



SLQS Integration Guide

AirVantage Agent



SIERRA
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Document History

Version	Date	Updates
1.0	July 29, 2013	Creation
1.1	October 18, 2013	Added auto start preprocessor in section 2.3
1.2	December 03, 2013	Added more monitoring attributes in section 3.9
1.3	January 16, 2014	Renamed avagent_r8 to avagent_r8m
1.4	April 23, 2014	Correct errors in steps and used MC7304 as an example for firmware update
1.5	April 30, 2014	Added deployed state description
1.6	June 12, 2014	Updated AVMS Portal UI to DevTree handler mapping in section 3.9
1.7	July 14, 2014	Added security section 4
1.8	July 14, 2014	Added deploy to Raspberry Pi section 5
1.9	September 23, 2014	Add make option AVMS_AUTO_START
1.10	October 16, 2014	Update for SDK 3.3.4



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1. Overview

AirVantage Agent is an enabling communication with the Sierra Wireless AirVantage cloud platform. This agent is part of the SQLS (SQLS 3.1 or newer). This agent is derived from Mihini Eclipse Open Source program.

1.1. Scope

This document describes the procedures needed to setup the embedded agents and the first steps needed to get started with the AirVantage Management Service Portal.

1.2. Reference Documents

- [1] AirVantage Agent / Mihini documentation
<http://download.eclipse.org/mihini/doc/>
- [2] AirVantage M2M Cloud documentation
<https://doc.airvantage.net/display/USERGUIDE/AirVantage+M2M+Cloud+Homepage>



2. Firmware Upgrade Implementation

This document provides a guide in integrating SLQS firmware upgrade to the AirVantage Agent.

The SLQS firmware upgrade contains two parts – a firmware upgrade background process and a firmware upgrade library.

The firmware upgrade library uses APIs defined in SLQS to perform actual firmware update for Sierra Wireless modules.

The firmware upgrade process uses AirVantage asset update APIs to receive update notification from the AirVantage server. The process responds to the notification and performs firmware upgrade by using the firmware upgrade library.

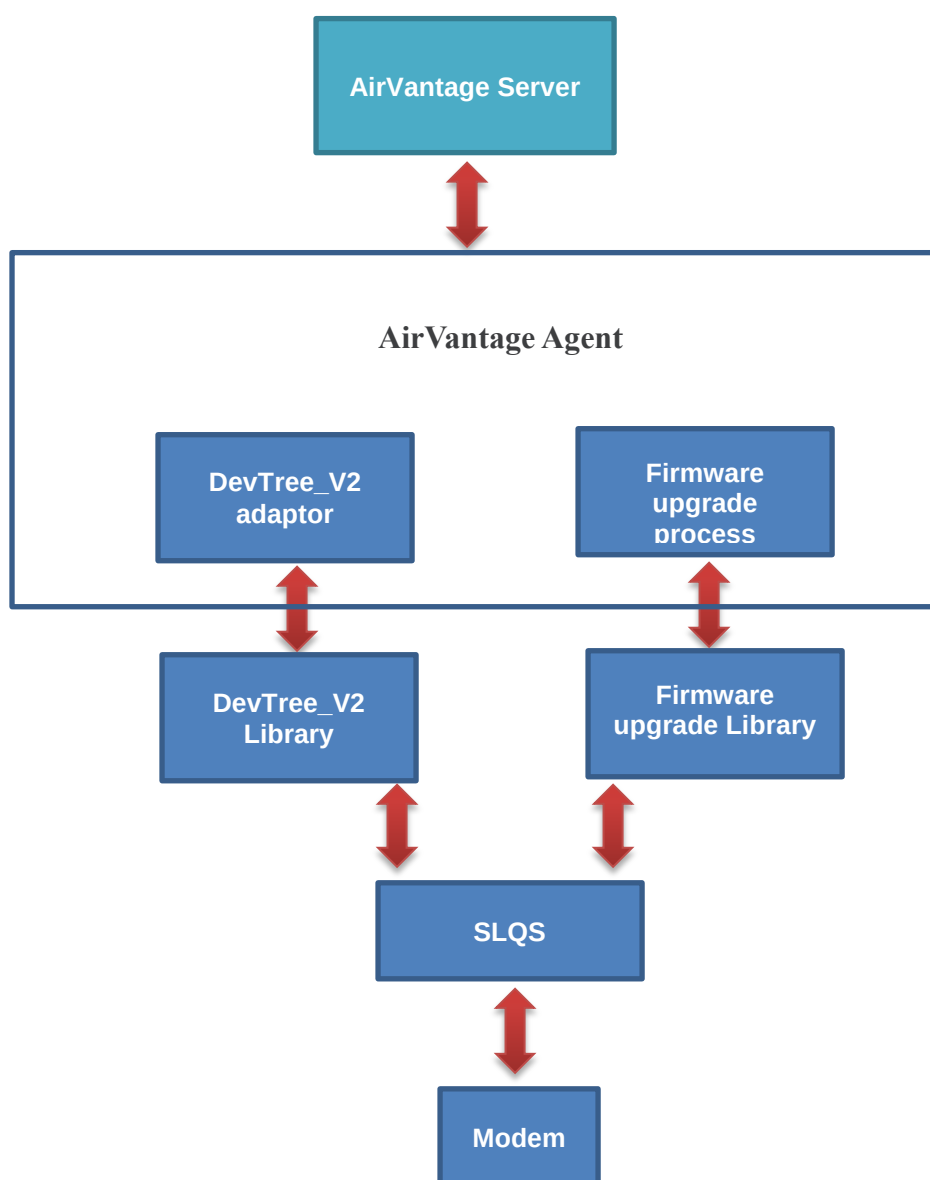


Figure 1. Firmware Upgrade Process

2.1. Pre-Compilation

Note: Only if SLQS is released in the source code.

Release content:

1. AirVantage Agent source location: **SampleApps/AirVantageAgent/avagent_r8m**
2. AirVantage Agent firmware update library location: **tools/Air_Vantage_fwupdate/**
3. AirVantage Agent DevTree library location: **tools/Air_Vantage_Dev_Tree_v2**

2.2. Auto Start Preprocessor

AGENT_AUTO_START is by default disabled at **pkgs/slqscompile.mak**.

To enable, run make command with **AVMS_AUTO_START=1**

```
make -C pkgs -f pkgs.mak complete AVMS_AUTO_START=1
```

2.3. Configure AirVantage Agent

The default setting of agent is to not actively connect to the AirVantage portal to prevent unnecessary data traffic.

Users need to modify the configuration file of the agent to enable periodic server connection as follows:

- X86 config file: **AirVantageAgent/avagent_r8m/porting/default/agent/defaultconfig.lua**
- ARM config file: **AirVantageAgent/avagent_r8m/porting/arm/agent/defaultconfig.lua**

To enable periodic server connections, enable the variables below in the configuration file:

```
server.autoconnect = { }
```

```
server.autoconnect.period = 15 -- period in minute (connect every 15 minutes)
```

To change the AirVantage server address, the **server.url** variable has to be modified as shown in the following example.

```
Example: server.url = "tcp://na.airvantage.net:44900"
server.url = "tcp://eu.airvantage.net:44900"
```

Note: The agent has to be rebuilt after the configuration file is changed.

2.4. Compilation

Note: Only if SLQS is released in source code.

1. Build the SLQS executable and library from source by running **make -f pkgs.mak CPU=xxx**.
The xxx CPU targets are defined in **pkgs/slqscompile.mak**
2. Build SLQS tools and sample applications by running the following codes:

```
make -f pkgs.mak tools CPU=xxx
make -f pkgs.mak sapps CPU=xxx
```

3. Build the AirVantage Agent at folder AirVantageAgent
for x86: `build_avagent.sh`
for arm: `build_avagent.sh arm`
To use a different tool chain for the AirVantage Agent, edit
SampleApps/AirVantageAgent/avagent_r8m/cmake/toolchain.xxx.cmake
4. The **build.xxx** (such as build.default) folder will be created after the build is completed.

2.5. Setup AirVantage Agent

1. Edit or create the `.sdk_config` file located in the SLQS executable folder.
2. Modify the config file if necessary:
e.g. `AVA_PATH= /absolute path/build.xxx/runtime`
or
`AVA_PATH=NO_AVA`
where NO_AVA means disabling AirVantage Agent (only the first line of the config file is valid).
3. If the config file doesn't exist, SLQS will search for an agent folder in the SLQS executable folder with folder name AirVantageAgent. If the agent folder is not found, SLQS will not start.

2.6.

-
-

Note:

2.7. Start AirVantage Agent

From SDK 3.3.4 onwards, a data call manager is embedded in AVMS. It will start a data call before connecting the server portal. The network interface, profile id and dhcp command are configurable at `config.server.network`

```
➔ 42 telnet localhost 2000
Trying 127.0.0.1...
Connected to localhost.
Escape character is '^]'.
Lua interactive shell
> :agent.config.network
= {
  interface = "eth1",
  dhcp_cmd = "route del default; dhclient -v ",
  profileid = 3,
  activate = true }
>
```

2.7.1. With AVMS_AUTO_START defined

From SLQS3.2, the AirVantage Agent is automatically started when SLQS starts when AUTO_AVMS_START macro is defined. The agent doesn't need to start explicitly.

Starting any sample application will start the AirVantage Agent as well.

An example log is shown below.

```
willis@willis-T430:~/projects/Linux_QMI_SDK/tags/SLQS03.03.01/SampleApps/Connection_Manager$ sudo
./bin/connectionmgrhostx86_64 ../../build/bin/hostx86_64/slqssdk 0
```

```
#devices: 1
```

```
deviceNode: /dev/qcqm1
```

```
deviceKey: 0000000000000000
```

```
[AVMS-FW-DL]Running with device in ready mode
```

```
...
```

```
[DevTree] Running with device in ready mode
```

```
---- GetVar ---- 1 -> 0
```

Please select one of the following options or press <Enter> to exit:

1. Start UMTS Data Session
2. Start LTE Data Session
3. Start CDMA Data Session
4. Start RUIM data session
5. Stop the currently active Data Session
6. Display all the profiles stored on the device
7. Display the settings for a particular profile stored on the device
8. Create a Profile on the device
9. Modify the settings of an existing profile stored on the device
10. Delete a profile stored on the device
11. Power cycle the device
12. Set Device Power Mode
13. Qos testing

2.7.2. Without AVMS_AUTO_START defined

Launch AVMS agent with start.sh script

```
sudo ./SampleApps/AirVantageAgent/build.default/runtime/start.sh
```

```

→ 334 git:(master) X sudo ./SampleApps/AirVantageAgent/build.default/runtime/start.sh
→ 334 git:(master) X 2014-10-16 14:45:20 GENERAL-INFO:
*****
2014-10-16 14:45:20 GENERAL-INFO: Starting ReadyAgent ...
2014-10-16 14:45:20 GENERAL-INFO: ReadyAgent: 8.0 - Build: 70cb0cf
2014-10-16 14:45:20 GENERAL-INFO: Lua VM: Lua 5.1.4 (+meta pairs/ipairs) (+patch-
lua-5.1.4-3)
2014-10-16 14:45:20 GENERAL-INFO: System: Linux t400 3.13.0-24-generic #47-Ubuntu
SMP Fri May 2 23:30:00 UTC 2014 x86_64
2014-10-16 14:45:20 GENERAL-INFO:
*****
2014-10-16 14:45:20 GENERAL-INFO: Migration executed successfully
#devices: 1
deviceNode: /dev/qcqm1
deviceKey: 35922505006913
#devices: 1
deviceNode: /dev/qcqm1
deviceKey: 35922505006913

[AVMS-FW-DL]Running with device in ready mode

[DevTree] Running with device in ready mode
---- FOUND libdevtree.so.2 ----
---- GetVar ---- 1 -> 0
---- Resolving 'dt2_GetDeviceId'... FOUND (0x7f0391926e44)
Got string value '359225050069137'.
2014-10-16 14:45:23 GENERAL-INFO: Device ID = "359225050069137"
2014-10-16 14:45:23 GENERAL-INFO: generating 'crypto.key'
---- GetVar ---- 4000 -> 33
---- Resolving 'dt2_GetSerialNumber'... FOUND (0x7f039192a536)
buffSize 100
SLQSSwiGetFSN rtn 42f
Got string value 'Unknown'.
2014-10-16 14:45:23 AGENT-PROVISIONING-WARNING: Setting authentication and encryption
key
Setting authentication and encryption key
2014-10-16 14:45:23 AGENT-PROVISIONING-WARNING: K =88 18 3b 94 6c c5 f0 e8 c9 6b 2e 66
e1 c7 4a 7e
K =88 18 3b 94 6c c5 f0 e8 c9 6b 2e 66 e1 c7 4a 7e
2014-10-16 14:45:23 AGENT-PROVISIONING-WARNING: KS=b7 eb 21 5a 13 be 67 c4 f2 02 54 fe
76 d2 ea 80
KS=b7 eb 21 5a 13 be 67 c4 f2 02 54 fe 76 d2 ea 80
2014-10-16 14:45:23 AGENT-PROVISIONING-WARNING: KD=a8 50 e8 cf 5c 1c 44 c8 89 56 69 c2
38 02 71 89
KD=a8 50 e8 cf 5c 1c 44 c8 89 56 69 c2 38 02 71 89
2014-10-16 14:45:23 AGENT-PROVISIONING-WARNING: Keys written in store
Keys written in store
2014-10-16 14:45:23 GENERAL-INFO: key set
2014-10-16 14:45:23 GENERAL-INFO: Module [AssetConnector] initialized
2014-10-16 14:45:23 SHELL-INFO: Binding a shell server at address ?localhost, port 2000
2014-10-16 14:45:23 GENERAL-INFO: Module [Lua Shell] initialized
2014-10-16 14:45:23 GENERAL-INFO: Module [NetworkManager] initialized
2014-10-16 14:45:23 GENERAL-INFO: Module [DataManagement] initialized
2014-10-16 14:45:23 SRVCON-INFO: Server URL = "tcp://eu.airvantage.net:44900"
2014-10-16 14:45:23 GENERAL-INFO: Module [ServerConnector] initialized
2014-10-16 14:45:23 ASSCON-INFO: Connection received from asset [table: 0xa908f0] at
'<local ipc=table: 0xa77410>:0'
2014-10-16 14:45:23 ASSCON-INFO: Asset registered, name="@sys", id=table: 0xa908f0.
2014-10-16 14:45:23 GENERAL-INFO: Module [DeviceManagement] initialized
2014-10-16 14:45:23 GENERAL-INFO: Module [Update] initialized
2014-10-16 14:45:23 GENERAL-INFO: ReadyAgent successfully initialized
2014-10-16 14:45:27 ASSCON-INFO: Connection received from asset [table: 0x9aedd0] at
'127.0.0.1:57475'
2014-10-16 14:45:27 ASSCON-INFO: Asset registered, name="SLQS_FW_UPDATER", id=table:
0x9aedd0.
2014-10-16 14:45:28 SHELL-INFO: Shell connection from client (127.0.0.1)
2014-10-16 14:45:53 DATAMGR-INFO: flushing policy "default"
2014-10-16 14:45:53 DATAMGR-INFO: flushing policy "now"
GetSessionState returned 0
[c-netman]state 1
2014-10-16 14:45:53 NETMAN-INFO: starting data call with profile id 3

```

2.8. Setup AirVantage Management Service Portal

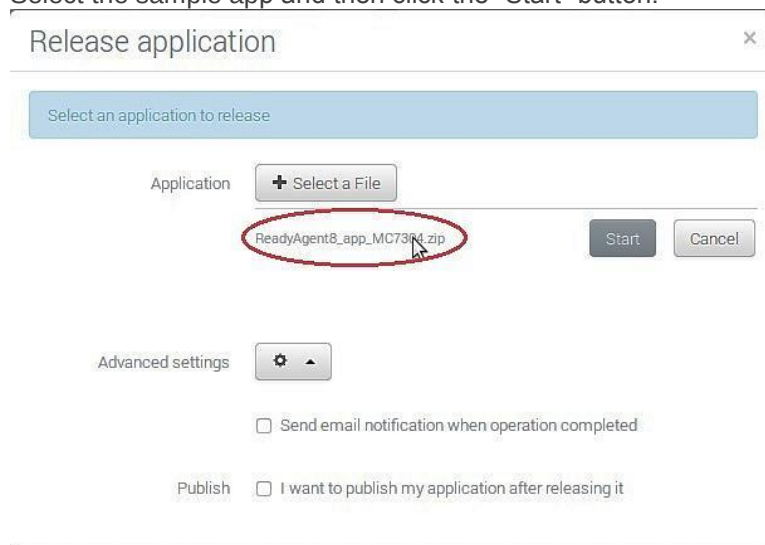
There are two sample applications for the AirVantage portal at **Linux_QMI_SDK/resource/AirVantageApps**.

Modify **readyagent_com_model_noauth_nociph.app** to update the application name and version number.

Modify **install/Manifest** to give a proper asset name. The readyagent firmware upgrade process will check this asset name and perform firmware upgrade for a different modem.

Upload the application on the AirVantage Portal by following these steps:

1. Create an AirVantage Management Service trial account at **<https://signup.airvantage.net/public/avms/>**.
2. Login to AirVantage Management Service Portal.
3. In the Develop tab, click “My Apps” and then click the “Release” button.
4. Select the sample app and then click the “Start” button.



5. After the upload is completed, select the app and click “Publish”.
6. Make sure your application is in published state.



7. Create a gateway.
 - a. In the Inventory tab, click “Gateways” and then click the “Create” button to add a new gateway.
 - b. Click the “Create” button.
8. Create a system.
 - a. In the Inventory tab, click “System” and then click the “Create” button to add a new system.

- Give it a name and then check the "Select gateway" option and then click "Next".
- Select the newly created gateway and then click "Next".
- Select the newly uploaded application from step 4 and then click "Next".
- Click the "Create" button.
- Select your newly created system and then click the "Activate" button.
- Make sure the system is in "Deployed" state as shown below. Launching any sample application of SLQS will bring up the system to Deployed state (this may take a few minutes). The AirVantage M2M Cloud automatically switches the system state to Deployed at first communication of a Ready system, whatever the protocol. For more information, visit <https://doc.airvantage.net/display/USERGUIDE/Getting+Started>.

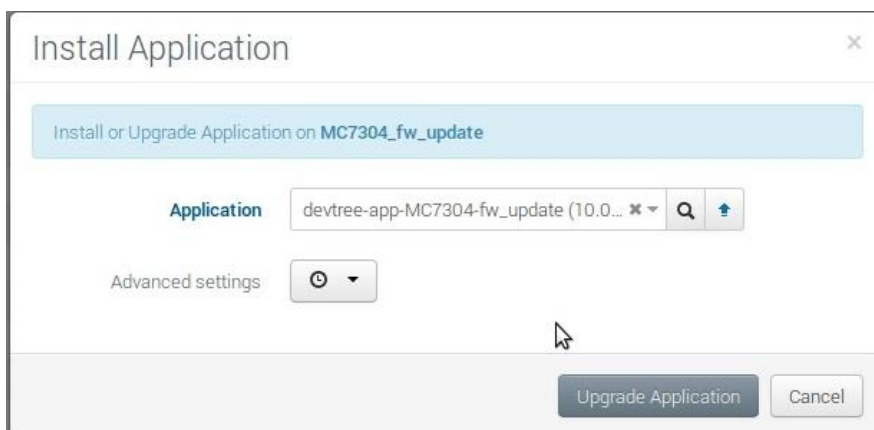
	Name	IMEI/ESN	Serial Number	MAC Address	ICCID/ESN	Firmware	Labels
☐	MC7304_fw_update	356853050000522	-	-	8985206120724...	-	MC7304_fw_update

2.9. Launch Firmware Upgrade through AirVantage Management Service Portal

- Login to the AirVantage server.
- In Monitor tab, select your system, (e.g, MC7304_fw_update) as shown below.

	Name	Last Comm. date	Labels	IMEI/ESN	Serial Number	System Type	Firmware	Technology	RSSI
☐	Ruben_MC7700_6333	-	-	012626000...	CDC29522739...	-	-	UNKNOWN	-
☐	Test Unit-101	-	-	123456789...	12345678911...	SL8080T	-	UNKNOWN	-
☐	MLW_SL6087_sarco	an hour ago	MLW test	359193033...	BE232027670...	-	OASIS SL6087 (R7.45.1...	UNKNOWN	-
☐	sdK323-mc7700	7 days ago	-	001027009...	-	-	-	UMTS	-
☐	sdK323-mc7710	a day ago	-	358178040...	-	-	-	NONE	-
☐	MC7700_Ruben_6431	-	-	359469040...	CAH15422003...	-	-	UNKNOWN	-
☐	dpm_SL6087_demo	7 days ago	-	359193033...	BE239012950...	SL6087	OASIS SL6087 (R7.46.0...	UNKNOWN	-
☐	dpm_SL6087	-	-	359193033...	BE238007650...	-	-	UNKNOWN	-
☐	Ruben_Cisco_MC7700	a day ago	-	012626000...	-	-	-	UMTS	-
☐	Jons_MC7700_AVMS	-	-	012626001...	CDC09931143...	Q2686G	-	UNKNOWN	-
☐	SL8082T_JBR	16 days ago	JBR	352561050...	CEM02331139...	-	OASIS SL8082T (R7.52.0...	UNKNOWN	-
☐	Test Modem CYU-1	14 days ago	test CYU	004401760...	AK115000090...	AirLink GL6100	OASIS EWM100 (R7.45.1...	UNKNOWN	-
☐	Sebz 1	20 days ago	sebz	-	SBZ1	-	ALEOS ES440 (4.3.5.010)	UNKNOWN	-
☐	demo	23 days ago	test	004401769...	BE012000150...	-	OASIS SL6087 (R7.47.0...	UNKNOWN	-

- Click the "More" button and then select "Install Application"; select **devtree-app-MC7304-fw_update** package.
- Click the "Update Application" button to start a firmware update from the server.



5. Firmware update will start automatically when the AirVantage Agent connects to the AirVantage server.
6. Logs on the console are displayed below.

```

2014-04-23 16:30:57 AV-DEBUG: empUpdateNotifHdlr
2014-04-23 16:30:57 AV-DEBUG: get_path_element: SLQS_FW_UPDATER.MC7304_pkg
2014-04-23 16:30:57 AV-DEBUG: get_path_element: left[SLQS_FW_UPDATER.MC7304_pkg][16],
right[MC7304_pkg][11]
2014-04-23 16:30:57 AV-DEBUG: get_path_element: pathLeftPart=SLQS_FW_UPDATER,
pathRightPart=MC7304_pkg
2014-04-23 16:30:57 AV-DEBUG: process
2014-04-23 16:30:57 AV-DEBUG: updateNotificationCb slqs : MC7304_pkg
2014-04-23 16:30:57 AV-DEBUG: updateNotificationCb path =
/home/willis/projects/Linux_QMI_SDK/tags/SLQS03.03.01/SampleApps/AirVantageAgent/build.default/runtime/update/
tmp/package_0a7b3b6125c04af2aeae8774c90fbee8/fw/
2014-04-23 16:31:23 AV-DEBUG: start SLQS MC73xx fw update

Firmware before download
PRI version: 005.008
Pkg version: 000
Firmware version: 05.05.26.00
Carrier : TELSTRA
INFO: Could not get details from the PRI image at the path: - will use PRI image present on device
Failure Code : 59395
Downloading Firmware. ....
Firmware Download Completed
Device Ready
Instance ID :0
Session StateV4:1
Session StateV6:1
Instance ID :1
Failed to get Session State
Instance ID :2
Failed to get Session State

```

7. Logs on the **mihini.log (/var/lib/mihini.log)** are displayed below.

```

2014-04-23 16:30:16 M3DA-SESSION-INFO: Opening default session #14
2014-04-23 16:30:17 M3DA-SESSION-INFO: Closing default session #14 with status 200.
2014-04-23 16:30:17 RACON-ASSET-TREE-INFO: Asset acknowledgement left to the handler
2014-04-23 16:30:17 UPDATE-INFO: Update Step: [1][start_update] finished successfully
2014-04-23 16:30:17 UPDATE-INFO: Start download using M3DA command info
2014-04-23 16:30:22 UPDATE-INFO: Download: No download file found, download from scratch
2014-04-23 16:30:57 UPDATE-INFO: Update Step: [2][download_package] finished successfully
fw/
fw/1102017_9903295_SWI9X15C_05.05.16.00_00_Generic_005.003_000-field.spk
Manifest
scripts/
scripts/install.lua
2014-04-23 16:30:57 UPDATE-INFO: Software Update Package from m3da protocol is accepted.
2014-04-23 16:30:57 UPDATE-INFO: Update Step: [3][check_package] finished successfully
2014-04-23 16:30:57 UPDATE-INFO: Sending SoftwareUpdate command to SLQS_FW_UPDATER.MC7304_pkg
2014-04-23 16:33:07 UPDATE-INFO: Update Step: [4][dispatch_update] finished successfully
2014-04-23 16:33:07 UPDATE-INFO: Acknowledging update command to M3DA server
2014-04-23 16:33:12 DATAMGR-INFO: flushing policy "now"
2014-04-23 16:33:12 M3DA-SESSION-INFO: Opening default session #15
2014-04-23 16:33:13 M3DA-SESSION-INFO: Closing default session #15 with status 200.
2014-04-23 16:33:13 RACON-ASSET-TREE-INFO: Asset acknowledgement left to the handler
2014-04-23 16:33:13 UPDATE-INFO: Update Step: [1][start_update] finished successfully
2014-04-23 16:33:13 UPDATE-INFO: Start download using M3DA command info

```

2.10. Supported Service

Supported Service	Modem	Sample Apps
Firmware update	MC7700	agent2_imei_fwup_OK_MC7710.zip
	MC7710	
	MC7750	
	MC8305	agent2_imei_fwup_OK_MC8355.zip
	MC8355	
	MC9090	
	SL9090	
	MC73xx	ReadyAgent8_app_MC7304.zip

2.11. System Requirements

When the AirVantage Agent starts, there are a few processes that start running in the background. The following table enumerates these processes.

Process Name	Description	Maximum Number of Threads	Maximum Resident Size (KB)	Maximum Stack + Data Size (KB)
Slqssdk	SLQS main process	14	~1300	~9000
Agent	AirVantage Agent main process	1	~6500	~12000
slqs_fw_update	AirVantage Agent background process for fw update	3	~1300	~26000

About 60MB of memory is needed when the AirVantage Agent performs an AirVantage server triggered firmware update.

Note: The memory figures are captured using Linux "top" command.



3. Device Tree Implementation

The Device Tree is the engine managing variables to be remotely accessible in either read or write through the AirVantage Cloud Platform.

The following sub-sections provide information about the "Air Vantage Dev Tree v2 application".

This is not actually an application on its own. Rather, it is a library that acts as an adapter between the AirVantage Agent and SLQS, effectively making a connected Qualcomm QMI-based modem device available for management via the Sierra Wireless AirVantage Cloud Platform.

3.1. Pre-Compilation (Only if SLQS is released in Source Code)

- The source code is available at The source code is available at:
 - tools/Air_Vantage_Dev_Tree_v2/
- Obtain a copy of the Device Management Tree Specification, Version 2 header files (devtree_v2.h). A copy of this file is included in the AirVantage Agent source tree of SLQS source release package.
- Open the "makefile" in a text editor and set the following variables:
 - AIRVANTAGE_AGENT_DIR --> path to the root of the AirVantage Agent source tree.
 - DEVTREE_V2_PATH --> path to the directory containing the devtree_v2.h file.

Note: Obviously, the makefile's "install" rules will have to be tailored further if this adapter library is to be used with a different Air Vantage communications agent other than the AirVantage Agent.

- Save the makefile.

3.2. Compilation (Only if SLQS is released in Source Code)

- Just run "make" to build the adapter library and install it into the AirVantage Agent (or other Air Vantage communications agent).
- By default, the application is compiled for i86 platform.
- The application can be compiled for different platform using the CPU option:

"make CPU=<platform>"

where <platform> = arm9 in case of ARM and ppc in case of Power PC.

- Supported platform and its compiler path are configured at pkgs/slqscompile.mak
- For arm9 and powerpc, platform specific toolchains are required. These must be installed to the \$(HOME) directory once, and can be used for all SDK workspaces. If they do not exist, "make CPU=arm9" and "make CPU=ppc" will simply fail.
- Below is an example to add raspberry as CPU=rpi
 - Insert below in pkgs/slqscompile.mak

```
#raspberry pi
(https://github.com/raspberrypi/tools.git)

ifeq ($(CPU),rpi)
    CROSS_COMPILE := $(HOME)/tools/arm-bcm2708/gcc-
linaro-arm-linux-gnueabi-hf-raspbian-x64/bin/arm-linux-
gnueabi-hf-
```

3.3. Execution

The library is loaded automatically and used as needed by the AirVantage Agent.

3.4. Adding More Device Tree Variables

To add support for more device tree variables, implement more of the functions defined in the Device Management Tree Specification header file (devtree_v2.h).

This can generally be done by:

1. Copying function prototypes from devtree_v2.h into a .c file under SampleApps/Air_Vantage_Dev_Tree_v2/src
2. Implementing the body of those functions (using SLQS API functions to access the modem).

The files under SampleApps/Air_Vantage_Dev_Tree_v2/src are named according to the section of the Device Management Tree Specification that they implement. For example, variables found under the "system.cellular" branch of the tree are implemented in the file "cellular.c".

If you need to add a new .c file for a new section of the specification,

1. Create the .c file under SampleApps/Air_Vantage_Dev_Tree_v2/src.
2. Add the name of the .c file to the "SOURCES" list in SampleApps/Air_Vantage_Dev_Tree_v2/makefile.

In addition to the Dev Tree v2 accessor function implementation modules, there is the module "main.c". This file implements the adapter library's start-up code (library constructor). This is the part of the adapter that starts-up the SLQSDK and attaches to the SLQSDK Daemon process. This module also

- exports a function to other modules that allows them to fetch the current device mode, and
- implements the special function dt2_GetDeviceld() that fetches the identifier used to identify the device to the Air Vantage platform.

3.5. Testing via Lua Shell

After the AirVantage Agent has been started, it is possible to verify the Device Tree library by using the Lua shell as shown below:

```
$ telnet localhost 2000
Trying ::1...
Trying 127.0.0.1...
Connected to localhost.
Escape character is '^]'.
Lua interactive shell
> tm=require'agent.treemgr'
> tm.get("system.mdm.global_id")
> id=tm.get("system.mdm.global_id")
> print(id)
012626000713915
```

Log:

```

2013-04-26 01:41:10 GENERAL-INFO: *****
2013-04-26 01:41:10 GENERAL-INFO: Starting ReadyAgent ...
2013-04-26 01:41:10 GENERAL-INFO:   ReadyAgent: 9.0-DEV - Build: 387672c
2013-04-26 01:41:10 GENERAL-INFO:   Lua VM: Lua 5.1.4 (+meta pairs/ipairs) (+patch-lua-5.1.4-3)
2013-04-26 01:41:10 GENERAL-INFO:   System: Linux stanley-ubuntu 3.4.25-030425-generic #2013011111332 SMP Fri
Jan 11 18:43:25 UTC 2013 i686
2013-04-26 01:41:10 GENERAL-INFO: *****
2013-04-26 01:41:10 GENERAL-INFO: Module [AssetConnector] initialized
2013-04-26 01:41:10 SHELL-INFO: Binding a shell server at address ?localhost, port 2000
2013-04-26 01:41:10 GENERAL-INFO: Module [Lua Shell] initialized
2013-04-26 01:41:10 GENERAL-INFO: Module [DummyNetman] initialized
2013-04-26 01:41:10 GENERAL-INFO: Module [Lua RPC] initialized
2013-04-26 01:41:10 GENERAL-INFO: Module [ServerConnector] initialized
2013-04-26 01:41:10 GENERAL-INFO: Module [DataManagement] initialized
2013-04-26 01:41:10 ASSCON-INFO: Connection received from asset [table: 0x8ded2c0] at '<local ipc=table: 0x8e5ad58>:0'
2013-04-26 01:41:10 ASSCON-INFO: Asset registered, name="@sys", id=table: 0x8ded2c0.
2013-04-26 01:41:10 GENERAL-INFO: Module [DeviceManagement] initialized
2013-04-26 01:41:10 GENERAL-INFO: Module [ApplicationContainer] initialized
2013-04-26 01:41:10 GENERAL-INFO: Module [Update] initialized

```

3.6. Access Device Tree Variables on AirVantage Portal

Please refer to following sections in the AirVantage Portal user guide:

1. Configuration section in:
<https://doc.airvantage.net/display/USERGUIDE/Monitor+Activity#MonitorActivity-MonitorSystemsSection>
2. How to section in:
<https://doc.airvantage.net/display/USERGUIDE/Monitor+Activity#MonitorActivity-MonitoringHowTo%3FSection>
3. Retrieving data section in:
<https://doc.airvantage.net/display/USERGUIDE/Monitor+Activity#MonitorActivity-Toretrievedatafromoneorseveralsystem%28s%29>

3.7. AVMS Portal UI to DevTree Handler

Monitoring Field	DevTree Attribute or Question	DevTree Handler @ cellular.c
Technology	system.cellular.link.service	dt2_GetTech
Signal Information	<indicator calculated base on below>	

Monitoring Field	DevTree Attribute or Question	DevTree Handler @ cellular.c
Details	RSSI: system.cellular.link.rssi RSRP: system.cellular.lte.link.rsrp Ec/Io: system.cellular.gsm.link.ecio RSRQ: system.cellular.lte.link.rsrq	dt2_GetRssi dt2_GetRsrp dt2_GetGsmEcio dt2_GetRsrq
Traffic	Bytes sent: system.cellular.link.bytes_sent Bytes received: system.cellular.link.bytes_rcvd	dt2_GetBytesSent dt2_GetBytesRcvd
Current Operator	system.cellular.gsm.link.operator	dt2_GetOperator
IP Address	system.cellular.link.ip	dt2_GetIP
Firmware	system.sw_info.fw_name system.sw_info.fw_ver	dt2_GetFwName dt2_GetFwVer
IMEI/ESN	system.cellular.hw_info.imei	dt2_GetImei
Serial Number	Assigned in gateway creation, not an DevTree attribute	
System Type	Assigned in gateway creation, not an DevTree attribute	
Subscription	system.cellular.sim.iccid	dt2_GetIccid
Phone number	system.cellular.subscriber.phone_num	dt2_GetPhoneNum
Last applied Template	N/A	
Labels	Assigned in gateway creation, not an DevTree attribute	

Timeline UI Label	DevTree Attribute	DevTree Handler @ cellular.c
N/A	system.mdm.global_id	dt2_GetImei
Board Temp in Celsius degrees	system.advanced.board_temp	dt2_GetBoardTemp
Radio Module Temp in Celsius degrees	system.advanced.radio_temp	dt2_GetRadioTemp
Nb of system resets	system.advanced.reset_nb	dt2_GetResetCnt
Current APN	system.cellular.apn.current	dt2_GetApn
Ec/Io	system.cellular.cdma.link.ecio	dt2_GetCdmaEcio
Operator	system.cellular.cdma.link.operator	dt2_GetCdmaOperator
CDMA current PN Offset	system.cellular.cdma.link.pn_offset	dt2_GetCdmaPnOff
Sector Identifier (SID)	system.cellular.cdma.link.sid	dt2_GetCdmaSid
Network Identifier (NID)	system.cellular.cdma.link.nid	dt2_GetCdmaNid
Cell Id	system.cellular.gsm.link.cell_id	dt2_GetGsmCellId
Ec/Io	system.cellular.gsm.link.ecio	dt2_GetGsmEcio
Operator	system.cellular.gsm.link.operator	dt2_GetOperator
Bytes received	system.cellular.link.bytes_rcvd	dt2_GetBytesRcvd
Bytes sent	system.cellular.link.bytes_sent	dt2_GetBytesSent
Cellular connection IP address	system.cellular.link.ip	dt2_GetIP
Packets received	system.cellular.link.pkts_rcvd	dt2_GetPktRcvd
Packets sent	system.cellular.link.pkts_sent	dt2_GetPktSent
Roaming status	system.cellular.link.roam_status	dt2_GetRoamStatus
Service	system.cellular.link.service	dt2_GetTech

Timeline UI Label	DevTree Attribute	DevTree Handler @ cellular.c
RSSI	system.cellular.link.rssi	dt2_GetRssi
RSRP	system.cellular.lte.link.rsrp	dt2_GetRsrp
RSRQ	system.cellular.lte.link.rsrq	dt2_GetRsrq
N/A	system.gps.altitude	dt2_GetAltitude
Latitude	system.gps.latitude	dt2_GetLatitude
Longitude	system.gps.longitude	dt2_GetLongitude
N/A	system.cellular.hw_info.imei	dt2_GetImei
N/A	system.cellular.sim.iccid	dt2_GetIccid
N/A	system.cellular.sim.imsi	dt2_GetImsi
Phone_num	system.cellular.subscriber.phone_num	dt2_GetPhoneNum
Firmware Version	system.sw_info.fw_ver	dt2_GetFwVer
Firmware Name	system.sw_info.fw_name	dt2_GetFwName
N/A	system.aleos.cellular.state	dt2_GetPinStatus
N/A	system.cellular.apn.apn	dt2_GetApnOverride/dt2_SetApnOverride

4. To enable security in AVMS

4.1. Portal setup

To setup password on portal, please open the padlock icon when creating system.

Create system

Create a new System

Name

Gateway Select a Gateway

Subscriptions Select Subscriptions

Applications MC7710 (GENERIC) (SWI9200X_03.05.29.00)

Labels Select a label

☐ I want to activate my system after creating it

Create Cancel

Then, enter your password in the Credentials window

Credentials

Provide security credentials.

M3DA

Password

☐ Set Provisioning Password

Continue Cancel

That is, the server now is configure with the password you just provided

4.2. AVMS Agent password setup

To setup password on AVMS agent

Firstly, make sure agent_provisioning module is compiled

For x86 target, run

```
cd SampleApps/AirVantageAgent/build.default; make all agent_provisioning
```

Secondly, telnet to Lua shell to configure the password

```
telnet localhost 2000
```

On the prompt, run

```
agent.config.server.authentication ='hmac-sha1'  
agent.config.server.encryption ='aes-cbc-128'  
require 'agent.provisioning'.password '<password>'
```

Please replace the password above with the one you have provided on the portal setup.

Below show a sample section of Lua shell

```
➔ 3 git:(master) X telnet localhost 2000  
Trying 127.0.0.1...  
Connected to localhost.  
Escape character is '^]'.  
Lua interactive shell  
> agent.config.server.authentication ='hmac-sha1'  
> agent.config.server.encryption ='aes-cbc-128'  
> require 'agent.provisioning'.password '<password>'  
Setting authentication and encryption key  
K =e6 e6 6b 89 81 c1 03 0d 56 50 da 15 9e 79 53 9a  
KS=11 dc dd 4b fd 5d 0e 46 1d a0 26 37 19 12 96 5e  
KD=bf 0f f2 1f fe 2d 61 5f 41 de 51 3d 24 0c eb d7  
Keys written in store  
> av=require 'airvantage'  
> av.connecttoserver()  
>
```

And the corresponding mihini log during authentication

```
2014-07-14 16:15:48 AGENT-PROVISIONING-WARNING: Setting authentication and  
encryption key
```

2014-07-14 16:15:48 AGENT-PROVISIONING-WARNING: K =e6 e6 6b 89 81 c1 03 0d
56 50 da 15 9e 79 53 9a

2014-07-14 16:15:48 AGENT-PROVISIONING-WARNING: KS=11 dc dd 4b fd 5d 0e 46
1d a0 26 37 19 12 96 5e

2014-07-14 16:15:48 AGENT-PROVISIONING-WARNING: KD=bf 0f f2 1f fe 2d 61 5f
41 de 51 3d 24 0c eb d7

2014-07-14 16:15:48 AGENT-PROVISIONING-WARNING: Keys written in store

2014-07-14 16:16:48 M3DA-SESSION-INFO: Sending data through authenticated
and encrypted session

2014-07-14 16:16:49 M3DA-SESSION-WARNING: Server issued a challenge,
resending with a new nonce

2014-07-14 16:16:50 M3DA-SESSION-INFO: Resynchronized message accepted by
server

2014-07-14 16:16:50 M3DA-SESSION-INFO: Accepted authenticated and encrypted
response from server

Reference: <https://wiki.eclipse.org/Mihini/Security>

5. Deploy to Raspberry Pi

5.1. Build

5.1.1. Configure toolchain

```
cd ~  
git clone https://github.com/raspberrypi/tools.git
```

5.1.2. Compile SLQS

```
cd <SDK_ROOT_FOLDER>  
make -C pkgs -f pkgs.mak complete -j CPU=rpi
```

5.1.3. Compile AVMS

```
(cd SampleApps/AirVantageAgent; ./build_avagent.sh rpi)
```

5.2. Deploy

5.2.1. Copy SDK executables & AVMS runtime

```
scp -r pkgs/qa/gatestrpi build/bin/rpi/slqssdk  
SampleApps/AirVantageAgent/build.rpi/runtime pi:/tmp
```

5.2.2. Start AVMS

```
ssh pi  
cd /tmp  
sudo ./slqssdk &  
sudo ./runtime/start.sh
```

5.2.3. Sample Log

```
? 3 git:(master) ? ssh pi  
Linux raspberrypi 3.12-1-rpi #1 Debian 3.12.9-1+rpi1 (2014-05-19) armv6l
```

The programs included with the Debian GNU/Linux system are free software;

the exact distribution terms for each program are described in the individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent permitted by applicable law.

Last login: Wed Jul 16 09:01:34 2014 from stanley-thinkpad-t400.sierrawireless.local

pi@raspberrypi ~ \$ cd /tmp/

pi@raspberrypi /tmp \$ sudo ./slqssdk &

[1] 3038

pi@raspberrypi /tmp \$ sudo ./runtime/start.sh

pi@raspberrypi /tmp \$

2014-07-18 03:37:04 GENERAL-INFO:

2014-07-18 03:37:04 GENERAL-INFO: Starting ReadyAgent ...

2014-07-18 03:37:04 GENERAL-INFO: ReadyAgent: 8.0 - Build: 70cb0cf

2014-07-18 03:37:04 GENERAL-INFO: Lua VM: Lua 5.1.4 (+meta
pairs/ipairs) (+patch-lua-5.1.4-3)

2014-07-18 03:37:04 GENERAL-INFO: System: Linux raspberrypi 3.12-1-rpi
#1 Debian 3.12.9-1+rpi1 (2014-05-19) armv6l

2014-07-18 03:37:04 GENERAL-INFO:

2014-07-18 03:37:04 GENERAL-INFO: Device ID = "356162050000676"

2014-07-18 03:37:04 GENERAL-INFO: Module [AssetConnector] initialized

2014-07-18 03:37:04 SHELL-INFO: Binding a shell server at address
?localhost, port 2000

2014-07-18 03:37:04 GENERAL-INFO: Module [Lua Shell] initialized

2014-07-18 03:37:04 GENERAL-INFO: Module [DummyNetman] initialized

2014-07-18 03:37:04 GENERAL-INFO: Module [Lua RPC] initialized

2014-07-18 03:37:04 SRVCON-INFO: Server URL = "tcp://edge.m2mop.net:44900"

2014-07-18 03:37:05 GENERAL-INFO: Module [ServerConnector] initialized

#devices: 1

deviceNode: /dev/qcqm11

deviceKey: 0000000000000000

2014-07-18 03:37:05 GENERAL-INFO: Module [DataManagement] initialized

2014-07-18 03:37:05 ASSCON-INFO: Connection received from asset [table:
0x20846c8] at '<local ipc=table: 0x2011a40>:0'

2014-07-18 03:37:05 ASSCON-INFO: Asset registered, name="@sys", id=table:
0x20846c8.

2014-07-18 03:37:05 GENERAL-INFO: Module [DeviceManagement] initialized

2014-07-18 03:37:05 GENERAL-INFO: Module [ApplicationContainer] initialized

2014-07-18 03:37:05 GENERAL-INFO: Module [Update] initialized

2014-07-18 03:37:05 GENERAL-INFO: ReadyAgent successfully initialized

```
[AVMS-FW-DL]Running with device in ready mode
2014-07-18 03:37:12 ASSCON-INFO: Connection received from asset [table:
0x20a3598] at '127.0.0.1:34526'
2014-07-18 03:37:12 ASSCON-INFO: Asset registered, name="SLQS_FW_UPDATER",
id=table: 0x20a3598.
2014-07-18 03:37:35 DATAMGR-INFO: flushing policy "now"
2014-07-18 03:37:35 DATAMGR-INFO: flushing policy "default"
2014-07-18 03:37:35 DATAMGR-INFO: flushing policy "on_boot"
2014-07-18 03:37:35 M3DA-SESSION-INFO: Sending data through authenticated
and encrypted session
2014-07-18 03:37:36 M3DA-SESSION-INFO: Accepted authenticated and encrypted
response from server
```