High Level Design for AMS Northbound Interface

Contents

1   AMS Generic Description

1.1   The 5520 AMS – Access Management System

5520 AMS provides fault, configuration, and performance management of the underlying access networks, using a GUI and hierarchical tree navigation. The 5520 AMS also supports network-productivity features such as equipment profile management, NE backup and restore, and NE software management.

The AMS manages the 7363 MX-6 through SNMP communication. SNMP carries management information between managers (AMS) and agents (7363MX-6). This means that the MSAN is a very passive component when thinking of communication between the AMS and the MSAN; it contains a database (MIB) with all information but will only `talk` upon request from the AMS.

The Modular Architecture of 5520 AMS

- The modular architecture starts from a base platform (core).
- Plug-ins are extensions, which provide additional functionality/features to a base system.
- This modular approach allows us to start from a base platform, where plug-ins can be added later according to the needs of our customers.
- 5520 AMS = core-function(s) + add-on functions
- Plug-ins
  - additional functionality, separately deliverable
  - hot-pluggable
  - NE specific plug-ins
  - Enhanced applications
- 5529 Enhanced Applications
  - 5529 Access Provisioning Center
  - 5529 OSS Alarm Dispatcher
  - 5529 Inventory Data Manager
  - 5529 Statistics and data collector
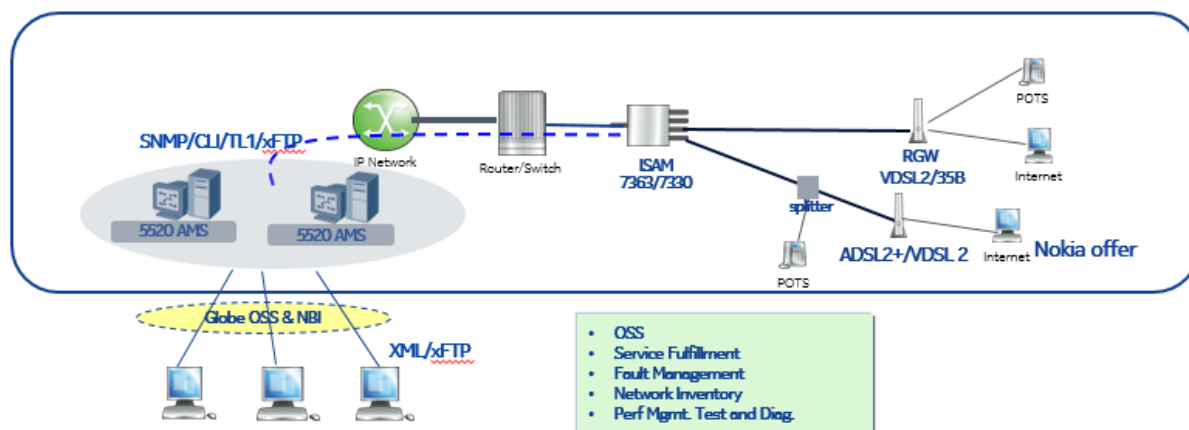
2   Configuration for AMS System

This chapter describes the proposed configurations for AMS System including commercial sites and test bed.

Product	Product Description	Qty	Test Bed	Valero	Lahug	Included in BoM
1AK17384AAAA	**HPE DL380 Gen9**	**3**				
719064-B21	HPE DL380 Gen9 8SFF CTO Server	3	1	1	1	YES
817927-L21	HPE DL380 Gen9 E5-2620v4 FIO Kit	3	1	1	1	YES
805347-B21	HPE 8GB 1Rx8 PC4-2400T-R Kit	12	4	4	4	YES
724865-B21	HP DL380 Gen9 Universal Media Bay Kit	3	1	1	1	YES
872475-B21	HPE 300GB SAS 10K SFF SC DS HDD	6	2	2	2	YES
726537-B21	HP 9.5mm SATA DVD-RW Jb Gen9 Kit	3	1	1	1	YES
749974-B21	HP Smart Array P440ar/2G FIO Controller	3	1	1	1	YES
720478-B21	HP 500W FS Plat Ht Plg Pwr Supply Kit	6	2	2	2	YES
512485-B21	HPE iLO Adv incl 1yr TSU 1-Svr Lic	3	1	1	1	YES
733660-B21	HP 2U SFF Easy Install Rail Kit	3	1	1	1	YES
HA114A1 / 5A0	HPE Startup Entry 300 Series OS SVC	3	1	1	1	YES
H7J34A3 / TT3	HPE ProLiant DL380 Gen9 Support	3	1	1	1	YES

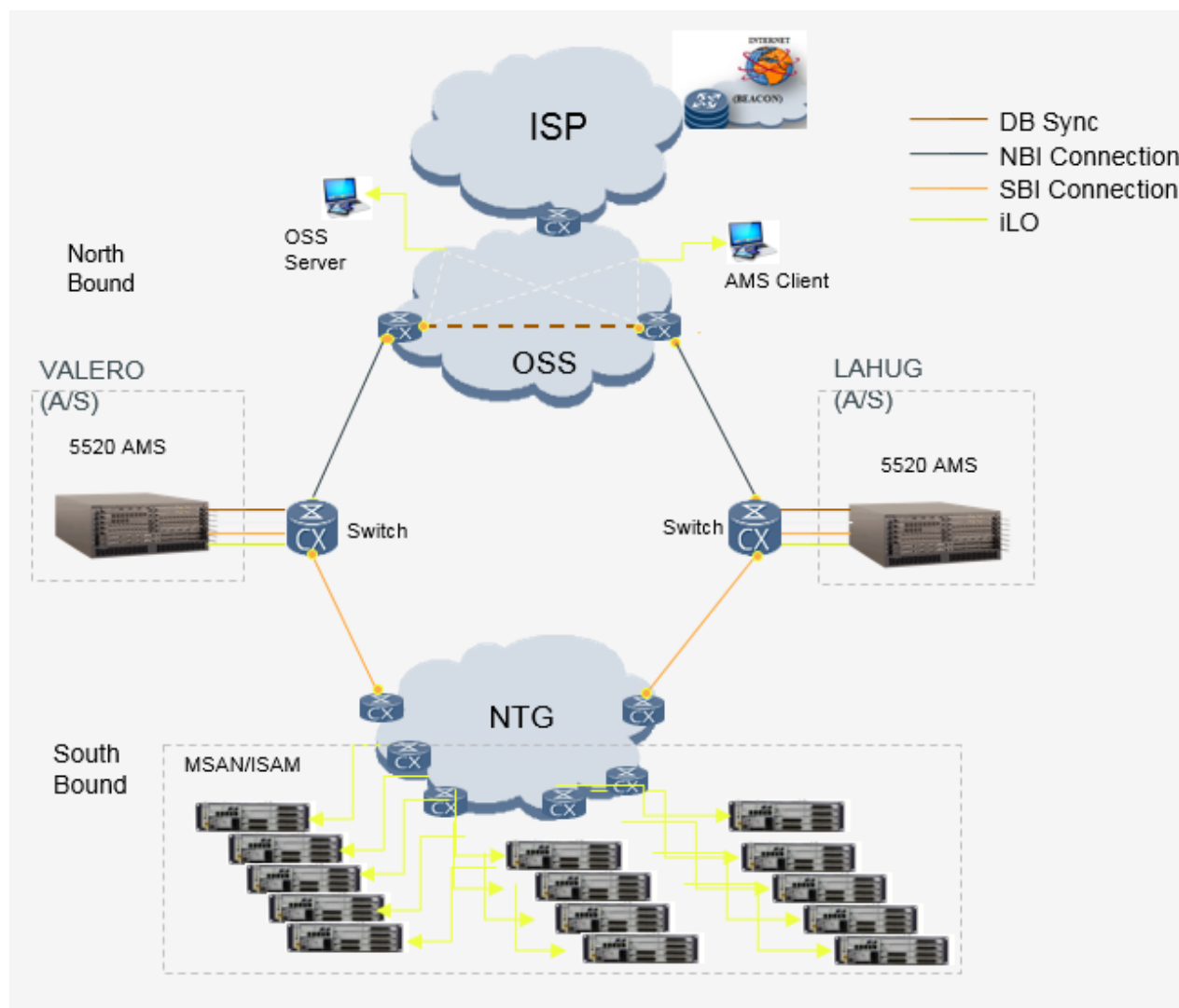| Code	Description	Qty	testbed	Valero	Lahug	Included in BoM
7210SAS-T						
3HE08364AA	SYS - 7210 SAS-T 12F 10T 4XFP AC system includes; (1) 7210 SAS AC Power supply, (1) Fan Tray, (10) 10/100/1000 TX + Accepts(12) 100/1000 SFP + (4) XFP(s). Does not include 7210 SAS Operating Software or usage licenses.	3	1	1	1	NO
3HE04414AA	PS - 7210 SAS E/M/T AC Power Supply (Non ETR)	3	1	1	1	NO
3HE00271AB	AC Power Cable NEMA 6-15P to IEC 60320 C13 10A/220V, 1.8 meter - United States / Canada / South America	3	1	1	1	NO
3HE00028CA	1-port 1000BASE-LX Small Form-Factor Pluggable (SFP) Optics Module, Single Mode Fiber (SMF), 10 km, 1310 nm, LC Connector, Digital Diagnostic Monitor (DDM), RoHS 6/6 compliant, Extended Temperature - 40/85C	6	2	2	2	NO
3HE09507AA	OS - 7210 SAS-T Release 7.x (or upgrade to rel 7.x) This is a per chassis license.	3	1	1	1	NO
Rack for the AMS server						**Included in BoM**
IM-TEMP-001	19 inch rack (600mm W * 900mm D * 2200mm H), including PDU	2		1	1	NO
3MC15002CBAA	7950 XRS-20 specifial 19 inch rack (600mm W *1100mm D * 2200mm H), CCLF-AL2S, PDU/TRU,125A		1			YES

3   AMS setup

3.1   E2E Diagram for Network Management

E2E Diagram for Network Management
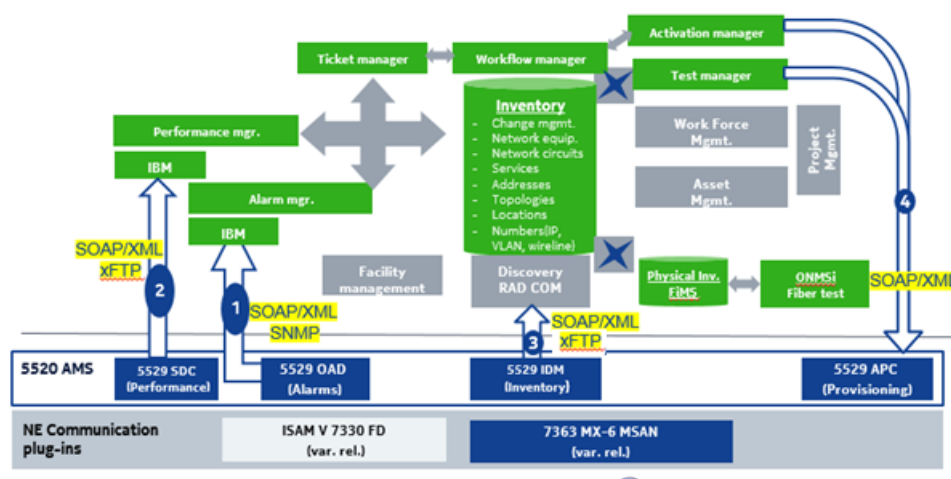
3.2 AMS GEO Redundancy Topology

4 Northband Interface

The 5520 AMS NBI component facilitates the integration of 5520 AMS data into OSS client applications. The 5520 AMS architecture is based on a web service interface over HTTP/S, which allows OSS client applications to send requests and receive responses with current system data. The 5520 AMS architecture supports the system data retrieval and user management operations performed by OSS client applications. A web services server is the interface between the OSS and the 5520 AMS. The supported operations on the 5520 AMS NBI are synchronous

RPC-type transactions, in which the data types and the request/response messages are defined.The OSS client applications and the 5520 AMS use SOAP as the web service messaging format for exchanging XML-based messages over HTTP/S. The web services operate as defined in the WSDL files, which are structured XML documents.Schema files describe the structure and elements of the SOAP XML messages. The messages are formatted according to the MTOSI 1.1 standard requirements.

Nokia 5520 EMS Interworking with OSS/BSS system architecture

4.1   5529 Access Provisioning Center

5529 APC provides OSS Interface for automation of service provisioning & activation, it can enable fast roll-out of new services to subscribers. 5529 APC Provides service provisioning in collaborative way
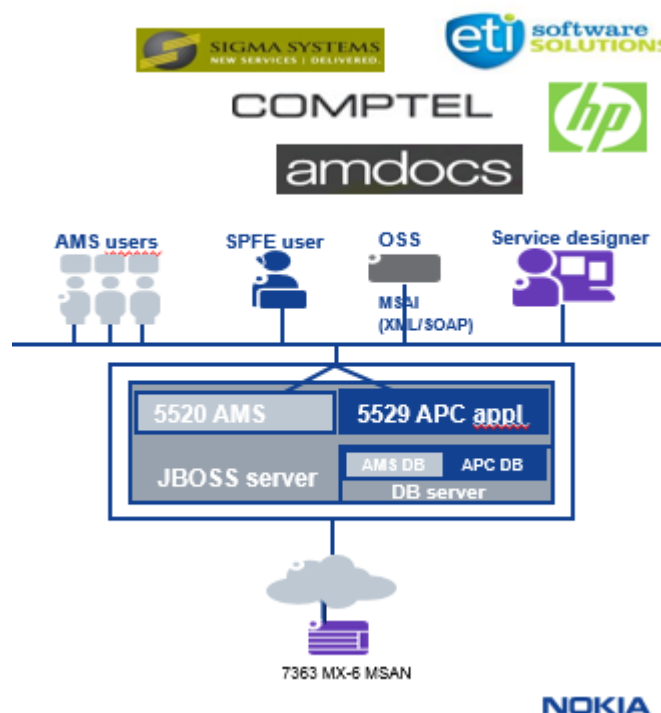
The 5529 APC provides web services that allow one or more client applications to perform service provisioning and service activation functions on the NEs. Web services allow web service clients to access the functionality of the web service provider application using standard Internet protocols, such as HTTP and XML/SOAP.

The Northbound interface and all the web services are published using the associated WSDL file. After the 5529 APC is installed, the WSDL file is located in the AMS system for all supported deployment models
The WSDL file contains:

- ◆ operations that are available over the Northbound interface for each 5529 APC function
- ◆ arguments and return types for each operation
- ◆ binding information that describes how the service is implemented. For the

Northbound interface, SOAP is used as the messaging protocol and document/literal is used as the data encoding style.

5529 Service provisioning & activation including full service life cycle supported:

- establishment,
- activation,
- suspension,
- removal,
- move,
- migrate, …

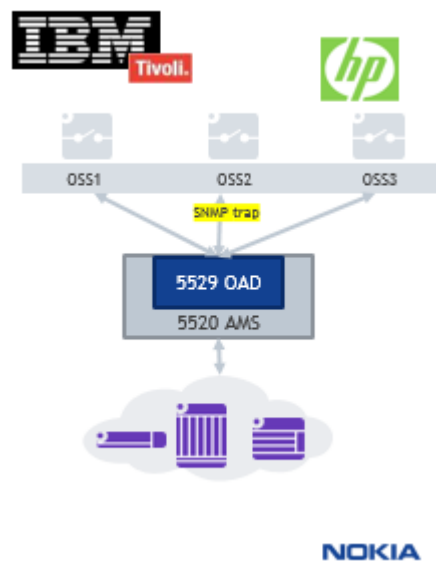Synchronous as well as asynchronous operation supported

- Synchronous: XML/SOAP message
- Asynchronous: packaged in XML file or SOAP message

4.2   5529 OSS Alarm Dispatcher

The 5529 OAD simplifies the alarm collection, aggregation and dispatching, and allows the OSS client applications to perform the following tasks:

➢ request and receive active alarms and alarm counts from the 5520 AMS:
➢ subscribe to JMS Fault topics, and receive notifications of alarms from 5520 AMS systems, as well as alarms and events from the 5529 OAD
➢ receive alarm information as SNMP traps

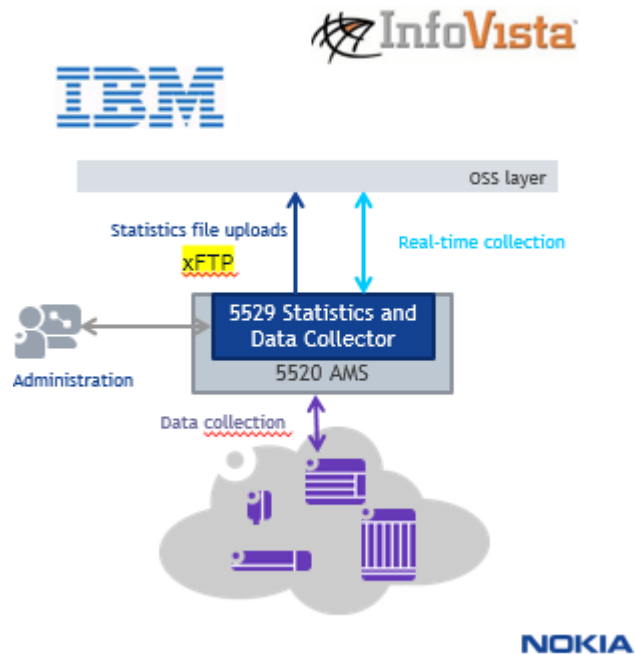SOAP and JMS are the interface used to communicate between AMS to GT OSS system

4.3 5529 Statistics and data collector

The 5529 SDC NBI component facilitates the integration of 5529 SDC data reports into OSS client applications. The 5529 SDC architecture is based on a web service interface over HTTP/S, which allows OSS client applications to send requests and receive responses with current system data.

➢ Webservices XML/SOAP NBI
  ■ Integration with multiple OSS
  ■ Nokia Connected Partner program for assured integration
➢ SFTP/HTTP(S) NBI
  ■ Collected data is streamed as CSV files to OSS

We propose to use xFTP NBI mode that OSS collect data periodicaly by xFTP protocal.

➢ Nokia will set performance monitoring collection in AMS system and generate csv file
➢ Nokia will notice the file directory to GT
➢ GT will retrive the file during non-busy hour by xFTP protocal
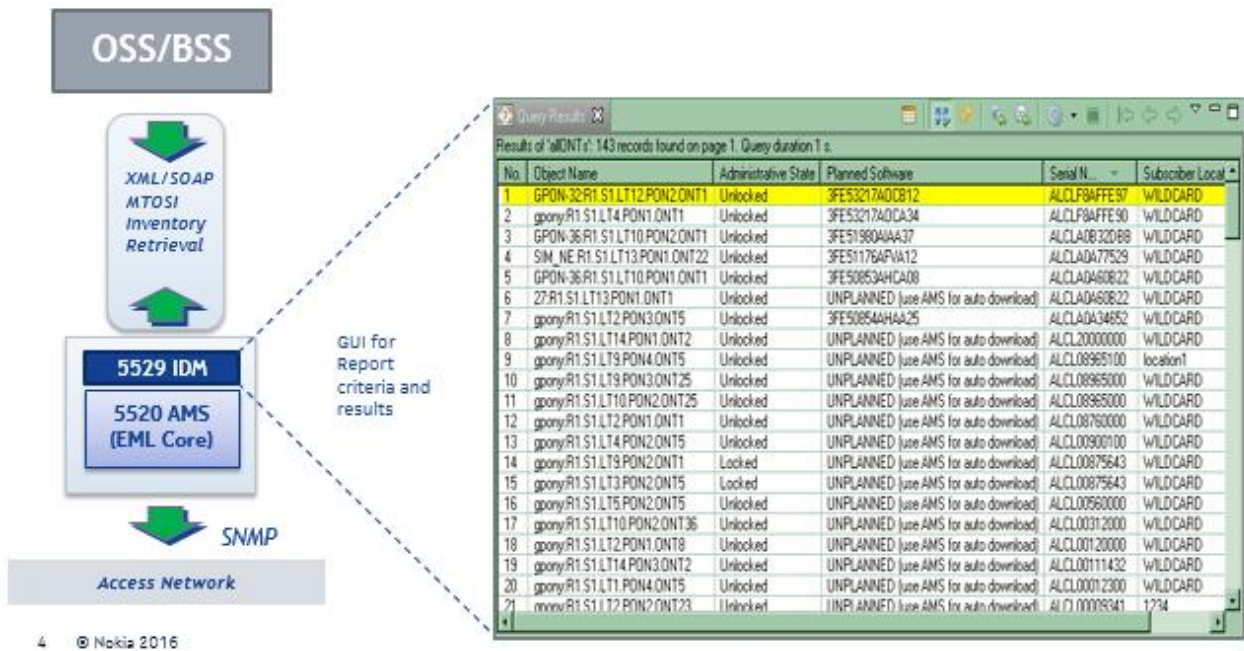
4.4   5529 Inventory Data Manager

5529 IDM is an advanced inventory management solution that provides a centralized repository of access network information. 5529 IDM helps operators to quickly and easily find and identify specific objects in their access networks. The 5529 IDM NBI component facilitates the integration of inventory data reports into OSS client applications. The 5529 IDM simplifies the inventory data reporting, and allows the OSS client applications to request and receive inventory data about the NEs supported by the 5520 AMS. The 5529 IDM architecture is based on two northbound interfaces that support data exchange with OSS client applications:

- ➢ a web service interface over HTTP/S, which allows OSS client applications to send requests and receive responses with current inventory data
- ➢ a JMS interface, which allows OSS client applications to receive inventory updates about the creation and deletion

sFTP, SOAP and JMS are the interface used to communicate between AMS to GT OSS system

- ➢ Nokia will set inventory data collection in AMS system and generate csv file
- ➢ Nokia will notice the file directory to GT
- ➢ GT will retrive the file during non-busy hour by xFTP protocal

We propose GT to use web service interface by XML/SOAP to retrieve current inventory data.

4.5 5529 NBI proposed protocal

5529 NBI Module	NBI protocal
5529 APC	SOAP/XML
5529 OAD	SOAP/XML
5529 SDC	xFTP
5529 IDM	xFTP, SOAP/XML

5 Firewall requirements for NBI

The 5529 APC requires port access for communication between the components listed in the below Table.

Firewall requirements for 5529 APC				
PORT	Protocol	Component	Service	Notes
69	UDP	5529 APC to /from NE	TFTP	Bulk Data Collection
161	UDP	5529 APC to NE	SNMP GET/SET	NE interface
4447	TCP	Client to 5529 APC	RMI object port; highavailability JRMP port	JBoss interface/Notification
8080	TCP	HTTP Client to 5529 APC	HTTP	5529 APC GUI and NBI
8443	TCP	HTTP Client to 5529 APC	HTTPS	5529 APC GUI and NBI
5445	TCP	Client to 5529 APC	Active MQ (JavaMessagingService)	

The 5529 IDM requires port access for communication between components listed in the below Table.

Firewall requirements for 5529 IDM				
PORT	Protocol	Component	Service	Notes
4447	TCP	Client to 5529 IDM NBI JMS	RMI object port; highavailability JRMP port	JBoss interface/Notification
8080	TCP	HTTP Client to 5529 IDM NBI	HTTP	5529 APC GUI and NBI
8443	TCP	HTTP Client to 5529 IDM NBI	HTTPS	5529 APC GUI and NBI
5445	TCP	Client to 5529 IDM	Active MQ (JavaMessagingService)	

The 5529 OAD requires port access for communication between components listed in the below Table.

Firewall requirements for 5529 OAD				
PORT	Protocol	Component	Service	Notes
162	UDP	5529 OAD to SNMP Client	SNMP Trap	SNMP Trap Forwarding
4447	TCP	Client to 5529 OAD	Jboss HA RMI	JBoss interface/Notification
8080	TCP	HTTP Client to 5529 OAD	HTTP	Alarm synchronization
8443	TCP	HTTP Client to 5529 OAD	HTTPS	Alarm synchronization
5445	TCP	Client to 5529 OAD	Active MQ (JavaMessagingService)	

The 5529 SDC requires port access for communication between the AMS Server and the External File Server. The list of options for the File transfer and their corresponding ports is listed in the below Table

Firewall requirements for 5529 SDC				
PORT	Protocol	Component	Service	Notes
22	TCP	5529 SDC to External File Server	SFTP	Counter Statistics File Transfer
21	TCP	5529 SDC to External File Server	FTP	Counter Statistics File Transfer (OPTIONAL)
80	TCP	5529 SDC to External File Server	HTTP	Counter Statistics File Transfer (OPTIONAL)
443	TCP	5529 SDC to External File Server	HTTPS	Counter Statistics File Transfer (OPTIONAL)
22	TCP	5529 SDC to NE	SFTP	BFMU Collection
69	UDP	5529 SDC to NE	TFTP	BFMU Collection

AMS NORTHBOUND INTERFACE HLD SIGN-OFF

GROUP	NAME	DATE SIGNED

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