

Appendix 5 to Tender Specifications

Installation User Manual



S-AIS DPC Block2

ESA contract n°: 4000103276/11/NL/US

SAT-AIS DPC Block2 Software Installation Manual

Reference: CLS-DT-NT-13-236

Nomenclature: SAI-CLS-MA-3049

Issue: 1. 8

Date: Jun. 17, 15



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List of items to be confirmed or to be defined

Lists of TBC:

Lists of TBD:

Applicable documents

- AD 1** Plan d'assurance produit de CLS
CLS-ED-NT-03-394
- AD 2** Space Engineering - Software
ECSS-E-ST-40C
- AD 3** SAT-AIS DPC Block2 - Software System Specification
SAI-CLS-RS-3008
- AD 4** SAT-AIS DPC Block2 - Software Requirements Specification [D2 / DSA]
SAI-CLS-RS-3014
- AD 5** S-AIS DPC Block 2 - Interface Control Document [D3 / DSA]
SAI-CLS-ICD-3015
- AD 6** ICT Architecture - System and Application Technical Landscape
xxxx

Reference documents

- RD 1** Manuel du processus Documentation
CLS-DOC



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1. Introduction

This document presents the installation, the system configuration and use instructions for the DPC system.

It describes the environment of the DPC system, how to install it and how to configure it.

2. Applicable and reference documents

See “Applicable Documents” and “Reference Documents” sections at the beginning of the document.

3. Terms, definitions and abbreviated terms

See Appendix A -

4. DPC environment

4.1. General

To successfully install and run S-AIS DPC CLS components, hardware and system must meet some requirements.

4.2. Infrastructure

The DPC system is installed on the EMSA infrastructure described in §AD 6.

4.3. System environment

The following diagram depicts the system configuration (i.e. operating system, virtual machines, software at system level) which hosts the S-AIS DPC in its whole.

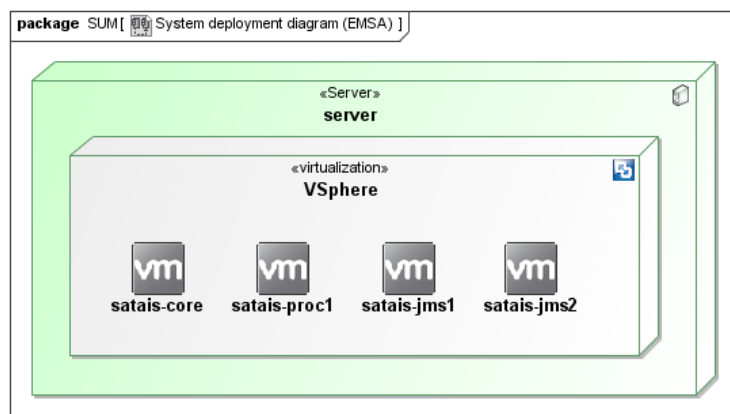


Figure 1 - S-AIS DPC System configuration



The following subsections describe the system elements of “server a”.

4.3.1. VSphere

VSphere is a hypervisor for guest virtual servers that run directly on host server hardware without requiring an additional underlying operating system. It is part of the EMSA infrastructure.

The characteristics are:

- VMWare VSphere 5

4.3.2. satais-core

The VM is dedicated to the “core” applications of the S-AIS DPC hosting the components at the boundary (data retrieval and data distribution), storage management (dma) as well as the SOA components (ESB & BPL).

The characteristics of the VM are:

- 4 vCPU
- 16 GB RAM
- 25 GB Disk (system / application & storage)

4.3.3. satais-proc

The VM is dedicated to the components in charge of the DPC processing. Several instances of the virtual machine can be started to distribute the load among them.

The characteristics of the VM are:

- 4 vCPU
- 8 GB RAM
- 25 GB Disk (system / application)

4.3.4. satais-jms1 and satais-jms2

These VMs are dedicated to the accommodation of the JMS server. Several instances of the virtual machine can be started to distribute the load among them (JMS clustering).

The characteristics of each of these VM are:

- 1 vCPU
- 4 GB RAM
- 25 GB Disk (system/application)

4.4. Software deployment

The following diagram depicts the software deployment into the VM instances.

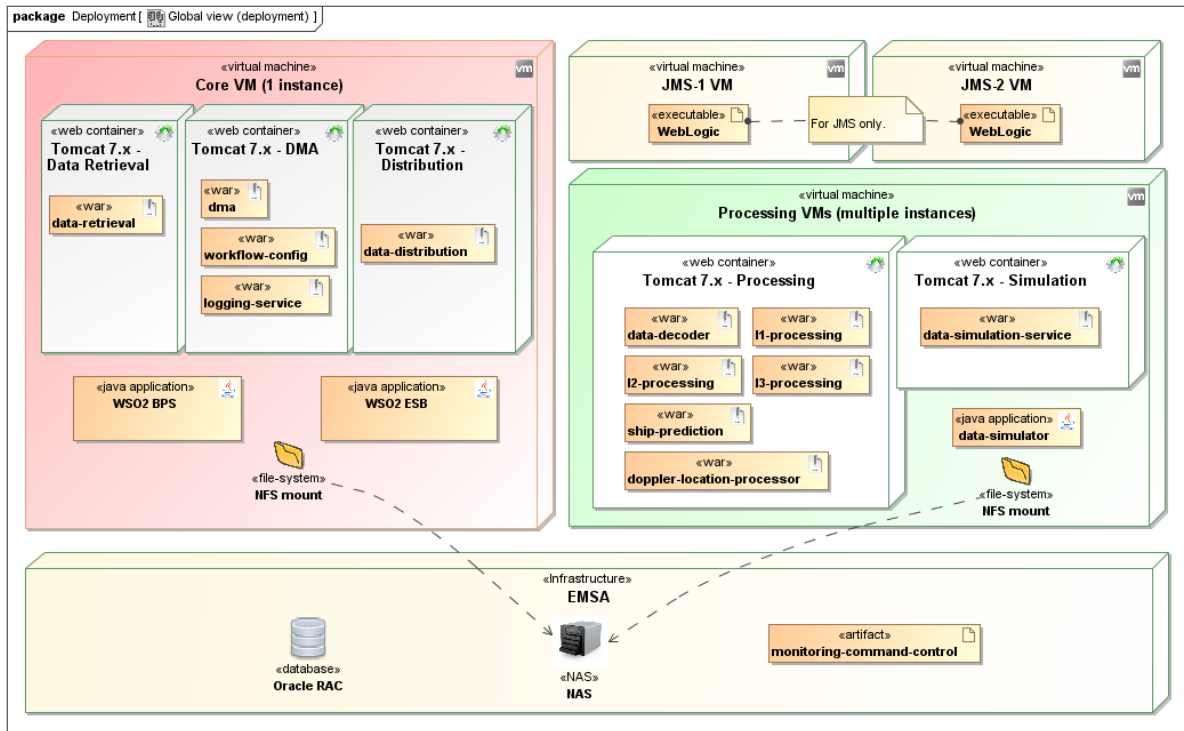


Figure 2 - S-AIS DPC Diagram of the software parts

4.4.1. Hosted applications

All the components and sub-system which are Web Services and part of the DPC project are deployed in a Tomcat servlet container as required by the EMSA ICT. Both a logical and technical grouping is done so to put in the same Tomcat container the components that are related.

- tomcat-data-retrieval: hosts the data-retrieval component;
- tomcat-dma: hosts the dma component as well as the Web Services used by the BPS components (workflow-config and logging-service);
- tomcat-distribution: hosts the data-distribution sub-system;
- tomcat-processing: hosts all the components which perform the processing;
- tomcat-simulation: hosts the data-simulation-service.

4.4.2. “Standalone” applications

All others applications which are not part of the hosted applications are standalone applications. Those are:

- WSO2 BPS: BPEL business engine, 3rd party application;
- WSO2 ESB: Enterprise Service Bus, 3rd party application;
- Oracle Weblogic Server: JEE application server used to host a JMS server, 3rd party application;
- data-simulator: DPC data simulator engine (not a WS-*).



5. DPC installation

5.1. Operating system and system installation

- Each machine (satais-core, satais-proc, satais-jms1 and satais-jms2) shall be installed with a RHEL 6.4.
- The following users and group shall be created:

Machine	User	Group
satais-core	s_dpc	s_dpc
satais-proc	s_dpc	s_dpc
satais-jms1 / satais-jms2	Oracle (weblogic)	oinstall (weblogic)

Note: 1 Because the s_dpc user accesses a shared NFS, the group GID and user UID at least must be the same on the satais-core and satais-proc servers.

- No specific recommendation is given for the partitioning. The following installation directories will be used (Weblogic follows EMSA standards):

Machine	Installation directories (user.group)
satais-core	/opt/s-ais-dpc (s_dpc.s_dpc)
satais-proc	/opt/s-ais-dpc (s_dpc.s_dpc)
satais-jms1 / satais-jms2	/oracle (oracle.oinstall) /wl_domains (oracle.oinstall)

These installation directories can be located on the / partition (recommended) or have dedicated /opt and /wl_domains partitions (in this case the size of these partitions shall be the size of the disk as defined in §4.3 minus the size of the system).

- It is recommended to declare the following machines in /etc/hosts of satais-core and satais-proc with the real IPs:

Machine	/etc/hosts content
satais-core	satais-core xxx.yyy.zzz.kkk satais-proc xxx.yyy.zzz.kkk satais-jms1 xxx.yyy.zzz.kkk satais-jms2 xxx.yyy.zzz.kkk ee-proxy xxx.yyy.zzz.kkk rac1 xxx.yyy.zzz.kkk rac2 xxx.yyy.zzz.kkk
satais-proc	satais-core xxx.yyy.zzz.kkk satais-proc xxx.yyy.zzz.kkk

ee-proxy is the ExactEarth proxy machine.



rac1 and rac2 are the Oracle rac database servers.

Note that the IPs correspond to the IPs of the site where the machines are installed (Primary site or BCF site).

This allows to used a pre-defined configuration in which all the machines are referenced with an entry in /etc/hosts.

If this choice is not followed, the configuration files shall be set with the correct host name for all of these machines.

Here is the list of server names per environment (all within domain emsa.local):

Environment	Name of satais-core	Name of satais-proc	Name(s) of satais-jms('s) *	Database name:port/Service
Test	ttom11	ttom13	twls63	tora23:1535/TINST8
Pre-prod	qtom11	qtom13	qwls63, qwls64	TBD
Prod	TBD	TBD	TBD	TBD

* The weblogicAdminServer runs in the first named server

- The following lines shall be added /etc/security/limits.conf of the satais-core machine:

```
s_dpc      soft    nproc      8000
s_dpc      hard    nproc      16000
s_dpc      soft    nofile     8000
s_dpc      hard    nofile     16000
```

- The following packages shall be installed on satais-core:

- o gcc
- o gcc-c++
- o python 2.6
- o numpy

- SELinux shall be configured as “permissive” or disabled:

In the file /etc/sysconfig/selinux, change or uncomment the line SELINUX=permissive

- Stop and disable the service iptables:

```
# service iptables stop
# chkconfig iptables off
```

- Configure a name server in /etc/resolv.conf
- Setup the start and stop script

A script to start and stop all the components of the DPC system during boot and shutdown is provided with the satais-distribution package unless EMSA has its own. It shall be installed on the satais-core and satais-proc machines.

Once this package is installed (see 5.5.1.2), the script can be copy as root to the /etc/init.d and the service can be initialized to be run during the boot:

```
# cp /opt/s-ais-dpc/saisdpc-distribution/script/init.d/dpc /etc/init.d
# chkconfig --add dpc
```



5.2. Database installation

The installation of the database will consist in running SQL scripts that will:

- Create the partitions and the jobs to manage these partitions
- Create the database users (one for the DPC core, one for the ESB and one for the BPS)
- Create the database schema for the DPC core
- Create the procedure to export and import data

5.2.1. Pre-requisites

You are connected on the Linux server where Oracle is.

Oracle must manage a number of files equals to 2000 in order to manage all the partitions. To set this parameter, you can use the following command from sqlplus (sys as sysdba):

```
alter system set db_files=2000 scope=spfile;
```

We are considering that TAG is the tag or the release.

“saisdpc-TAG-database.tar.gz” is the archive which contains database scripts.

5.2.2. Installation

Follow the steps described below to install the database.

Setup Oracle environment, use EMSA way or, for example:

```
-----
. oraenv
#Here you are prompted to enter ORACLE_SID
ORACLE_SID = [oracle] ? XXXXXXXX
```

Uncompress the archive which contains database scripts:

```
-----
tar xvzf saisdpc-TAG-database.tar.gz
cd saisdpc-database
```

Edit the script “config.sql” and check the parameters corresponding to start date of the partition and to the users. Review also the AIS_EXPORT_DROP_PAST_DAYS nr. of days and adapt accordingly. Note that this script is also used by the uninstall process.

```
-----
vi config.sql
```

Then you have to create the directory where dump files will be exported. The path of this directory is declared in the file “config.sql” with the property AIS_DUMP_DIR. Check that oracle user can write into it.

```
mkdir $(cat config.sql | grep AIS_DUMP_DIR | cut -d'=' -f2 | sed "s/['\\r]/ /g")
```

Connect to “sqlplus”:



```
sqlplus sys as sysdba
```

```
#Here you are prompted to enter the sysdba user password "Enter password:"
```

```
SQL>
```

Install database scripts from the SQL> console:

```
@create-aisdpc-all.sql
```

```
# [...] several messages are displayed until
```

```
' -----
' End of creation of maintenance program'
' -----
```

```
# [...]
```

```
' -----
' Create web display tables ...'
' -----
```

```
# [...]
```

```
View created.
```

```
Disconnected from Oracle Database 11g Enterprise Edition Release 11.2.0.4.0 - 64bit
Production
```

```
With the Partitioning, OLAP, Data Mining and Real Application Testing options
```

Initialize data (GROUNDSTATION, LINKGROUNDSTATIONTOPROVIDER and SATELLITE):

Connect to sqlplus with SAISDPC schema user (*Replace \$SAISDPC_USER_NAME and \$SAISDPC_USER_PASSWORD by value written in config.sql*):

```
sqlplus $SAISDPC_USER_NAME/$SAISDPC_USER_PASSWORD;
```

```
@init-table.sql
```

Installation is now ended. Some manual operations may now be done in order to compute the statistics as explained in the next chapter.

Note: 1 user is created named 'SAISDPC' in order to store the DPC business data.

5.2.3. Database statistics manual procedure

This manual procedure **must be done until the activity is stable**. Once the activity is stabilized, a job is scheduled to automatically copy the statistics.

First of all go to the "saidpc-database" directory as extracted in the previous chapter.

```
cd saidpc-database
```

Then connect to "sqlplus" with the user set in the "config.sql" file and run the following sql script:

```
sqlplus $SAISDPC_USER_NAME/$SAISDPC_USER_NAME
```

```
@manual_stats
```

```
exit;
```



Finally in order to activate the automatic mode of the statistic copy procedure, you have to connect to sqlplus with the user set in the “config.sql” file and run the following sql script:

```
sqlplus $SAISDPC_USER_NAME/$SAISDPC_USER_NAME
@auto_stats
exit;
```

This command is going to create a scheduled program named “AIS_COPY_STATS” and a scheduled job named “AIS_COPY_AUTO_STATS” which will be executed each day at the same hour of its first execution.

5.2.4. Uninstallation

Follow the same instructions as above and replace the step “Install database scripts from the SQL> console” by the following one:

Uninstall database data from the SQL> console:

```
@uninstall_aisdpc.sql
```

5.3. ESB / BPS installation

5.3.1. ESB / BPS packages description

The ESB and BPS installation for the DPC is composed of the following packages:

- esb-x-y-z-bps-x'-y'-z'-pgsql-bin.tar.gz: the ESB and BPS with PostgreSQL binaries
- esb-bps-dpc-deploment-xxxxx.tar.gz : the DPC deployment in the ESB / BPS for the environment xxxxxx
- saidpc-distribution-config-x-y-z-target-esb-bps-xxxxx.tar.gz : the ESB / BPS DPC configuration for the environment xxxxxx

5.3.2. ESP / BPS packages installation

The ESB / BPS are installed in /opt/s-ais-dpc/esb directory, on the machine satais-core.

The following commands shall be run:

```
cd /opt/s-ais-dpc
tar xvzf esb-x-y-z-bps-x'-y'-z'-pgsql-bin.tar.gz
tar xvzf esb-bps-dpc-deploment- xxxxx.tar.gz
tar xvzf saidpc-distribution-config-x-y-z-target-esb-bps-xxxxx.tar.gz
```

The ESB / BPS package depends on third parties products (jdk) provided in saidpc-distribution-product.tar.gz. These package shall be installed before initializing the ESB / BPS (see 5.5.1.1 saidpc-distribution-product.tar.gz)

5.3.3. ESB / BPS initialization

The ESB and BPS initialization consist in creating the database schema for each of them and setting up the topic which will be used for the distribution



5.3.3.1. PostgreSQL initialization

PostgreSQL is started using the following command:

```
cd /opt/s-ais-dpc/esb/pgsql
./start.sh
```

5.3.3.2. ESB initialization

The ESB is initialized using the following command:

```
cd /opt/s-ais-dpc/esb/wso2esb-4.0.2/bin
./wso2server.sh -Dsetup
```

Wait 1 or 2 minutes till the following line is displayed on the screen:

```
INFO - EventBrokerBuilderDS Successfully registered the event broker
```

Connect to the ESB administration console with a web browser using the following url:

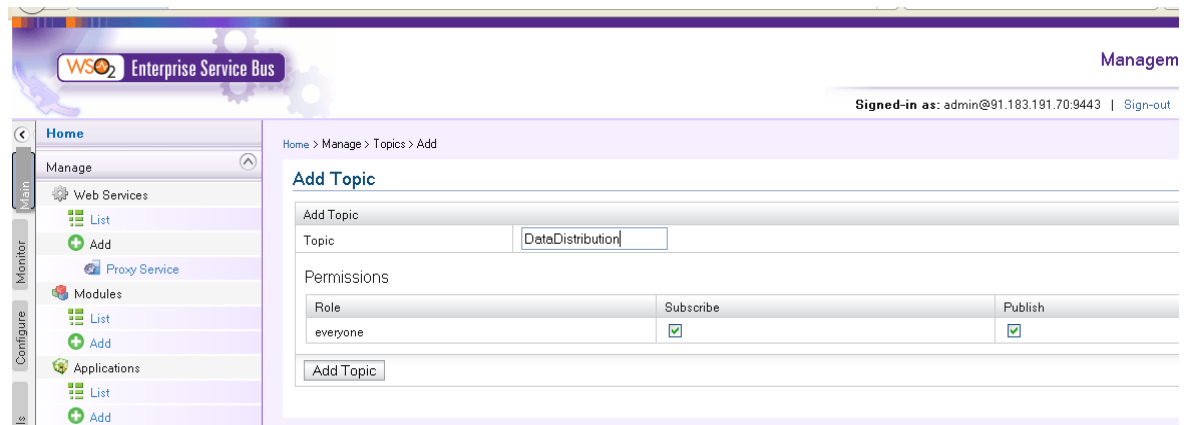
<https://satais-core:9443/carbon>

Login with admin/admin

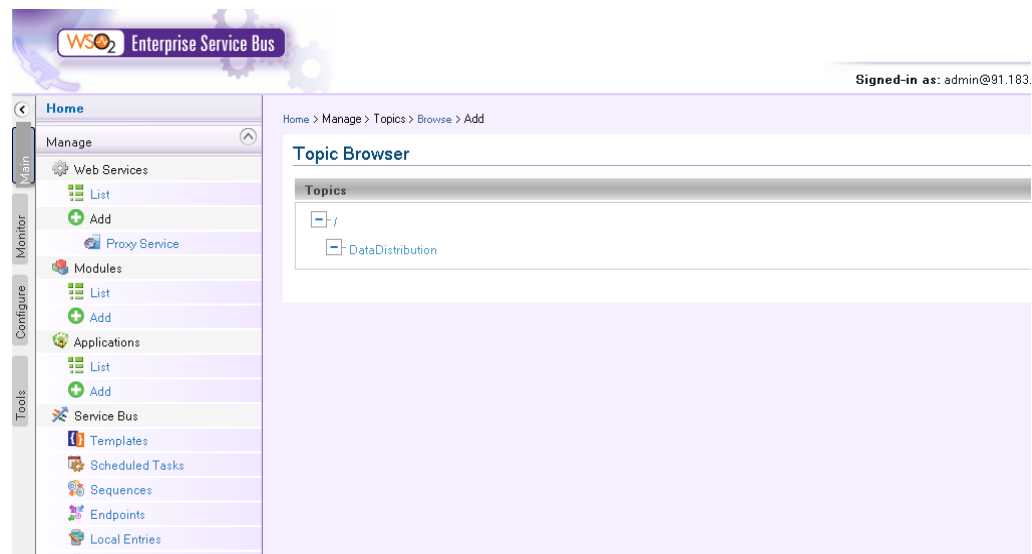
From menu on the left, select “Web Services”=> “List”. If a list of predefined proxies is displayed like in the below image, the ESB has been correctly initialized.

On Menu on the left, click the “Topics=>Add”

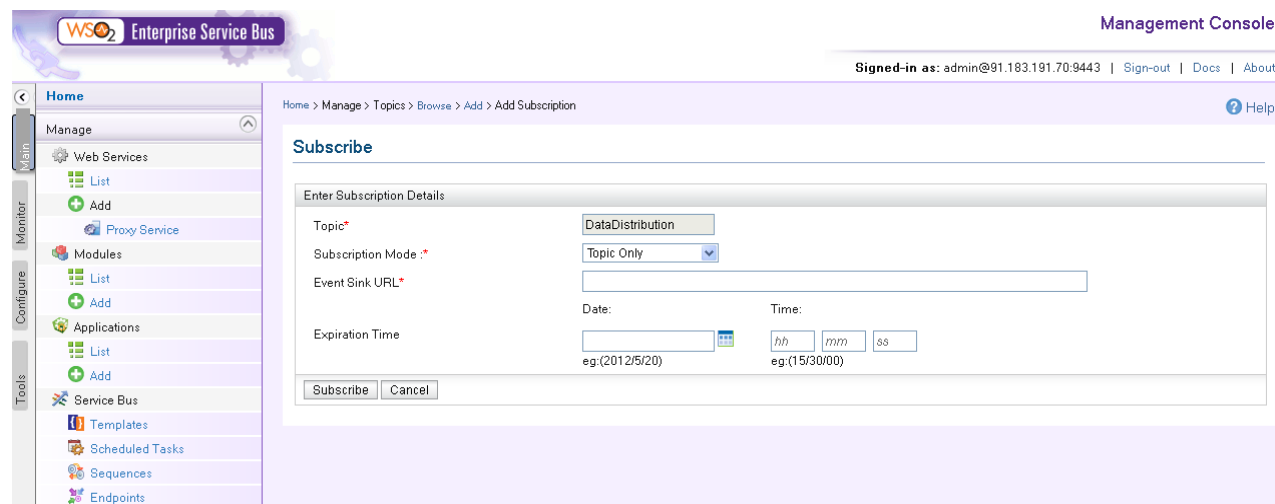
On the “Add Topic” page, provide the “DataDistribution” as topic name then click “Add Topic” button



On Menu on the left, click the “Topics=>Browse”. A “Topic Browser” page is shown



On the “Topic Browser” page, select “DataDistribution” then select “Subscribe”





On the “Subscribe” page, provide the URL of the “Distribution service” (<http://satais-core:8180/satais-dis/services/DistributionService>) into the “Event Sink URL” then click “Subscribe”
Note that satais-core should be replaced by the satais-core machine name (e.g. in test environment it should be ttom11).

In the console, interrupt the wso2server process with ctrl-C

After the initialization, the ESB can be started (see 6.2.1 ESB management).

5.3.3.3. BPS initialization

The ESB is initialized using the following command:

```
cd /opt/s-ais-dpc/esb/wso2bps-3.2.0/bin
./wso2server.sh -Dsetup
```

Wait 1 or 2 minutes till the following line is displayed on the screen:

```
INFO {org.wso2.carbon.ui.internal.CarbonUIServiceComponent} - Mgt Console URL :
https://xxx.yyy.zzz.uuu:9444/carbon/
```

Connect to the BPS administration console with a web browser using the following url:

<https://satais-core:9444/carbon>

Login with admin/admin

If the BPS administration console displays the following screen, the BPS has been correctly initialized.

The screenshot displays the WSO2 Business Process Server Home page. The top navigation bar includes 'Home', 'Manage', 'Monitor', 'Configure', and 'Tools'. The main content area is titled 'WSO2 Business Process Server Home' and 'Welcome to the WSO2 Business Process Server Management Console'. It lists various system parameters in a table format:

Server	
Host	10.20.0.34
Server URL	local://services/
Server Start Time	2015-05-22 08:48:16
System Up Time	5 day(s) 3 hr(s) 19 min(s) 10 sec(s)
Version	3.2.0
Repository Location	file:/opt/s-ais-dpc/esb/wso2bps-3.2.0/repository/deployment/server/
Operating System	
OS Name	Linux
OS Version	2.6.32-358.el6.x86_64
Operating System User	
Country	US
Home	/home/s_ais-dpc
Name	s_ais-dpc
Timezone	UTC
Java VM	
Java Home	/home/opt/s-ais-dpc/saisdpc-distribution/product/jdk1.6.0_45/jre
Java Runtime Name	Java(TM) SE Runtime Environment
Java Version	1.6.0_45
Java Vendor	Sun Microsystems Inc.
Java VM Version	20.45-001
Registry	
DBMS	PostgreSQL
DBMS Version	9.3.5
DBMS Driver	PostgreSQL Native Driver
DBMS Driver Version	PostgreSQL 9.3 JDBC4 (build 1102)

In the console, interrupt the wso2server process with ctrl-C

After the initialization, the BPS can be started (see 6.2.2 BPS management).



5.3.4. ESB / BPS structure

5.3.4.1. ESB structure

The following table explains the directory structure and the content of each significant directory.

/opt/s-ais-dpc/esb/wso2esb-4.0.2/	root
-bin/	contains various scripts .sh & .bat scripts
-dbscripts/	contains all the database scripts
-repository/	the repository where services and modules deployed in WSO2 ESB are stored
---conf/	contains configuration files
---deployment/	services deployment folder
---logs	contains all log files created during execution

5.3.4.2. BPS structure

The following table explains the directory structure and the content of each significant directory.

/opt/s-ais-dpc/esb/wso2bps-3.2.0/	root
-bin/	contains various scripts .sh & .bat scripts
-dbscripts/	contains all the database scripts
-repository/	the repository where services and modules deployed in WSO2 BPS are stored
---bpel/	contains the compiled workflows
---conf/	contains configuration files
--- conf/datasources	contains configuration file for database connection
---deployment/server/bpel	contains the deployed workflows
---logs	contains all log files created during execution

5.4. Weblogic / JMS installation

This chapter describes the installation of Weblogic server and configuration steps to deploy a JMS broker.



The weblogic software (12.1.3) with latest jdk 1.7 (jdk7u65) will be installed according to EMSA standards (using oracle:oinstalluser:group). The domain is called **sais** and created under /wl_domains, the AdminServer will listen on port **7200** and the host nodemanager(s) setup using the default port.

If a cluster is created it will be called **saisCluster1**. The managed servers are created as **saisJMSSrv1:7003** on the ...wls63 server, and if clustered, a second **saisJMSSrv2:7003** on the ...wls64 server.

The `nodemanager{stop|start|status}` is controlled, as oracle user, using `/etc/init.d/nodemanager`. The `AdminServer{stop|start}` is controlled, as oracle user, using `/wl_domains/sais/bin/weblogic.sh`. Run the scripts without arguments to see their usage, the password of user oraxle will be the username in small caps.

The managed servers are controlled thru the AdminServer GUI console, as the weblogic user. The password on test will be the username in small caps.

5.4.1. Weblogic / JMS configuration

ORACLE WebLogic Server Administration Console 12c

Welcome, weblogic Connected to: sais_dpc

Home Log Out Preferences Record Help

Home > sais_dpc

Settings for sais_dpc

Configuration Monitoring Control Security Web Service Security Notes

General JTA JPA EJBs Web Applications Logging Log Filters

Click the **Lock & Edit** button in the Change Center to modify the settings on this page.

Save

A domain is a collection of WebLogic Server instances that is managed by a single Administration Server. Use this page to configure administrative options that apply to all servers in the current domain.

* Indicates required fields

* **Name:** sais_dpc The name of this WebLogic Server domain. [More Info...](#)

☐ **Enable Administration Port** Specifies whether the domain-wide administration port should be enabled for this WebLogic Server domain. Because the administration port uses SSL, enabling the administration port requires that SSL must be configured for all servers in the domain. [More Info...](#)

Administration Port: 9002 The common secure administration port for this WebLogic Server domain. (Requires you to enable the administration port.) [More Info...](#)

☒ **Production Mode** Specifies whether all servers in this domain run in production mode. [More Info...](#)

☐ **Enable Exalogic Optimizations** Specifies whether optimizations for Oracle Exalogic should be enabled. Optimizations include improved thread management and request processing, and reduced lock contention. This attribute should be enabled only when configuring a WebLogic domain for Oracle Exalogic. [More Info...](#)

☐ **Enable Cluster Constraints** Specifies that deployments targeted to a cluster succeed only if all servers in the cluster are running. [More Info...](#)

☒ **Enable on-demand deployment of internal applications** Specifies whether internal applications such as the console, uddi, wlstclient, and uddiexplorer are deployed on demand (first access) instead of during server startup. [More Info...](#)

Advanced

Save

Click the **Lock & Edit** button in the Change Center to modify the settings on this page.

WebLogic Server Version: 12.1.3.0.0
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ORACLE WebLogic Server Administration Console 12c

Home Log Out Preferences Record Help

Welcome, weblogic Connected to: satais_dpc

Change Center
View changes and restarts
Click the Lock & Edit button to modify, add or delete items in this domain.
Lock & Edit
Release Configuration

Domain Structure
satais_dpc
Environment
Servers
Clusters
Coherence Clusters
Machines
Virtual Hosts
Work Managers
Startup and Shutdown Classes
Deployments
Services
Security Realms
Interoperability
Diagnostics

How do I...
Create Managed Servers
Clone servers
Delete Managed Servers
Delete the Administration Server
Start and stop servers

System Status
Health of Running Servers
Failed (0)
Critical (0)
Overloaded (0)
Warning (0)
OK (2)

Summary of Servers
Configuration Control
A server is an instance of WebLogic Server that runs in its own Java Virtual Machine (JVM) and has its own configuration.
This page summarizes each server that has been configured in the current WebLogic Server domain.

Customize this table
Servers (Filtered - More Columns Exist)
Click the Lock & Edit button in the Change Center to activate all the buttons on this page.

Name	Type	Cluster	Machine	State	Health	Listen Port
AdminServer(admin)	Configured			RUNNING	OK	7201
JMS-1	Configured	JMSCluster	satais-jms1	RUNNING	OK	7003

5.4.1.1. Create JMS server

The following action has to be made on saisJMSSrv1 and, if within a cluster, saisJMSSrv2.

Create a JMS server on JMS server page name “SataISJmsServer” with saisJMSSrv[1|2] as target.

Create a JMS module on JMS Modules page name “SataISJmsModule”.

Create a subdeployment (called JMSSubDeployment) for this module to “SataISJmsServer”

Add a connection factory resource to this module name “satais.ConnectionFactory”.

Add a queue for this module named “satais.in.queue”.

Add a queue for this module named “satais.out.queue”.

You should be similar to this state:

ORACLE WebLogic Server Administration Console 12c

Home Log Out Preferences Record Help

Welcome, weblogic Connected to: satais_dpc

Change Center
View changes and restarts
Click the Lock & Edit button to modify, add or delete items in this domain.
Lock & Edit
Release Configuration

Domain Structure
satais_dpc
Environment
Deployments
Services
Messaging
JMS Servers
Store-and-Forward Agents
JMS Modules
Path Services
Bridges
Data Sources
Persistent Stores
Foreign JNDI Providers
WorkContexts

How do I...
No task help found.

System Status
Health of Running Servers
Failed (0)
Critical (0)
Overloaded (0)
Warning (0)
OK (2)

Settings for SataISJMSModule
Configuration Subdeployments Targets Security Notes
This page displays general information about a JMS system module and its resources. It also allows you to configure new resources and access existing resources.

Name: SataISJMSModule
Descriptor File Name: jms/sataisjmsmodule-jms.xml

Customize this table
Summary of Resources
Click the Lock & Edit button in the Change Center to activate all the buttons on this page.

Name	Type	JNDI Name	Subdeployment	Targets
satais.ConnectionFactory	Connection Factory	satais.ConnectionFactory	JMSSubDeployment	SataISJmsServer
satais.in.queue	Queue	satais.in.queue	JMSSubDeployment	SataISJmsServer
satais.out.queue	Queue	satais.out.queue	JMSSubDeployment	SataISJmsServer

Restart the managed server(s) and the “satais.in.queue” is now working.



Create a user `saisjms` (no group) and assign a password, this user will be used for connecting to the JMS. After the `satais-core` installation, check the configuration file `/opt/s-ais-dpc/saisdpc-distribution/config/data-retrieval/saisdpc-dataretrieval-process-config.xml` and define this user password to be the same as the one in the file or update the file with the assigned one.

5.5. DPC software distribution installation

This chapter describes the installation of the DPC software distribution, which correspond to the subcomponents:

- `saisdpc-data-retrieval`
- `saisdpc-data-decoder`
- `saisdpc-data-l1processing`
- `saisdpc-data-l2processing`
- `saisdpc-data-l3processing`
- `saisdpc-doppler-loc-processor`
- `saisdpc-dma-service`
- `saisdpc-workflow-config`
- `saisdpc-logging-service`
- `saisdpc-ship-prediction`
- `saisdpc-data-simulation`
- `saisdpc-system-performance`

5.5.1. DPC software packages

The DPC software distribution is composed of 3 packages. The following chapters describe these packages and how to install them.

5.5.1.1. `saisdpc-distribution-product.tar.gz`

5.5.1.1.1. Introduction

The product distribution artefact contains the COTS needed by the SAIS DPC software to run and is intended to be deployed on the `satais-core` and `satais-proc` VMs.

The products included in the package are: the JAVA VM platform, Tomcat and data-simulator, as shown in the following diagram.

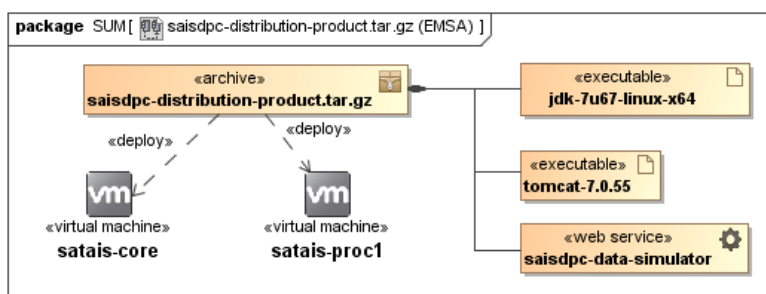


Figure 3 - S-AIS DPC Diagram of the product parts

5.5.1.1.2. Deployment on `satais-core`

Deployment (installation) of the artefact consists in getting the artefact, putting it in the appropriate location on the file-system of the virtual machine and un-taring the file.



- Login on the `satais-core` using the username “s_dpc” and password.
- The artefact is expected to be placed in the `/opt/s-ais-dpc` directory.
- Type the following command lines:

```
> cd /opt/s-ais-dpc/
> tar -zxvf saisdpc-distribution-product-x.y.zz.tar.gz
```

Note that this package is also used by the ESB / BPS and shall be installed before running them (see 5.3.2 ESP / BPS packages installation)

5.5.1.1.3. Deployment on satais-proc

Deployment (installation) of the artefact consists in getting the artefact, putting it in the appropriate location on the file-system of the virtual machine and un-taring the file.

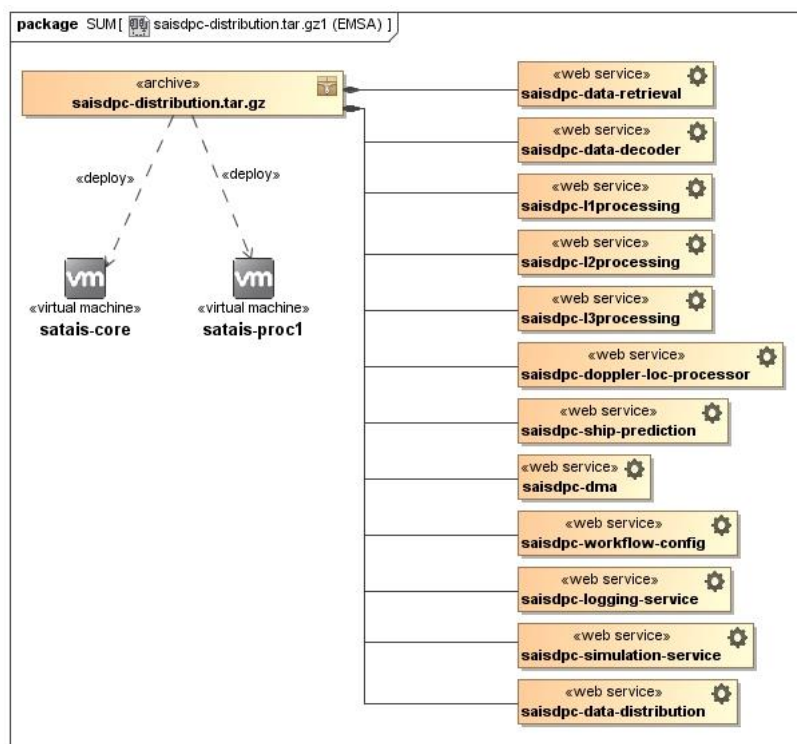
- Login on the `satais-proc` using the username “s_dpc” and password.
- The artefact is expected to be placed in the `/opt/s-ais-dpc` directory.
- Type the following command lines:

```
> cd /opt/s-ais-dpc/
> tar -zxvf saisdpc-distribution-product-x.y.zz.tar.gz
```

5.5.1.2. saisdpc-distribution.tar.gz

5.5.1.2.1. Introduction

This artifact contains the s-ais dpc software itself, i.e. the binary parts of the DPC deployed to both `satais-core` and `satais-proc` virtual machines.





5.5.1.2.2. Deployment on satais-core

Deployment (installation) of the artefact consists in getting the artefact, putting it in the appropriate location on the file-system of the virtual machine and un-taring the file.

- Login on the `satais-core` using the username “s_dpc” and password.
- The artefact is expected to be placed in the `/opt/s-ais-dpc` directory.
- Type the following command lines:

```
> cd /opt/s-ais-dpc/  
> tar -zxvf saisdpc-distribution-x.y.zz.tar.gz
```

5.5.1.2.3. Deployment on satais-proc

Deployment (installation) of the artefact consists in getting the artefact, putting it in the appropriate location on the file-system of the virtual machine and un-taring the file.

- Login on the `satais-proc` using the username “s_dpc” and password.
- The artefact is expected to be placed in the `/opt/s-ais-dpc` directory.
- Type the following command lines:

```
> cd /opt/s-ais-dpc/  
> tar -zxvf saisdpc-distribution-x.y.zz.tar.gz
```

5.5.1.3. saisdpc-distribution-config-target-satais-core.tar.gz

5.5.1.3.1. Introduction

This artifact contains the s-ais dpc set of configuration items for the applications deployed to the `satais-core` VM.

5.5.1.3.2. Deployment on satais-core

Deployment (installation) of the artefact consists in getting the artefact, putting it in the appropriate location on the file-system of the virtual machine and un-taring the file.

- Login on the `satais-core` using the username “s_dpc” and password.
- The artefact is expected to be placed in the `/opt/s-ais-dpc` directory.
- Type the following command lines:

```
> cd /opt/s-ais-dpc/  
> tar -zxvf saisdpc-distribution-config-x.x.x.xx-target-satais-core.tar.gz
```

5.5.1.4. saisdpc-distribution-config-target-satais-proc.tar.gz

5.5.1.4.1. Introduction

This artifact contains the s-ais dpc set of configuration items for the applications deployed to the `satais-proc` VM.

5.5.1.4.2. Deployment on satais-proc

Deployment (installation) of the artefact consists in getting the artefact, putting it in the appropriate location on the file-system of the virtual machine and un-taring the file.



- Login on the `satais-proc` using the username “`s_dpc`” and password.
- The artefact is expected to be placed in the `/opt/s-ais-dpc` directory.
- Type the following command lines:

```
> cd /opt/s-ais-dpc/
> tar -zxvf saisdpc-distribution-config-x.x.x.xx-target-satais-proc.tar.gz
```

5.5.1.5. saisdpc-distribution-auxdata.tar.gz

5.5.1.5.1. Introduction

This artifact contains the `s-ais dpc` set of auxiliary data, mainly for the `satais-ship-prediction` component deployed to the `satais-proc` VM.

5.5.1.5.2. Deployment on `satais-proc`

Deployment (installation) of the artefact consists in getting the artefact, putting it in the appropriate location on the file-system of the virtual machine and un-taring the file.

- Login on the `satais-proc` using the username “`s_dpc`” and password “`s_dpc`” (without quotes).
- The artefact is expected to be placed in the `/opt/s-ais-dpc` directory.
- Type the following command lines:

```
> cd /opt/s-ais-dpc/
> tar -zxvf saisdpc-distribution-auxdata-x.y.zz.tar.gz
```

5.5.2. DPC software structure

5.5.2.1. `satais-core`

This section gives an overview of the structure of the installed files for `satais-core` VM.

- Login on the `satais-core` using the username “`s_dpc`” and password.
- Type the following command lines:

```
> cd /opt/s-ais-dpc/saisdpc-distribution
> ls -R | grep ":@" | sed -e 's/:@"/' -e 's/[^\]]*\]/--/' -e 's/^/ /' -e 's/-/|/'
```

The following table explains the directory structure and the content of each significant directory.

<code>./</code>	root
<code> -bin/</code>	contains <code>s-ais dpc</code> binaries
<code> -config/</code>	root of configuration items
<code> ---dataretrieval/</code>	configuration items for Data Retrieval
<code> ---dma-service/</code>	configuration items for DMA
<code> ---logging-service/</code>	configuration items for Logging Service
<code> ---workflow-config-service/</code>	configuration items for Workflow Config
<code> ---s-ais-dpc.app</code>	Application configuration file
<code> -data/</code>	data files
<code> -etc/</code>	misc files (python extensions)
<code> -lib/</code>	libraries
<code> -log/</code>	log files
<code> ---data-retrieval/</code>	log files for Data Retrieval
<code> ---dma-service/</code>	log files for Doppler Processing



---logging-service/	log files for L1 Processing
---workflow-config-service/	log files for L2 Processing
pid/	pids of the started processes
product/	products
---jdk1.7.0_67/	JDK installation path
----bin/	JDK binaries
---apache-tomcat-7.0.55/	Apache tomcat installation path
tmp/	temporary directory
s-ais-dpc	administrative script

5.5.2.2. satais-proc

This section gives an overview of the structure of the installed files for satais-proc VM.

- Login on the satais-proc using the username “s_dpc” and password.
- Type the following command lines:

```
> cd /opt/s-ais-dpc/saisdpc-distribution
> ls -R | grep ":@" | sed -e 's:$/:' -e 's/[^\]]*[/\--/g' -e 's/^/ /' -e 's/-/|/'
```

The following table explains the directory structure and the content of each significant directory.

./	root
bin/	contains s-ais dpc binaries
config/	root of configuration items
---data-decoder/	configuration items for Data Retrieval
---data-simulation/	configuration items for Data Simulation
---doppler-processing/	configuration items for Doppler Processing
---l1processing/	configuration items for L1 Processing
---l2processing/	configuration items for L2 Processing
---l3processing/	configuration items for L3 Processing
---ship-prediction/	configuration items for Ship Prediction
---graph/	graphs for the Ship Prediction component
---route/	routes for the Ship Prediction component
---shore/	shores for the Ship Prediction component
---s-ais-dpc.app	Application configuration file
data/	data files
etc/	misc files (python extensions)
lib/	libraries
log/	log files
---data-decoder/	log files for Data Retrieval
---doppler-processing/	log files for Doppler Processing
---l1-processing/	log files for L1 Processing
---l2-processing/	log files for L2 Processing
---l3-processing/	log files for L3 Processing
---ship-prediction/	log files for Ship Prediction
pid/	pids of the started processes
product/	products
---jdk1.7.0_67/	JDK installation path
----bin/	JDK binaries
---apache-tomcat-7.0.55/	Apache tomcat installation path
---saisdpc-data-simulator	Data simulator engine installation path
tmp/	temporary directory
s-ais-dpc	administrative script

5.5.3. DPC software scripts

Some scripts are provided within the DPC software to manage and automate some tasks. There are installed on the satais-core machine in the directory /opt/s-ais-dpc/saisdpc-distribution/script.

Here is the list and description of these scripts:



- `init-data-shared-fs.sh`: script to initialize the `/data/shared-fs` structure. It shall be run once during the installation of the DPC software, before the first run of the satais software)
- `init-tle.sh`: script to ingest the first TLE
- `get-tle.sh`: script to get TLE of one satellite from the internet (the proxy shall be configured depending of the configuration)
- `upload-tle.sh`: script to upload the TLEs of all the satellites
- `drop-esb.sh`: script to drop the ESP database (after this command a BPS initialization has to be done again - see 5.3.3.2 - ESB initialization)
- `drop-bps.sh`: script to drop the BPS database (after this command a BPS initialization has to be done again - see 5.3.3.3 - BPS initialization)
- `clean-bps-process.sh`: script to clean old BPS processes
- `clean-bps-job.sh`: script to clean old BPS jobs and vacuum the PostgreSQL database
- `clean-old-data-shared-fs.sh`: script to clean old data in `/data/shared-fs` (file older than 24H)
- `clean-unsent-data-shared-fs.sh`: script to clean unsent data in `/data/shared-fs`
- `retrieve-last-dataflow-stat.sh`: script to retrieve the KPI of the last dataflow

Beside these scripts, there are some extra files:

- `crontab.content`: content that shall be added in the crontab of the `s_dpc` user to automate some periodic tasks
- `bash.aliases`: alias that can be added to make some command more easy
- EMSA build `init.d/sais-dpc-core`, `init.d/sais-dpc-proc` to start the DPC full system

5.5.4. DPC software configuration

This section describes the configuration elements of the S-AIS DPC subcomponents that concern the installation.

The more detailed configuration of the S-AIS DPC subcomponents is described in the document SAT-AIS DPC Block2 Software Configuration Manual.

5.5.4.1. Global subcomponents services configuration

Application level configuration allows configuring “system” parameters for application, like the memory they use, the HTTP port they use, and so on.

As the applications are JAVA applications, the configurable parameters are closely related to JVM parameters.

The configuration file for the application is:

```
/opt/s-ais-dpc/saisdpc-distribution/config/s-ais-dpc.app
```

This file is used by the administrative script to control the life-cycle of installed applications.

The content is expressed in YAML¹, a human-readable structured data format. It consists in an associative array for each application, with an underlying associative array for each configurable attribute of the application.

In this file 2 kinds of applications are described:

- the Web Services, regular web applications that need to be deployed in a servlet container;
- the Web Servers, servlet container used for hosting Web Services.

¹ <http://en.wikipedia.org/wiki/YAML>



For instance, the data-decoder system configuration is described like this:


```
data-decoder:
  name:      'data-decoder'
  bin:       'saidsdp-data-decoder'
  version:   1.0.0.02
  context:   'saidsdp-data-decoder'
  appserver: 'tomcat-proc1'
  order:     6
```

And a tomcat server is described like this:

```
tomcat-proc1:
  name:      'tomcat-proc1'
  javaOpts:  '-Xmx4096M -Xss32M -XX:PermSize=512m -XX:MaxPermSize=1024m -Duser.timezone=UTC -Djava.rmi.server.hostname=10.20.0.32'
  server:    'apache-tomcat-7.0.52'
  jdk:       'jdk1.7.0_11'
  order:     0
  port.http: 8080
  port.ajp:  8009
  port.shutdown: 8005
  port.jmx:  10010
  port.debug: 9090
```

5.5.4.1.1. name

The name displayed in the administrative script (s-ais-dpc)

 Don't need to be touched.

5.5.4.1.2. bin

Binary name of the application.

 Don't need to be touched. Application may fail to start otherwise.


5.5.4.1.3. context

Web Service context for the application.

Web services are published in distinct ports and separate context according to the following scheme:

<http://hostname:port/context>

This parameter can be used to change the context name.

 Only used for Web Applications







 Don't need to be touched. Web service clients may fail to invoke web service otherwise.


5.5.4.1.4. javaOpts

Options for the JVM.

This parameter allows configuring the start-up parameters of the JVM used to launch servers. Please refer to JDK manual to learn more on all the available parameters.

For information, the following table sums up the most used JVM parameters.

-server	Specifies that the JVM should optimize for server applications.
-Xms<n>[g m k]	The initial and minimum size of the Java heap. <n> is the size. [g m k] indicates whether the size should be interpreted as gigabytes, megabytes, or kilobytes.
-Xmx<n>[g m k]	The maximum size of the Java heap. <n> is the size. [g m k] indicates whether the size should be interpreted as gigabytes, megabytes, or kilobytes.  Specifying a value too low will result in a start failure for the application.
-Xss<n>[g m k]	The maximum size for the Java stack for a thread. <n> is the size. [g m k] indicates whether the size should be interpreted as gigabytes, megabytes, or kilobytes.  Specifying a value too low will result in a start failure for the application.
-Duser.timezone	Fix the time zone used by the application independently of the system.  Specifying another value than 'UTC' will result in an improper content generation for dates.
-Djava.rmi.server.hostname	Fix the hostname to use when exposing managed beans through JMX.  Specifying another value than 'UTC' will result in the inability to remotely connect to the JMX server of the application.


 This parameter is used only for Web Servers. Since the Web Applications are hosted in a server they share the JVM parameters of the container.

5.5.4.1.5. jdk

The JDK version to use for servers.

Several different versions of the JDK can safely coexist. This parameter allows specifying the JDK version (and binary) used to launch applications with the help of the administrative script.

 Version change may be necessary to fix some issues of the JVM.

 Specifying a JDK version older than 1.7.x will result in a start failure for the applications.


Installed versions of the JDK can be listed with the following commands:

- Login on the VM using the username "s_dpc" and password "s_dpc" (without quotes).
- Type the following command lines:



```
> cd /opt/s-ais-dpc/saisdpc-distribution/product  
> ls -l jdk*
```

```
jdk1.7.0_11  
jdk1.7.0_17
```

 This parameter is used only for Web Servers. Since the Web Applications are hosted in a server they use the same JDK of the container.

5.5.4.1.6. appserver

Only relevant for Web applications (Web Services) which are regular Web Archives and can be deployed in a servlet container.


This parameter can be used to designate the servlet container to use. When starting, the application will be deployed, if necessary, in the referenced container.

 This parameter must reference an application server declared in the s-ais-dpc.app configuration file.

5.5.4.1.7. order

Start and stop order of applications.

This parameter is used to order the applications when starting or stopping them. Ascending order is used when starting so that the application with lowest index order is started first. Descending order is used when stopping so that the application with highest index order is stopped first.

 data-retrieval application should be started last (highest index order). As it acts as a consumer for the system, all other applications should have been started before and should be ready to process.


5.5.4.1.8. port.http

HTTP port used by servers for publishing Web Services.

Web services are published in distinct ports and separate context according to the following scheme:

<http://hostname:port/context>

This parameter can be used to change the HTTP port.

 This parameter is used only for Web Servers. Since the Web Applications are hosted in a server they use the same port of the container.


 Don't need to be touched. Web service clients may fail to invoke web service otherwise.

 A distinct port must be specified for all the applications.


5.5.4.1.9. port.jmx

JMX port number through which JMX connections of servers are enabled.

This parameter can be used to change the JMX port.

 This parameter is used only for Web Servers. Since the Web Applications are hosted in a server they use the same port of the container.




 Don't need to be touched. JMX clients may fail to invoke JMX services otherwise, which is mainly the case for Zabbix, the monitoring solution used within the S-AIS DPC infrastructure to supervise applications.


 A distinct port must be specified for all the applications.

5.5.4.1.10. port.debug

Port through which remote debugging is enabled.

This parameter can be used to change the Remote Debug port, used to remotely diagnose an application with the help of the source code of the application.


 This parameter is used only for Web Servers. Since the Web Applications are hosted in a server they use the same debug port of the container.

 The remote debug capacity should be disabled in production. For that, just comment the line by prefixing the sentence with the sharp character (#).

5.5.4.1.11. port.ajp

Port for the Apache JServ protocol of the servlet container.


This parameter can be used to change the AJP port.

 This parameter is used only for Tomcat Web Servers.

5.5.4.1.12. port.shutdown

Port for the Apache Shutdown of the servlet container.

This parameter can be used to change the shutdown port.

 This parameter is used only for Tomcat Web Servers.

5.5.4.2. Host subcomponents services configuration

The hosts are configured in the configuration file of some subcomponents services. The following table gives the configuration file, the machine where it is installed and the corresponding parameters name and description.

Configuration file	Machine	Parameter	Value
config/data-retrieval/dataretrieval.properties	satais-core	sais_dpc.notify.bpelURI	http://satais-core:8280/services/push-resources?wsdl
config/data-retrieval/saisdpc-dataretrieval-process-config.xml	satais-core	jndiFactoryBean.jndiFactoryBean	satais.ConnectionFactory
config/data-retrieval/saisdpc-dataretrieval-process-config.xml	satais-core	jndiTemplate.java.naming.provider.url	t3://satais-jms1:7003



config/data-simulation/datasimulation.properties	satais-proc	sais_dpc.datasimulation.satellites.bpelURI	http://satais-core:8280/services/push-Satellite4Simulator?wsdl
config/data-simulation/datasimulation.properties	satais-proc	sais_dpc.datasimulation.scheduledDownlink.bpelURI	http://satais-core:8280/services/push-Downlinks4Simulator?wsdl
config/data-simulation/datasimulation.properties	satais-proc	sais_dpc.datasimulation.alert.bpelURI	http://satais-core:8280/services/push-alert?wsdl
config/data-simulation/datasimulation.properties	satais-proc	sais_dpc.datasimulation.information.bpelURI	http://satais-core:8280/services/push-Info4Simulator?wsdl

The **satais-core**, **satais-proc** and **satais-jms1** shall be changed according to the real host name of these machines.

5.5.4.3. Database configuration

The only service accessing to the database is the dma. The following parameters of the configuration file config/dma-service/dma.properties of the dma service running on satais-core allow to change the database access.

Parameter	Value
datasource.url	jdbc:oracle:thin:@ [databaseHost] : [databasePort] / [databaseServiceName] (Can also use @(DESCRIPTION...) TNS string Dataguard, RAC compliant)
datasource.username	[databaseUser]
datasource.password	[databasePassword]

The **[databaseHost]**, **[databasePort]**, **[databaseServiceName]**, **[databaseUser]** and **[databasePassword]** parameter shall be changed according to the database access.

5.6. Web display installation

5.6.1. Web display packages description

The Web Display installation for the DPC is composed of the following packages:

- wdisp-distrib-x-y-z.tar.gz: the web display binaries and 3rd party libraries
- wdisp-cots-x-y-z.tar.gz : the Apache DS cots



5.6.2. Web display packages installation

The Web display are installed in /opt/s-ais-dpc/wdisp directory, on the machine satais-core.

The following commands shall be run:

```
cd /opt/s-ais-dpc
tar xvzf wdisp-cots-x-y-z.tar.gz
tar xvzf wdisp-distrib-x-y-z.tar.gz
```

Optionally if you need to use the cx_Oracle database driver for python, you have to run the commands below. This driver shall be used to configure the « sqlalchemy.url ».

```
cd /opt/s-ais-dpc/wdisp/cots/
#Connect as root
su

#Install cx_Oracle library
rpm -ivh cx_Oracle-5.1.2-11g-py26-1.x86_64.rpm
exit

#Check library has been install successfully
export LD_LIBRARY_PATH=/usr/lib/oracle/11.2/client64/lib:$LD_LIBRARY_PATH
python
Python 2.6.6 (r266:84292, Nov 22 2013, 12:16:22)
[GCC 4.4.7 20120313 (Red Hat 4.4.7-4)] on linux2
Type "help", "copyright", "credits" or "license" for more information.
>>>import cx_Oracle
>>>exit()

# If no message appears, it means that the cx_Oracle is well installed.
# Otherwise you shall get an error message like this one:
>>>import cx_Oracle
Traceback (most recent call last):
  File "<stdin>", line 1, in <module>
ImportError: No module named cx_Oracle
>>>exit()
# In this case check that the file is present
ls -l /usr/lib/python2.6/site-packages/cx_Oracle.so
```

5.6.3. Web display cots and libraries installation

It's important to understand the border between system requirements and COTS/libraries for the web display. For system requirements, the following system libs must be present in the system: python 2.6, gcc, gcc-c++, numpy. All these libs can be installed by the system administrator from the RHEL installation source using yum tool or others without web access need.

5.6.3.1. Libraries installation

5.6.3.1.1. Manual Installation (as root)

To manual install the COTS and libraries, please go to /opt/s-ais-dpc/wdisp/source/ folder

Compile and install GDAL libraries

```
cd gdal-1.9.2
./configure
make
make install
```



```
cd ..
```

Install GEOS libraries

```
rpm -ivh geos-3.3.3-1.x86_64.rpm
```

```
rpm -ivh geos-devel-3.3.3-1.x86_64.rpm
```

Install Oracle client libraries

```
rpm -ivh oracle-instantclient11.2-basic-11.2.0.1.0-1.x86_64.rpm
```

```
rpm -ivh oracle-instantclient11.2-devel-11.2.0.1.0-1.x86_64.rpm
```

5.6.3.1.2. Automatic installation (as root)

As an alternative, the installation of the COTS and libraries can be made automatically. For that, as root, please go to `source` folder and run `'install-deps.sh'`.

5.6.3.2. Startup

After the installation, review the `wdisp-conf` parameters (host, under `server:main`, and the `sqlalchemy.url`), the web display server and Apache DS can be started (see 6.5 Web display management)

5.6.4. Web Display structure

The following structure is shown in the `wdisp` folder (`/opt/s-ais-dpc/wdisp`).

<code>apps</code>	Where the SATAIS web display is installed
<code>env</code>	Environment ready for RHEL 6.4
<code>source</code>	Necessary libs to be installed as root
<code>docs</code>	Support documentation
<code>cots</code>	The cots folder
<code>wdisp-start.sh</code>	Start the web display service
<code>wdisp-stop.sh</code>	Stop the web display service
<code>wdisp-test.sh</code>	Start the web display service in test mode. To finish the test press CTRL-C.
<code>wdisp-status.sh</code>	Verifies the status of the web display service.
<code>wdisp-clean-log.sh</code>	Cleans the web display log
<code>wdisp-conf</code>	Web display configuration file



5.6.5. Web display configuration

5.6.5.1. wdisp-conf

This is the main configuration file of the web display. All the necessary changes to be made in the future are centralized in this file. The file is present in the web display root folder (/opt/s-ais-dpc/wdisp/).

The following content reflects the web display options present in the configuration file:

The server configuration and SSL options.

```
# Server options
# for ssl, uncomment ssl_pem line
[server:main]
use = egg:Paste#http
```

host = satais-core	The service host IP
port = 9080	The service port
#ssl_pem = %(here)s/server.cert	Activate the HTTPS. You can use the same port, but the web address becomes SSL protected.

The following section represents the Oracle database configuration.

Database options

Two drivers are available "oracle" and "oracle+cx_oracle"

user pass IP PORT DBID

sqlalchemy.url = oracle://AIS:AISDPC@193.42.151.199:1521/AISDCP

sqlalchemy.url = oracle+cx_oracle://AIS:AISDPC@193.42.151.199:1521/AISDCP

To use "cx_oracle" you need to install a specific driver as detailed in the chapter "5.6.2 Web display packages installation".

The following section represents the SMTP configuration for password recovery functionality

SMTP options for password recovery

note: you need internet connection or an internal SMTP server to perform this operation

smtpServer = mail.cls.fr	SMTP server
smtpPort = 25	Port used by the server
smtpSSL = false	Server is SSL based (true / false)
smtpAuth = false	Server requires authentication (true / false)
smtpUser = username	In case smtpAuth is true, set the username
smtpPass = password	In case smtpAuth is true, set the password



The following section represents the Oracle database configuration.

```
# LDAP options
```

```
[login]
```

<code>ldapServer = localhost</code>	LDAP server, usually the localhost
<code>ldapPort = 10390</code>	LDAP port. Default for the apacheDS installation is the 10390
<code>ldapAdmin = uid=admin,ou=system</code>	LDAP admin user
<code>ldapPass = secret</code>	LDAP admin pass
<code>retryAttempts = 5</code>	Password failing tolerance
<code>blockSeconds = 60</code>	block user when reached the max attempts during a specific amount of time.

5.6.5.2. SSL certificate generation

A certificate and key is provided already in the installation package (`server.cert`), but if a new certificate is needed, it's necessary to create a new key and the corresponding new certificate. For this, go to `/opt/s-ais-dpc/wdisp/apps/satais/` and run:

```
opensslreq -nodes -new -x509 -keyoutserver.key -out server.cert
```

Second, we need to concatenate the key with the certificate:

```
catserver.key>>server.cert
```

You can then delete the private `server.key` file:

```
rmserver.key
```

5.7. ExactEarth proxy and Nmea acquisition installation

5.7.1. ExactEarth proxy

Upload the provided archive file named “Harwell Proxy 1.7.2.rar” on an MS Windows host.

Unrar it, and provide the delivered password when asked.

Launch extracted “`subscriber_setup.exe`” install binary, and follow the installation instructions, by letting the default configuration.

The files are installed in `%ProgramFiles%\GateHouse\Subscriber Proxy\` folder.

Copy extracted “`client.pem`”, “`rootcert.pem`” and “`proxy_serverlist.ini`” files in `%ProgramFiles%\GateHouse\Subscriber Proxy\` folder.

5.7.2. Nmea acquisition

The Nmea acquisition module allows to ingest Nmea data from files or from the ExactEarth proxy, to convert the corresponding AIS messages in CDF and to push them to a JMS queue.

Note that only AIS messages 1,2,3,5,18,19 are supported.

This module is based on a product call DAP (Data Acquisition and Post) developed by CLS.



5.7.2.1. DAP nmea acquisition packages description

The DAP nmea acquisition installation for the DPC is composed of the following packages:

- `dap-distrib.product.x.y.zz.tar.gz`: the DAP third parties products (jdk/tomcat)
- `dap-distrib-x.y.z.tar.gz`: the DAP distribution binaries
- `dap-distrib-connection-jms-plugin-x'.y'.z'.tar.gz`: the DAP jms connection plugin
- `dap-distrib-imdate-codec-plugin-x''.y''.z''.tar.gz`: the DAP nmea to CDF codec plugin
- `dap-distrib-config-dpc-acq-xxxxx.tar.gz`: the DAP nmea acquisition configuration for the xxxxx platform

5.7.2.2. DAP nmea acquisition packages installation

The DAP nmea acquisition is installed in `/opt/s-ais-dpc/acq` directory, on the machine `satais-core`.

The following commands shall be run:

```
cd /opt/s-ais-dpc
mkdir acq
cd acq
tar xvzf dap-distrib.product.x.y.zz.tar.gz
tar xvzf dap-distrib-x.y.z.tar.gz
tar xvzf dap-distrib-connection-jms-plugin-x'.y'.z'.tar.gz
tar xvzf dap-distrib-imdate-codec-plugin-x''.y''.z''.tar.gz
tar xvzf dap-distrib-config-dpc-acq-xxxxx.tar.gz
```

After the installation, the DAP nmea acquisition can be started (see 6.2.2 BPS management).

6. DPC management

The following chapters describe how to start / stop and manage the DPC subsystems.

6.1. Database management

The management of the database will consist in running shell scripts that will:

- Export data from a partition for a specific date
- Import data to a specific dated partition

Also some jobs are scheduled to run automatically.

6.1.1. Scheduled jobs

6.1.1.1. Job “AIS_EXPORT_DROP_AUTO”

This job, triggered daily, is used to export automatically data contained in partitions and to remove these partitions after 5 days. This number of days can be configured in the script “`create-aisdpc-maintenance.sql`” as shown below. Data are exported in the directory which can be configured in the “`config.xml`” file.

```
SYS.DBMS_SCHEDULER.DEFINE_PROGRAM_ARGUMENT
(
  program_name      => 'AIS_EXPORT_DROP_AUTO'
```



```
,argument_name      => 'PAST_DAYS'
,argument_position   => 2
,argument_type       => 'NUMBER'
,default_value       => '5'
);
```

6.1.1.2. Job “AIS_MAINTENANCE_SCHEDULE”

This job, triggered daily, is used to create the new partitions for the next 10 days.

6.1.2. Pre-requisites to import or export data

You are connected on the Linux server where Oracle is.

We are considering that TAG is the tag or the release.

“saisdpc-TAG-database.tar.gz” is the archive which contains database scripts.

Follow the steps described below before running the database management shell scripts.

Setup Oracle environment:

```
. oraenv
#Here you are prompted to enter ORACLE_SID
ORACLE_SID = [oracle] ? XXXXXXXX
```

Uncompress the archive which contains database scripts:

```
tar xvfz saisdpc-TAG-database.tar.gz
cd saisdpc-database
```

Export/Import directory path:

The database management shell scripts are going to generate dump and log files. These files will be created in the directory that has been defined in the “config.sql” file during the installation phase. You can retrieve this path by execution the following below.

Connect to sqlplus with SAISDPC schema user (*Replace \$\$SAISDPC_USER_NAME and \$\$SAISDPC_USER_PASSWORD by value written in config.sql during the installation phase*):

```
sqlplus $$SAISDPC_USER_NAME/$$SAISDPC_USER_PASSWORD;
SQL> SELECT directory_path FROM DBA_directories WHERE directory_name = 'AIS_PUMP_DIR';
DIRECTORY_PATH
-----
/oradata/AISDPC/exports/
```



```
SQL> exit;
```

6.1.3. Export data

Use the script “export_AISDPC.sh” to export data from the tables below for a given date:

- ✓ CONSOLIDATEDPOSITIONL2
- ✓ DATADISTRIBUTIONTIME
- ✓ POSITIONL1
- ✓ AISMESSAGEINTERNAL

This script has parameters, before running it, be sure that you have followed the steps as described in “6.1.2 Pre-requisites to import or export data”:

```
Usage: . export_AISDPC.sh $USER $PASSWORD $YYYYMMDD $DOTRUNCATE
```

- ✓ \$USER: The username used to connect to the database.
- ✓ \$PASSWORD: The password of the user used to connect to the database.
- ✓ \$YYYYMMDD: The date of the partition that you need to export with ‘YYYY’ representing the year, ‘MM’ the month and ‘DD’ the day of month.
- ✓ \$DOTRUNCATE: [Y|N] Set ‘Y’ to truncate the partitions at the given date or set ‘N’ to keep data in the table partitions.

Here is an example which exports data for the user ‘SAISDPC’, with password ‘SAISDPCPWD’, for the date 20th January 2015 and which truncates table partitions.

```
. export_AISDPC.sh SAISDPC SAISDPCPWD 20150120 Y
```

Once the procedure is executed a dump file and a log file are created in the “Export/Import directory” with the name “expdp_\$USER_part\$YYYYMMDD.[dmp|log]”.

6.1.4. Import data

Use the script “import_AISDPC.sh” to import data from the tables below for a given partition:

- ✓ CONSOLIDATEDPOSITIONL2
- ✓ DATADISTRIBUTIONTIME
- ✓ POSITIONL1
- ✓ AISMESSAGEINTERNAL

This script has parameters, before running it, be sure that you have followed the steps as described in “6.1.2 Pre-requisites to import or export data”:

```
Usage: . import_AISDPC.sh $USER $PASSWORD $YYYYMMDD
```

- ✓ \$USER: The username used to connect to the database
- ✓ \$PASSWORD: The password of the user used to connect to the database
- ✓ \$YYYYMMDD: The date of the partition that you need to import with ‘YYYY’ representing the year, ‘MM’ the month and ‘DD’ the day of month.

Here is an example which imports data for the user ‘SAISDPC’, with password ‘SAISDPCPWD’ and for the date 20th January 2015.

```
. import_AISDPC.sh SAISDPC SAISDPCPWD 20150120
```

Once the procedure is executed a log file is created in the “Export/Import directory” with the name “impdp_\$USER_part\$YYYYMMDD.log”.



Note that the dump file is loaded from the corresponding exported file named “expdp_\$(USER)_part\$(YYYYMMDD).dmp” from the “Export/Import directory”.

6.2. ESB / BPS management

6.2.1. ESB management

The ESB server can be started with the following command:

```
cd /opt/s-ais-dpc/esb/wso2esb-4.0.2/bin
./wso2server.sh start
```

The ESB server can be stopped with the following command:

```
cd /opt/s-ais-dpc/esb/wso2esb-4.0.2/bin
./wso2server.sh stop
```

6.2.2. BPS management

The BPS server can be started with the following command:

```
cd /opt/s-ais-dpc/esb/wso2bps-3.2.0/bin
./wso2server.sh start
```

The BPS server can be stopped with the following command:

```
cd /opt/s-ais-dpc/esb/wso2bps-3.2.0/bin
./wso2server.sh stop
```

6.3. Weblogic / JMS management

EMSA uses a home-build init.d script to control the [host] NodeManager (calls the standard nodemanager script in the end) and does not start servers using the domain bin scripts but, instead, uses its own keystores and setup the AdminServer and managed servers to be started through the NodeManager.

Add to each managed server the arguments, at least: -XX:PermSize=128m -XX:MaxPermSize=256m

For the domain and servers, enable the limit number of retained files, keep the defaults of 7 days of logging rotated daily or when size is 5MB (for both General and HTTP tabs). Applications must manage their own logs, since there is at least a weekly backup, consider keeping only 7 days (or 2 weeks in case a backup fails) of logs in the systems, a level of warning or higher (no verbose/info) and files small, up-to 5MB. The .out files are not managed by Weblogic so in the installation of Weblogic a cron job using a specific script is setup to manage them.

6.4. DPC software management

6.4.1. Introduction

The DPC software is provided with administrative script “s-ais-dpc” located at the root of the installation directory (/opt/s-ais-dpc/ saiddpc-distribution), which gives to the administrator a mean to control the life-cycle of the installed software list below:



- ✓ On the “Core VM”:
 - tomcat-core
 - tomcat-data-retrieval
 - tomcat-distribution
- ✓ On the “Processing VM”:
 - tomcat-proc
 - tomcat-data-simulation
 - *Note that “data-simulator” process is stopped when “tomcat-data-simulation” is stopped*

The script “s-ais-dpc” handles many commands and the most useful ones are described in details below.

6.4.2. Synopsis

6.4.2.1. All commands

Enter the “help” command below to show the available script parameters:

```
./s-ais-dpc -h
```

Usage:

```
./s-ais-dpc COMMAND [ARGS...]
./s-ais-dpc help [COMMAND]
```

Options:

```
--version    show program's version number and exit
-h, --help   show this help message and exit
```

Commands:

```
check        check s-ais-dpc applications
help (?)      give detailed help on a specific sub-command
log          display application log
restart       restart s-ais-dpc running applications
service       list url pages pointing to published services
stacktrace   ask for the generation of the stacktrace
start        start s-ais-dpc applications.
status       print the status of s-ais-dpc applications
stop         stop s-ais-dpc running applications
```


Commands coloured in Black are the most useful and are described below. All other commands can be used but are less useful. You can use the following syntax to display help on a specific command.

```
./s-ais-dpc command -h
```

6.4.2.2. “start” command

Start s-ais-dpc applications.

```
./s-ais-dpc start
```

 The start command of the administrative script is not totally unerring. If for some reasons the process identifier is removed from `pid/` directory, a service can be started even if another instance of the same service is already running.



Returned statuses are:

- **pid created** : a tomcat process is started but not fully available
- **running**: means the tomcat process has log “INFO: Server startup” which means that tomcat is really available
- **ok**: all tomcat process are running
- **failed**: the service failed to be started (process can’t be started). In that case, an explanation message is returned.
- **war deployed**: an application is copied from the “lib/\$app-bare.war” file to “tmp/tomcat-proc/webapps/\$app.war”
- **libs deployed**: all libraries listed in the “bin/\$app.classpath” file are copied from the lib directory to the “tmp/\$tomcat/lib/\$app” directory.

6.4.2.3. “stop” command

Stop s-ais-dpc applications.

```
./s-ais-dpc stop
```



A SIGTERM signal is sent to the service process to (nicely) request its termination.



Even if a service is considered “not stopped”, it does not necessary mean that it will not be stopped in the future. Some service takes time greater than the given one to stop.



The stop command of the administrative script is not totally unerring. If for some reasons the process identifier is removed from `pid/` directory, an application can become un-stoppable through the administrative script.

Returned statuses are:

- **stopped**: the service has been successfully stopped (application process is no more alive)
- **not started**: the service has never been started, so no action is made to stop it. (i.e. no process identifier found under `pid/` for that application)
- **not running**: the service is not currently running, so no action is made to stop it. (i.e. process identifier found under `pid/` for that application is not alive)
- **not stopped**: the service failed to be stopped.

6.4.2.4. “status” command

Displays for each tomcat servers, if it is “running”, “stopped” or “not started”:

```
./s-ais-dpc status
```



The status command is not totally unerring. If for some reasons the process identifier is removed from `pid/` directory, the returned status will be “not started”, even if the service is still running.

Returned statuses are:

- **“not started”**: the service was never started (i.e. no process identifier can be found under `pid/` directory).
- **“not running”**: the was started but is not currently running (i.e. the process identifier found under `pid/` for that service is no longer alive)
- **“running”**: the service is currently running (i.e. the process identifier found under `pid/` for that service is alive)

Additional system information can be returned by the administrative script if the “-v” option is enabled. Those are:



- **pid**: process identifier of the running service (if status is “running”), or identifier of the dead process of the service (if status is “not running”), or dash (if status is “not started”)
- **http**: the http port of the published services for the application
- **jmx**: the JMX supervision port through which a JMX client can connect

Type the following command lines:

```
cd /opt/s-ais-dpc/saisdpc-distribution
./s-ais-dpc status -v
```

Example on the “Core”:

```
status: tomcat-distribution (pid: 6115, http: 8180, jmx: 10015) [ running ]
status: tomcat-core (pid: 6151, http: 8080, jmx: 10010) [ running ]
status: tomcat-data-retrieval (pid: 6260, http: 8081, jmx: 10011) [ running ]
```

6.4.2.5. “restart” command

Stop all s-ais-dpc tomcats and start them again.

```
./s-ais-dpc restart
```

This command does exactly the same thing as the following:

```
./s-ais-dpc stop
./s-ais-dpc start
```

6.4.3. Start

Example on the “Core”:

```
cd /opt/s-ais-dpc/saisdpc-distribution
./s-ais-dpc start
```

```
start: apache-tomcat-7.0.57 : tomcat-distribution [ pid created ]
start: apache-tomcat-7.0.57 : tomcat-core [ pid created ]

[tomcat-distribution] INFO: Server startup in 15653 ms: tomcat-distribution [ running ]
[tomcat-core] INFO: Server startup in 57807 ms: tomcat-core [ running ]

start: apache-tomcat-7.0.57 : tomcat-data-retrieval [ pid created ]
[tomcat-data-retrieval] INFO: Server startup in 21786 ms: tomcat-data-retrieval [ running ]
['tomcat-distribution', 'tomcat-core', 'tomcat-data-retrieval'] startup done in 0:01:27.017119: [ OK ]
```

We can notice that the tomcats are started in a specific order which enable to start the “tomcat-data-retrieval” once all others components are started.

For more details about this command, refers to 6.4.2.2 “start” command.

6.4.4. Stop

Example on the “Core”:

```
cd /opt/s-ais-dpc/saisdpc-distribution
./s-ais-dpc start
```

```
...
```



```
stop:  apache-tomcat-7.0.57 : tomcat-data-retrieval      [  stopped  ]
...
stop:  apache-tomcat-7.0.57 : tomcat-core                [  stopped  ]
..
stop:  apache-tomcat-7.0.57 : tomcat-distribution        [  stopped  ]
['tomcat-distribution', 'tomcat-core', 'tomcat-data-retrieval'] stopped, done in 0:00:08.034087: [  OK  ]
```

For more details about this command, refers to 6.4.2.3 “stop” command.

6.4.5. Status

Example on the “Core”:

```
cd /opt/s-ais-dpc/saisdpc-distribution
./s-ais-dpc status
```

```
status:  tomcat-distribution      [  running  ]
status:  tomcat-core             [  running  ]
status:  tomcat-data-retrieval    [  running  ]
```

For more details about this command, refers to 6.4.2.4 “status” command.

6.4.6. Restart

Example on the “Core”:

```
cd /opt/s-ais-dpc/saisdpc-distribution
./s-ais-dpc restart
```

For more details about this command, refers to 6.4.2.5 “restart” command.

6.5. Web display management

6.5.1. Apache DS management

The Web display is using Apache DS as LDAP.

Apache DS can be started with the following command:

```
cd /opt/s-ais-dpc/wdisp/cots
./ApacheDS.sh start
```

Apache DS can be stopped with the following command:

```
cd /opt/s-ais-dpc/wdisp/cots
./ApacheDS.sh stop
```

The status of Apache DS can be retrieved with the following command:

```
cd /opt/s-ais-dpc/wdisp/cots
./ApacheDS.sh status
```



6.5.2. Web display management

The web display server can be started with the following command:

```
cd /opt/s-ais-dpc/wdisp
./wdisp-start.sh
```

The web display server can be stopped with the following command:

```
cd /opt/s-ais-dpc/wdisp
./wdisp-stop.sh
```

The status of the web display server can be retrieved with the following command:

```
cd /opt/s-ais-dpc/wdisp
./wdisp-status.sh
```

6.6. ExactEarth proxy and Nmea acquisition management

6.6.1. ExactEarth proxy

Launch the Subscriber Proxy program: "C:\Program Files\GateHouse\Subscriber Proxy\clientproxy.exe"

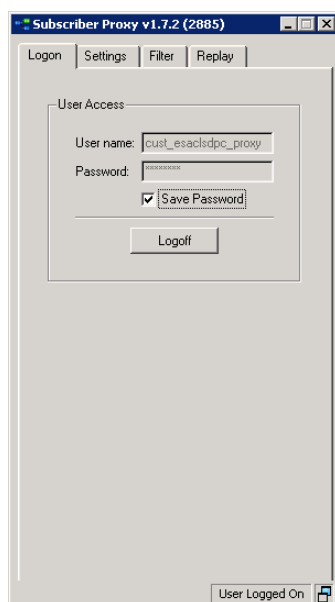
Provide (delivered by ExactEarth) credentials, then login.

The Subscriber Proxy tries to establish a connection on ExactEarth' server listed in "%ProgramFiles%\GateHouse\Subscriber Proxy\proxy_serverlist.ini".

If credentials are correct, and server available, then

- a local 4001 port is opened on MS Windows host,
- a connection to remote ExactEarth Proxy Server:port

are opened, and the Subscriber Proxy program informs that "you" are logged on:





6.6.2. Nmea acquisition

The Nmea acquisition DAP server can be started with the following command:

```
cd /opt/s-ais-dpc/acq/dap-distrib
./dap all start
```

The Nmea acquisition DAP server can be stopped with the following command:

```
cd /opt/s-ais-dpc/acq/dap-distrib
./dap all stop
```

The Nmea acquisition DAP server status can be retrieved with the following command:

```
cd /opt/s-ais-dpc/acq/dap-distrib
./dap all status
```

6.7. Satellite adding

This chapter describes how to add a new satellite in the configuration of the system.

6.7.1. The satellite identification

A satellite is identified in the DPC system by its NORAD id. This identifier shall be given by the satellite operator (ie. Exact Earth).

6.7.2. Satellite adding to the database

The script add-satellite.sql can be used to add a satellite in the database. This script inserts the satellite and associate it to the ground stations which can receive data from the satellite. The satellite provider and the ground stations shall already exist in the database (if not they have to be previously created by using the add-provider-groundstation.sql - see next chapter)

```
--
-- Satellite ADDING SQL script
-- #####

-- Satellite Adding
Insert into SATELLITE (SATELLITEID,SATAISPROVIDER_NAME,NAME,OPERATIONALSTATUS,STATUSTIME) values
('#NORAD#','#PROVIDERID#','#SATNAME#','OK',null);

-- Ground Stations for satellite
INSERT INTO LINKSATELLITETOGROUNDSTATION(SATELLITE_SATELLITEID, GROUNDSTATION_NAME,
OPERATIONALSTATUS, STATUSTIME)
VALUES('#NORAD#', '#GROUNDSTATIONID1#', 'OK', NULL);
INSERT INTO LINKSATELLITETOGROUNDSTATION(SATELLITE_SATELLITEID, GROUNDSTATION_NAME,
OPERATIONALSTATUS, STATUSTIME)
VALUES('#NORAD#', '#GROUNDSTATIONID2#', 'OK', NULL);
INSERT INTO LINKSATELLITETOGROUNDSTATION(SATELLITE_SATELLITEID, GROUNDSTATION_NAME,
OPERATIONALSTATUS, STATUSTIME)
VALUES('#NORAD#', '#GROUNDSTATIONID3#', 'OK', NULL);
INSERT INTO LINKSATELLITETOGROUNDSTATION(SATELLITE_SATELLITEID, GROUNDSTATION_NAME,
OPERATIONALSTATUS, STATUSTIME)
VALUES('#NORAD#', '#GROUNDSTATIONID4#', 'OK', NULL);

COMMIT;
```

The token #XXX# shall be replaced by the corresponding values:



- #NORAD# by the satellite NORAD id (ie. '38709' for rEV01 Exact Earth satellite)
- #PROVIDERID# by the satellite provider id (ie. 'eE' Exact Earth)
- #SATNAME# by the satellite name (ie. 'rEV01' for rEV01 Exact Earth satellite)
- #GROUNDSTATIONIDn# by the ground station identifier (ie. 'Bangalore')

6.7.3. Satellite provider and ground station declaration in the database

The script add-provider-groundstation.sql can be used to add a satellite provider and declare the associated ground stations.

```
--
-- Satellite provider and ground station ADDING SQL script
-- #####

# Satellite provider adding
INSERT INTO SATAISPROVIDER(NAME, DELIVERYDELAY, LINKSTATUS, STATUSTIME, OPERATIONALSTATUS,
LINKSTATUSTIME)
VALUES('#PROVIDERID#', 1800, 'OK', NULL, NULL, TO_TIMESTAMP ('2014-03-28 18:32:56.07', 'YYYY-MM-DD
HH24:MI:SS.FF'));

# Ground station adding
INSERT INTO GROUNDSTATION(NAME, ALTITUDE, GAIN, AVGPROCESSINGDURATION, MINIMALELEVATION,
POSITION)
VALUES('#GROUNDSTATIONID1#', 0, NULL, 300, 5, SDO_GEOMETRY(4326, 8307, SDO_POINT_TYPE (77.512708,
13.035039, NULL), NULL, NULL));
INSERT INTO GROUNDSTATION(NAME, ALTITUDE, GAIN, AVGPROCESSINGDURATION, MINIMALELEVATION,
POSITION)
VALUES('#GROUNDSTATIONID2#', 0, NULL, 300, 5, SDO_GEOMETRY(4326, 8307, SDO_POINT_TYPE (-157.826114,
21.312425, NULL), NULL, NULL));
INSERT INTO GROUNDSTATION(NAME, ALTITUDE, GAIN, AVGPROCESSINGDURATION, MINIMALELEVATION,
POSITION)
VALUES('#GROUNDSTATIONID3#', 0, NULL, 300, 5, SDO_GEOMETRY(4326, 8307, SDO_POINT_TYPE (-76.616657,
39.283211, NULL), NULL, NULL));
INSERT INTO GROUNDSTATION(NAME, ALTITUDE, GAIN, AVGPROCESSINGDURATION, MINIMALELEVATION,
POSITION)
VALUES('#GROUNDSTATIONID4#', 0, NULL, 300, 5, SDO_GEOMETRY(4326, 8307, SDO_POINT_TYPE (15.396019,
78.229519, NULL), NULL, NULL));

# Ground station - Satellite provider link
INSERT INTO LINKGROUNDSTATIONTOPROVIDER(GROUNDSTATION_NAME, SATAISPROVIDER_NAME,
FILEHANDLE_FILEHANDLEID, OPERATIONALSTATUS, STATUSTIME)
VALUES('#GROUNDSTATIONID1#', '#PROVIDERID#', NULL, 'OK', TO_TIMESTAMP ('2014-02-05 08:07:07.578', 'YYYY-MM-
DD HH24:MI:SS.FF'));
INSERT INTO LINKGROUNDSTATIONTOPROVIDER(GROUNDSTATION_NAME, SATAISPROVIDER_NAME,
FILEHANDLE_FILEHANDLEID, OPERATIONALSTATUS, STATUSTIME)
VALUES('#GROUNDSTATIONID2#', '#PROVIDERID#', NULL, 'OK', TO_TIMESTAMP ('2014-02-05 12:06:12.273', 'YYYY-MM-
DD HH24:MI:SS.FF'));
INSERT INTO LINKGROUNDSTATIONTOPROVIDER(GROUNDSTATION_NAME, SATAISPROVIDER_NAME,
FILEHANDLE_FILEHANDLEID, OPERATIONALSTATUS, STATUSTIME)
VALUES('#GROUNDSTATIONID3#', '#PROVIDERID#', NULL, 'OK', TO_TIMESTAMP ('2014-03-28 17:23:56.433', 'YYYY-MM-
DD HH24:MI:SS.FF'));
INSERT INTO LINKGROUNDSTATIONTOPROVIDER(GROUNDSTATION_NAME, SATAISPROVIDER_NAME,
FILEHANDLE_FILEHANDLEID, OPERATIONALSTATUS, STATUSTIME)
VALUES('#GROUNDSTATIONID4#', '#PROVIDERID#', NULL, 'OK', TO_TIMESTAMP ('2014-03-28 18:32:56.07', 'YYYY-MM-
DD HH24:MI:SS.FF'));

COMMIT;
```

The token #XXX# shall be replaced by the corresponding values:

- #PROVIDERID# by the satellite provider id (ie. 'eE' Exact Earth)
- #GROUNDSTATIONIDn# by the ground station identifier (ie. 'Bangalore')



6.7.4. Satellite TLE retrieving

The current TLE of the satellite shall be retrieved by using the script `get-tle.sh`. For that, connect on `satais-core` as `s_dpc` and run the command:

```
/opt/s-ais-dpc/saisdpc-distribution/script/get-tle.sh #NORAIID# #SATNAME#
```

and add the following line the the script `/opt/s-ais-dpc/saisdpc-distribution/script/upload-tle.sh`:

```
/opt/s-ais-dpc/saisdpc-distribution/script/get-tle.sh #NORAIID# #SATNAME# >/dev/null 2>&1
```

where:

- `#NORAIID#` is the satellite NORAD id (ie. '38709' for rEV01 Exact Earth satellite)
- `#SATNAME#` is the satellite name (ie. 'rEV01' for rEV01 Exact Earth satellite)

The `get-tle.sh` script initializes the DPC system to use the new satellite and the `upload-tle.sh` script is called every day by crontab to update the TLE of all the satellites.

6.7.5. Satellite simulation declaration

The satellite shall be declared in the simulator configuration files (located in `/opt/s-ais-dpc/saisdpc-distribution/config/data-simulation` of the `satais-proc` machine) by adding in `config_service_RT_2.xml` and `config_service_Simulate_2.xml`:

```
<satellite id="#SATNAME#">
  <TLEFilePath>
    <fileInformation loadingMode="once"
      filePath="{saisdpc.shareddata}/working-fs/dps/data/RT2/TLE/#SATNAME#.tle"/>
  </TLEFilePath>
  <downlinkSchedule>
    <generated/>
  </downlinkSchedule>
  <antenna gainRefId="1">
    <position X="0.0" Y="0.0" Z="0.0"/>
    <polarization>
      <circular/>
    </polarization>
    <AISChannels AIS1="true" AIS2="true" AIS3="false" AIS4="false"/>
  </antenna>
  <antenna gainRefId="1">
    <position X="0.0" Y="1.0" Z="0.0"/>
    <polarization>
      <circular/>
    </polarization>
    <AISChannels AIS1="true" AIS2="true" AIS3="false" AIS4="false"/>
  </antenna>
  <groundStationVisibility>
    <seenByAll/>
  </groundStationVisibility>
  <attitude>
    <rollAmplitude>0.0</rollAmplitude>
    <rollPeriod>0.0</rollPeriod>
    <rollInitialAngle>0.0</rollInitialAngle>
    <pitchAmplitude>0.0</pitchAmplitude>
    <pitchPeriod>0.0</pitchPeriod>
    <pitchInitialAngle>0.0</pitchInitialAngle>
    <yawInitialAngle>0.0</yawInitialAngle>
    <yawDrift>0.0</yawDrift>
  </attitude>
</satellite>
```

where:

- `#SATNAME#` is the satellite name (ie. 'rEV01' for rEV01 Exact Earth satellite)

in the section XXXXXXXX corresponding to the satellite provider:



```
...
<provider id="eE">
  <constellation>
    <satellites>
      XXXXXXXX
    </satellites>
  </constellation>
</provider>
...
```

The satellite configuration is defined in the ICD (AD 5) §6.1.1.8.1. Constellation configuration. It describes the parameters (antenna, attitude, etc.) that can be defined per satellite.

Note that the ground stations shall also be declared in the config_service_RT_2.xml and config_service_Simulate_2.xml and if one ground station is added, the following lines shall be added:

```
<groundStation id="#GROUNDSTATIONID# ">
  <position latitude="78.229519" longitude="15.396019"
    altitude="0.0"/>
  <antenna gainRefId="1"/>
  <minimumMaskingAngle>5.0</minimumMaskingAngle>
  <minimumVisibilityDuration>30</minimumVisibilityDuration>
  <deliveryDelay>15</deliveryDelay>
</groundStation>
```

Where:

- #GROUNDSTATIONID# is the ground station identifier (ie. 'Bangalore')

The latitude and longitude attribute shall be set with the proper location of the ground station.

6.7.6. Satellite data acquisition

The satellite AIS message acquisition is currently done by using the DAP module. In this module satellite filtering allows to only ingest in the DPC system the AIS messages from some satellites. If one satellite is added, the DAP acquisition configuration shall be changed, by adding the satellite in the following section of /opt/s-ais-dpc/acq/dap-distrib/config/acqfe/dap.xml:

```
<codec ref="ee-sat-filter" facility="decoder" factory-class-name="fr.cls.dap.ais.filter.PropertyFilterCodecFactory">
  <param name="propertyName" value="tagBlock.parameters(s)" />
  <param name="propertyValueList" value="rEV01d,rEV02,rEV05,rEV06,rEV61,rEV63,#SATNAME#" />
</codec>
```

where:

- #SATNAME# is the satellite name (ie. 'rEV01' for rEV01 Exact Earth satellite)

6.7.7. System restart

After having configured the system to handle a new satellite, the system shall be restarted by stopping it and starting it (see 6.9 DPC full system startup and stop)

6.8. Doppler engine tuning

The main steps to tune the Doppler engines are the following:



1. Collect the Doppler frequency measurements and the associated satellite ephemeris for a great number of AIS ships. The measurements should be gathered by satellite passes. This can be obtained with the Doppler processor engine which generates intermediate files containing all data needed (input_macropasses_*.txt). The Doppler processor should run at least few days to collect a sufficient amount of data.
2. For each satellite pass where at least 5 measurements were recorded:
 - i. Estimate the emitting frequencies for each AIS each channel and the location of the ship. This is carried out with a least squares adjustment using the frequency measurements of the pass. The least squares adjustment exploits the Doppler observation function that links the location and the emitting frequencies of the ship to the recorded frequency measurements during the pass.
 - ii. If the least squares adjustment converged, the residual of the least square adjustment S is available. It is the sum (in Hz^2) of the squared differences between each observed measurement and the measurement predicted by the model. The residual is used to estimate the standard deviation of the measurement noise σ (in Hz) using the following equation: $\sqrt{\frac{S}{n-4}}$ where n is the measurement number in the satellite pass.
3. The average value of the measurement noise σ can be used in the model parameter of the configuration file of the Doppler engine.

The default Doppler model is used when no dedicated model can be found by the doppler engine; the model applied is the `default0Hz` model:

```
<util:map id="dopplerModelsBySatellites" map-class="java.util.HashMap">
  <entry key="default" value="default0Hz" />
  <entry key="rEV01d" value="ExactEarth" />
</util:map>
```

6.9. DPC full system startup and stop

Some scripts allow to start and stop the entire system. These scripts were initially build by EMSA and are also provided with the `satais-distribution`, should be copied in the `/etc/init.d` directory owned by root: and with permissions 755 (see 5.5.3 DPC software scripts)

6.9.1. System starting

The system startup consists in doing the following actions:

- On the core machine do as `s_dpc`:
`/etc/init.d/sais-dpc-core start ESB`
`/etc/init.d/sais-dpc-core start SAISDPC`
`/etc/init.d/sais-dpc-core start WD`
- On the proc machine do as `s_spc`:
`/etc/init.d/sais-dpc-proc start SAISDPC`
- On the core machine do as `s_dpc`:
`/etc/init.d/sais-dpc-core start DAP`

6.9.2. System stop

The system stop consists in doing the following actions:

- On the core machine do as `s_dpc`:



```
/etc/init.d/sais-dpc-core stop
```

- On the proc machine do as s_spc:

```
/etc/init.d/sais-dpc-proc stop
```

6.10. Old files management

The DPC system is generating lots of files, for which the majority can be considered as temporary. These files shall be periodically deleted if they are older than a certain age.

6.10.1. Log files

Log files are written in the following directories (and the corresponding sub-directories):

- For the saiddpc-distribution: in `/opt/s-ais-dpc/saisdpc-distribution/log` sub-directories
We recommend to keep them at least 2 months for analysis.
- For esb and bps: in `/opt/s-ais-dpc/esb/wso2esb-4.0.2/repository/logs` and `/opt/s-ais-dpc/esb/wso2bps-3.2.0/repository/logs`
- For dap: in `/opt/s-ais-dpc/acq/dap-distrib/log`
We recommend to delete esb/bps and dap log file after 10 days (it can be done by including the crontab.content provided in `/opt/s-ais-dpc/saisdpc-distribution/script` in the crontab)

6.10.2. Working files

Working files are written in `/data/shared-fs/` sub-directories. We recommend to delete xml files after 24 hours (it can be done by including the crontab.content provided in `/opt/s-ais-dpc/saisdpc-distribution/script` in the crontab)

6.10.3. Distribution output file

For testing purpose, the DAP module is defining 2 simplexes to read CDF position report from the JMS queue and to read S2 CAP alert: `dis-acq` and `s2-ws-acq`.

In production, these simplexes shall be disabled (by changing the enabled flag to false).

During testing, the read data are written in files in the `/opt/s-ais-dpc/acq/dap-distrib/data/dis` sub-directories. We recommend to delete these files after 24 hours (it can be done by including the crontab.content provided in `/opt/s-ais-dpc/saisdpc-distribution/script` in the crontab)

6.11. BCF management

6.11.1. BCF switch over procedure

The switch over procedure allows to switch from the primary site to the redundant site (or vice versa), during a maintenance operation.

It consists in executing the following actions:

- On the source site, stop DAP and SAISDPC (WD can be let running, ESB can eventually be stopped for cleaning - see 6.12 Postgresql management):
 - On the core machine do as s_dpc:



- `/etc/init.d/sais-dpc-core stop DAP`
 - `/etc/init.d/sais-dpc-core stop SAISDPC`
- On the proc machine do as s_spc:
 - `/etc/init.d/sais-dpc-proc stop SAISDPC`
- On the destination site, start the system:
 - On the core machine do as s_dpc:
 - `/etc/init.d/sais-dpc-core start ESB`
 - `/etc/init.d/sais-dpc-core start SAISDPC`
 - `/etc/init.d/sais-dpc-core start WD`
 - On the proc machine do as s_spc:
 - `/etc/init.d/sais-dpc-proc start SAISDPC`
 - On the core machine do as s_dpc:
 - `/etc/init.d/sais-dpc-core start DAP`

6.11.2. BCF failover over procedure

The fail over procedure allows to restart the system to the redundant site in case of failure of the primary site.

It consists in executing the followings actions:

- On the redundant site, start the system:
 - On the core machine do as s_dpc:
 - `/etc/init.d/sais-dpc-core start ESB`
 - `/etc/init.d/sais-dpc-core start SAISDPC`
 - `/etc/init.d/sais-dpc-core start WD`
 - On the proc machine do as s_spc:
 - `/etc/init.d/sais-dpc-proc start SAISDPC`
 - On the core machine do as s_dpc:
 - `/etc/init.d/sais-dpc-core start DAP`

6.11.3. BCF files synchronization

The following directory (and sub-directories) shall be synchronized: `/data/shared-fs/working-fs/dps/data`.

6.12. Postgresql management

The postgresql database is used by the ESB and BPS to store transient data. The data used by the BPS processes are automatically deleted when the processes are terminated.

Postgresql is managing properly such data suppression and the data space taken by the postgresql database should not increase significantly.

In some situation, some not well terminated BPS process can let pending data. We provide scripts to clean these data and also to do a vacuum action, which retrieve the no more used data on the filesystem (see 5.5.3 DPC software scripts):



- `clean-bps-process.sh`: script to clean old BPS processes
- `clean-bps-job.sh`: script to clean old BPS jobs and vacuum the PostgreSQL database

It is preferable to use these scripts when the ESB/BPS are stopped. Indeed when the BPS is running, some locks may let the execution of these scripts very long.

We recommend to run them when a switch over is done. For that, on the source site, after having stop DAP and SAISDPC, stop ESB and do the cleaning:

- On the core machine do as `s_dpc`:
 `/etc/init.d/sais-dpc-core stop ESB`
 `/opt/s-ais-dpc/saisdpc-distribution/script/clean-bps-process.sh`
 `/opt/s-ais-dpc/saisdpc-distribution/script/clean-bps-job.sh`



Appendix A - List of acronyms

TBC	To be confirmed
TBD	To be defined
AD	Applicable Document
RD	Reference Document