for\_online” processing only runs a detailed probe once IDS can completed it's startup.
- Check the IDS status using standard IDS commands, in particular:
  - The probe will obtain the IDS state using the onstat command, in particular the onstat header. From the onstat header, the onstat mode and any blocked states are derived. This is all performed within the get\_state() function within /opt/SUNWscids/bin/functions. Please refer to the caller sequence document for how the various components/scripts are called.
  - Once get\_state() has obtained the relevant onstat states, the probe determines those states that indicate if IDS is running correctly or those states that indicate a failure. Additionally, some onstat states are tolerated, i.e. The probe will tolerate certain states if the DBA is performing critical tasks. The check\_ids() function within

/opt/SUNWscids/bin/functions performs this check. Please refer to the caller sequence document for how the various components/scripts are called.

It is proposed that the probe function will be located within a functions file and named as /opt/SUNWscids/bin/functions.

## **7 Configuration file**

The configuration file provides variable values to define the environment for the OHAC IDS. This file will be used by the registration script to register the OHAC IDS.

It is proposed that the configuration file will be located and named as /opt/SUNWscids/util/ids-config. Of particular interest the administrator will be able to specify the runtime environment for the IDS via the following variables:

USERID=

ONCONFIG=

INFORMIXDIR=

INFORMIXSERVER=

INFORMIXSQLHOSTS=

## **8 Registration script**

The registration script uses as input the configuration file to register the OHACIDS resource.

It is proposed that the registration script will be located and named as /opt/SUNWscids/util/ids-register.

## **9 Debug file**

If debug of the OHAC agent for IDS is required a debug file will be provided to simply turn on debug for a OHAC IDS resource.

It is proposed that the debug file will be located and named as /opt/SUNWscids/etc/debug.

## **10 OHAC registration file**

The OHAC registration file is required by OHAC so that the OHACagent for IDS can be registered and upgraded by OHAC.

It is proposed that the OHAC registration file will be located and named as /opt/SUNWscids/etc/SUNW.ids.

## **11 Packaging**

The following package name and files are proposed,

- Package name SUNWscids
- /opt/SUNWscids/bin/control-ids
- /opt/SUNWscids/bin/functions
- /opt/SUNWscids/etc/config
- /opt/SUNWscids/etc/SUNW.ids
- /opt/SUNWscids/util/ids-config

- `/opt/SUNWscids/util/ids-register`
- `/opt/SUNWscids/util/ids_smf_register`
- `/opt/SUNWscids/util/ids_smf_remove`

## ***12 Further Information***

The design of the OHAC agent for IDS uses various components as detailed within the Caller Sequence presentation. Further information for these components can be obtained from the links below.

- General information on RGM  
<http://docs.sun.com/app/docs/doc/819-2969/6n57kl13s?a=view>
- General Information on GDS  
<http://docs.sun.com/app/docs/doc/819-2972/6n57ngit6?a=view>
- HA-Container agent  
<http://docs.sun.com/app/docs/doc/819-3069>
- START, STOP, PROBE and VALIDATE methods of GDS  
SUNW.gds(5) man page (`/usr/cluster/man`)
- General information on PMF  
pmfadm(1m) man page (`/usr/cluster/man`)
- General information on SMF  
<http://www.sun.com/bigadmin/content/selfheal/>