



## Chapter 1 - Introducing the AirVantage Services Platform

Modifier | Partager | Ajuster | Outils

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This section provides you with an overview of the M2M chain and shows how the AirVantage Services Platform fits into this chain. It clearly defines the platform's concepts and relates them to the operation and design of the AirVantage Services Platform's Web User Interface: the AirVantage Operating Portal.

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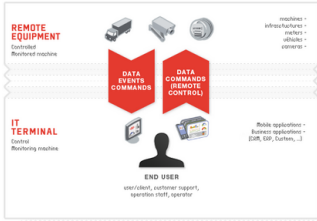
### M2M: A Basic Definition

The term machine-to-machine (M2M) basically refers to an exchange of information over a mobile network between a remote equipment (vehicle, video camera, meter, ...) and:

- an IT terminal (PC, mobile phone, tablet, ...) running an M2M application for remotely controlling and/or monitoring the remote equipment, or
- a business application (CRM, ERP, custom application, ...) running on an end-user IT environment.

For more information on M2M challenges, see AirVantage Services Platform, a Solution to M2M Challenges

Three types of information are essentially exchanged from one end to the other of the M2M chain: data (for example temperature, alarm status, etc.), events (for example temperature has exceeded a given threshold, an alarm has been raised, etc.) and commands (raise temperature, acknowledge alarm, etc.).



A number of M2M elements are needed in between the controlled/monitored and control/monitoring machines in terms of data communication, management and application. We will now unfold the above M2M according and progressively introduce them.

This will help us figure out the place as well as purpose of the AirVantage Services Platform within an M2M architecture. In a second step, we will see which and how M2M objects are defined in the AirVantage Operating Portal.

### The AirVantage Services Platform: Concepts and Place within an M2M Architecture

Let's first describe which elements are needed in between a remote equipment and applications used to control and/or monitor the equipment parameters, and see how they translate into concepts specific to the AirVantage Services Platform.

#### The notion of "system"

Throughout this introduction, AirVantage Services Platform concepts are represented in *italics and bold*. These concepts are defined in the Appendix A - Glossary section.

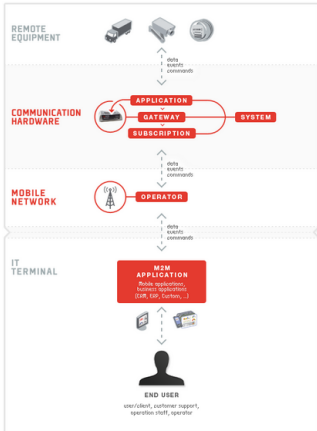
For data, events and commands to be properly relayed between both ends of the M2M chain, they need to be:

- exchanged bidirectionally via a communication hardware serving as point of relay, called a **gateway**,
- exchanged over mobile networks needing a **subscription** with an mobile network operator (MNO).

And in order to be correctly understood by both ends, data, events and commands need to be modelled in an application embedded in the gateway. An application model defines which and how data and commands are sent or received and which and how events are triggered from/to the remote equipment and IT terminal (see The embedded application model).

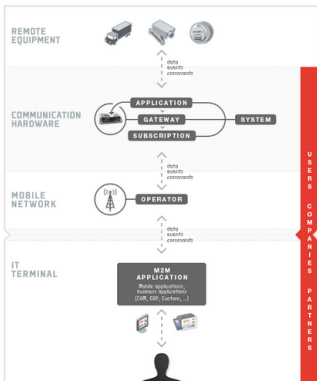
In the AirVantage Services Platform architecture, these three pivotal elements (**gateway**, **subscription** and **application**) are seen as and called a **SYSTEM**.

A system can represent one or more of these elements, the application and gateway being generally required as a minimum to define a system.



#### Users, companies, partners and operators

Systems, no matter whether they include a gateway only or a full "gateway + application + subscription" package, are managed by users belonging to companies. Companies can interact with partners (hardware manufacturer, provider, customer, etc.). Users, companies and partners are shown below crossing several folds of the whole M2M according as they can act on one section of the chain in particular, or on all of them. It all depends on whether a user, company or partner operate in the communication hardware, mobile network and/or IT terminal market.



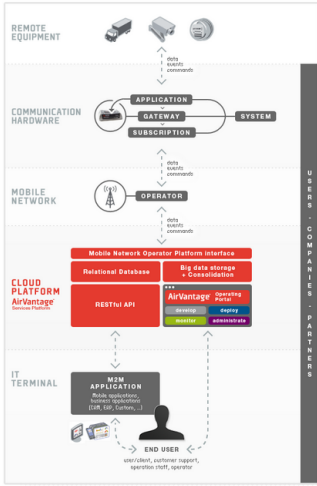


## The AirVantage Services Platform

Added to the system is the AirVantage Services Platform itself, a cloud platform able to:

- relay incoming and outgoing M2M information through mobile network operator systems - to this end, the AirVantage Services Platform interfaces with the MNO platform
- based on this information to any terminal M2M applications or business application in the required form, format and content - to this end, all the logic is exposed through REST APIs (JSON over HTTP), which can be driven from any application whatever the technology or environment they are based on,
- store, consolidate and access big data - to this end, the AirVantage Services Platform includes a relational database as well as persistent storage space.
- offer development, deployment, monitoring as well as administration capabilities to operation and support staff for the whole M2M chain from remote equipment to end terminal - to this end, a dedicated Web User Interface called AirVantage Operating Portal has been developed.

An Integrated Development Environment coupled with embedded Software Development Kits speeds up the development of M2M applications, by providing a flexible framework that reduces the complexity of wireless communication between a large number of devices and a central server.



## The AirVantage Services Platform Web User Interface: AirVantage Operating Portal

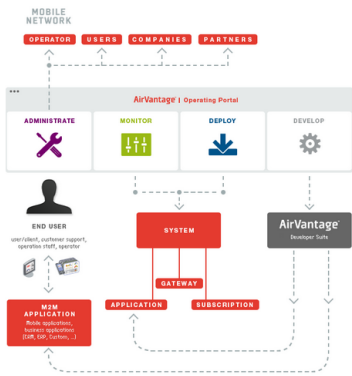
The web user interface used to access the AirVantage Services Platform is called AirVantage Operating Portal. This management portal is a generic application used to administrate accounts, deploy and monitor fleet of systems in a unified device management user interface.

The AirVantage Operating Portal is designed to reflect naturally and faithfully the general M2M architecture illustrated earlier, by focusing on areas of interest for portal users depending on their business. This section defines AirVantage Operating Portal notions and features.

### Introduction

The AirVantage Operating Portal is based on a set of four activities meant at answering a basic question: why did I log in to the AirVantage Operating Portal?

Did I log in to develop an embedded application for my remote equipment, did I log in to remotely deploy a system, to monitor it, or to administrate users, companies or partners? Activities cover all of the needs you may have for acting on or monitoring any element of the M2M chain. In AirVantage Services Platform language, acting on an element of the M2M chain is translated as "executing an operation on an entity of the AirVantage Operating Portal".



### Activities and Entities

The AirVantage Operating Portal is mainly based on three objects: activities, operations and entities. This section describes all of these objects.

#### Activities

The table below describes activities available through the AirVantage Operating Portal.

Activity	Icon	Description	Related Operations
Develop		Allows you to access development tools, launch a Smart Automation project and manage applications.	<ul style="list-style-type: none"> <li>• Develop embedded applications</li> <li>• Develop Web and mobile M2M applications</li> </ul>
Deploy		Allows you to manage your stock of systems, gateways, subscriptions, and to release and deploy your applications.	<ul style="list-style-type: none"> <li>• Register systems to be deployed on field</li> <li>• Manage inventory and activate systems to be deployed</li> <li>• Check deployment status of systems</li> <li>• Deploy and upgrade system applications</li> <li>• Release Alocos Application Framework applications and publish for partners</li> </ul>
Monitor		Allows you to monitor systems' state, enable remote configuration and control them over the air.	<ul style="list-style-type: none"> <li>• Monitor wireless connectivity of deployed systems</li> <li>• Remotely retrieve data, send commands and change your system configuration</li> <li>• Install, upgrade, start, stop, uninstall AAF applications on your systems</li> <li>• Monitor system state, signal strength, deployed applications, communication reports via a dedicated dashboard</li> <li>• Locate systems on a map</li> </ul>
Admin		Allows you to manage transversal entities: companies, users, partners, operators, etc.	<ul style="list-style-type: none"> <li>• Manage users, companies, profiles</li> <li>• Create labels to group entities under a common label (= context)</li> <li>• List and create partners</li> </ul>

#### Entities

Entities can be created, edited, deleted as well as configured, deployed, activated, controlled and monitored. The following paragraphs describe all of them.

##### General entities

The table below defines general entities:

Entity	Icon	Description
Company		Represents a business organization in the Services Platform terminology. Almost all entities are associated with a company.
User		Individual user, acts in the context of a company depending on the rights he has. A user can have access granted on several companies.
Partner		Another company the active company is in relation with. The relation with a partner is defined using a set of rights.
Operator		Provides connectivity to companies. Can be wireless or not. A subscription is associated to an Operator. The AirVantage services Platform is connected to some Operator partners to provide companies features like Subscription activation, suspend or connection diagnosis.

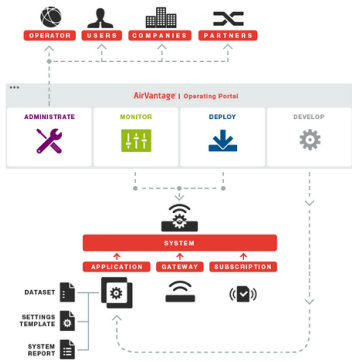
##### System-related entities

The table below defines system-related entities:

Entity	Icon	Description
Gateway		Hardware with communication capabilities: Gx400, FXT009, GL6100. Can be an AirPrime module.
Subscription		A subscription is used in a system to manage the connectivity provided by an operator. It can be wireless or wired connectivity.

<b>Embedded Application</b>	<ul style="list-style-type: none"> <li>Company business applications managed with the AirVantage Services Platform</li> <li>Uses Sierra Wireless embedded applications to install and upgrade: ALEOS, Ready Agent, Oasis IDS Agent. Sierra Wireless embedded applications are seen as company applications but are provided by Sierra.</li> <li>Deployed on the systems of the company</li> <li>A company business application can use the AirVantage Services Platform to receive data and events to his systems or send configuration and commands to systems.</li> </ul>
<b>System</b>	<ul style="list-style-type: none"> <li>Identifies the system a company wants to manage through the AirVantage Services Platform</li> <li>It can represent an Airtel gateway running ALEOS but also a telematics box, a power meter, a monitoring equipment, a home gateway and more.</li> </ul>

The AirVantage Operating Portal main activities and entities can then be basically illustrated as follows:



### Main entity in the AirVantage Services Platform: The system

The system is really the entity that a user, whatever his or her business, will manage and monitor. A user creates a system linking together a communication gateway, one or multiple embedded applications, and a subscription (optional).

In order to manage the communication with a system, the AirVantage Services Platform requires at least one application. You can activate a system only when it has been associated with an application.



### System lifecycle management

After creation, a system can be in one of the four following states:

Status	Description
Inventory	System registered (complete or partially created) in the AirVantage Services Platform. Used during staging activities: before deployment and after maintenance.
Ready	System activated ready for deployment. The AirVantage Services Platform can start monitoring the system.
Deployed	The AirVantage Services Platform automatically switches the system state to Deployed at first communication of a Ready system, whatever the protocol.
Maintenance	The AirVantage Services Platform no longer monitors the system. The user can change the gateway, subscription and applications.

A system therefore follows the lifecycle illustrated below:



System states are represented as follows in the AirVantage Operating Portal:



### The embedded application model

The embedded application model defines how the AirVantage Services Platform can interact with an embedded application deployed on a system. It can be seen as a "contract" defining the general terms of communication between the embedded application and the platform, which data am I supposed to send you, how, when?

Embedded application models are developed by hardware developers using dedicated IDEs and SDKs available through the AirVantage Developer Studio (for more information, see our Sierra Wireless Developer Zone). They are then handed over to system management staff working on the AirVantage Operating Portal, who can then associate systems with corresponding embedded applications.

Several kinds of interactions are possible between the AirVantage Services Platform and the embedded application. They are described below.

### Application Lifecycle Management

The AirVantage Services Platform can manage the lifecycle of applications through remote install, upgrade, start, stop, uninstall commands. In that case, the application model is used to describe the lifecycle supported by the application, how the application runs on the system (operating system or application container), which binary formats (full, incremental/delta) can be installed.

#### Data Management

If your embedded application needs to communicate with an external application to exchange data, receive remote commands to perform specific actions and so on, the AirVantage Services Platform has the capability to do so. To use these features, you can define the data model of the embedded application in the application model. The data model is then used by the AirVantage Services Platform to determine what kind of data can be exchanged with the embedded application, which commands can be sent.

#### Device Management

Several device management actions can be performed through the AirVantage Services Platform: reboot the gateway, synchronize the "real" gateway with its image on the platform, send PRL update, send AT commands. The application model describes what kind of device management actions are supported by the embedded application. The feature is mostly provided by low-level applications able to execute device management operations: ALEOS/OS, Open AT/B firmware, embedded agents). Application developers usually don't need to worry about that part to build a custom embedded application.

#### Application-specific objects

Three objects in particular are related to applications on AirVantage Operating Portal:

Object	Icon	Description
Dataset		User defined set of variables used by the AirVantage Services Platform to retrieve system data either periodically (heartbeat communication) or on-demand.
Settings Template		User-defined set of fixed settings (key, value) used by the AirVantage Services Platform to configure an embedded application.
System Report		Dataset filled with data reported by a system.

In summary, a Settings Template applied to a Dataset results in a System Report.

### AirVantage Services Platform and system communication

The AirVantage Services Platform and systems communicate either periodically or on demand, and either at the platform or system initiative.

Although a date and time can be set to force the platform to communicate with a given system - for example for a specific operation to be executed at a scheduled date and time - both usually communicate on a heartbeat basis. This concept is defined in the following paragraphs.

#### Periodical, or heartbeat communication

When creating a system, a user can set it so that it periodically communicate with the platform. Periodical communication is referred to in this documentation as **heartbeat communication**. This setting, called **heartbeat frequency** (defined in minutes, hours, days or weeks) is a mandatory user-defined parameter for all systems. It is defined at platform-level and sets the interval at which the AirVantage Services Platform will check in the operation queue if anything is to be sent to the system (command, update, etc.) from the platform, or if the system has anything to send to the platform (data, event, etc.).

Every X minutes, hours, days or weeks:

- The AirVantage Services Platform wakes up the system.
- The system connects to the platform after authentication.
- The system checks whether an operation has been queued for it in the portal.
- If so, the operation is processed.

A heartbeat parameter can also be set at embedded application level. It can for example define the interval at which a data must be pushed from the system to the AirVantage Services Platform. The heartbeat value set at application level can be different from the parameter set at platform-level.

Application-level and platform-level heartbeat parameters are compatible but can enter in conflict if illogically set.

When reaching...	Communication is initiated at...
a platform-defined heartbeat cycle	the AirVantage Services Platform's initiative
an application-defined heartbeat cycle	the system's initiative

#### On-demand communication

On demand communication is achieved when a user sets a date and time for an operation to be executed whenever required, without waiting for a new communication cycle to be reached. Another on demand possibility is to force the platform to communicate with the system as soon as the command is queued.

#### Communication warnings and errors

Communication errors can occur between the AirVantage Services Platform and system. To be warned of communicating issues, two parameters can be set when creating a system: the Warning and Error delays. These parameters define after which amount of time a warning or error alarm must be raised.

Here is an example, where:

- the warning delay has been set to 1 minute
- the error delay has been set to 5 minutes





## Sample Use Cases

This section describes the most common actions usually performed via the AirVantage Operating Platform:

- Get Aleos reports from a system
- Get Aleos Application Framework reports from a system
- Configure a system
- Configure multiple systems
- Upgrade an application on a system
- Upgrade an application on multiple systems

For more information on **heartbeat** communication, see [Periodical](#), or [heartbeat](#) communication.

Click in graphics!

Following graphics are interactive. When you hover over a step, the corresponding procedure title pops-up. Just click and the procedure opens in a new tab.

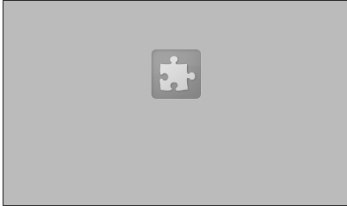
### Get Aleos reports from a system

You might want to retrieve a System Report.

Here is basically how it works:

1. You connect to the **AirVantage Operating Portal**.
2. You create a system and define a heartbeat frequency (for example 15 mn) for your system.
3. You create an embedded application - including a dataset, set of parameters to be retrieved from your system - and associate it with your system.

Every 15 mn, the **AirVantage Operating Portal** wakes up the system, which connects in turn to the platform after authentication. The platform talks to the system which data must be retrieved as per dataset definition. The system retrieves the required data, fills a system report and passes it on to the platform. The system report can then be retrieved from the **AirVantage Operating Portal**.



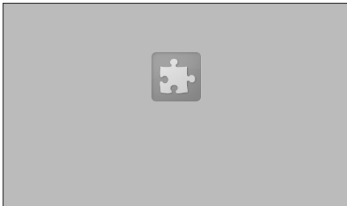
### Get Aleos Application Framework reports from a system

You might want to periodically retrieve a System Report, by defining a report frequency in the embedded application.

Here is basically how it works:

1. You, as a developer, develop an embedded application (for more information, see our [Sierra Wireless Developer Zone](#)) and define a heartbeat frequency (for example 5 mn) for your application.
2. You connect to the **AirVantage Operating Portal**.
3. You create a system.
4. You create an embedded application - including a dataset, set of parameters to be retrieved from your system - and associate it with your system.

Every 5 mn, your system sends a system report to the **AirVantage Services Platform**, which you can retrieve from the **AirVantage Operating Portal**.



### Configure a system

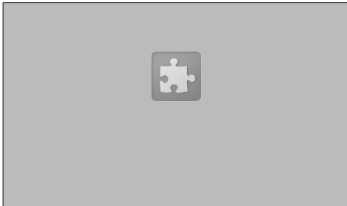
You might want to configure a system with specific settings.

It is assumed here that a system has already been created (with a heartbeat frequency) and associated with an embedded application (including a dataset).

Here is basically how it works:

1. You connect to the **AirVantage Operating Portal**.
2. You select the system to be configured.
3. You select parameters to be set (as per Dataset definition) and give them a value.
4. You apply settings to your system.

Upon first system/platform communication, that is to say at first heartbeat, settings are applied to the system. The system is configured.



### Configure multiple systems

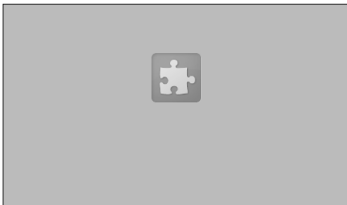
You might want to simultaneously configure a fleet of systems with the same settings.

It is assumed here that systems have already been created (with a heartbeat frequency) and associated with the same embedded application (including a dataset).

Here is basically how it works:

1. You connect to the **AirVantage Operating Portal**.
2. You create a Settings Template matching the set of parameters (as per Dataset definition) to be set in your system.
3. You select systems to be configured.
4. You apply the Settings Template to these systems.

Upon first system/platform communication, that is to say at first heartbeat, the Settings Template is applied to systems. Systems are configured.



### Upgrade an application on a system

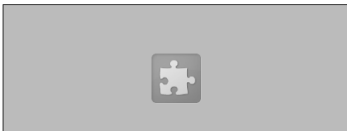
You might want to upgrade a system application.

It is assumed here that a system has already been created (with a heartbeat frequency) and associated with an embedded application (including a dataset).

Here is basically how it works:

1. You connect to the **AirVantage Operating Portal**.
2. You select the system.
3. You check which upgrade packages (application new version) are available for the selected system.
4. You select the required upgrade package.
5. You send the upgrade command.

Upon first system/platform communication, that is to say at first heartbeat, the system connects to the **AirVantage Services Platform** and the upgrade command is processed. The system application is upgraded.





### Upgrade an application on multiple systems

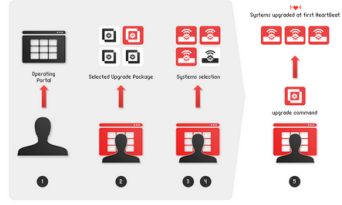
You might want to launch an application upgrade campaign on a fleet of systems.

It is assumed here that systems have already been created (with a heartbeat frequency) and associated with the same embedded application (including a dataset).

Here is basically how it works:

1. You connect to the AirVantage Operating Portal.
2. You check which upgrade packages (regardless of new version) are available.
3. You select the required upgrade package.
4. You select the systems to be upgraded.
5. You send the upgrade command.

Upon first system/platform communication, that is to say at first heartbeat, systems connect to the AirVantage Services Platform and the upgrade command is processed. The system applications are upgraded.



Étiquettes : Aucun

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