

# Ayla Intelligent Over-the-Air (OTA) Solution



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 Ayla Networks

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# 1 Introduction

Ayla's Over-the-Air (OTA) solution provides real-time and scheduled management and services for up to 1 million devices at a time. OTA enables manufacturers to securely send device firmware updates to devices in both development and field environments. This is often required for updates needed in the communications protocol and for improvements to product functionality and in the transport or security service.

On the Ayla Customer Dashboard, you can manage OTA tasks, which include creating, updating, and tracking all OTA images (firmware updates). You can also view the list of available images (Ayla and Host MCU) and the status of past OTA jobs from the dashboard.

Some benefits of the OTA feature set are:

- Rich user interface and capabilities.
- Ability to create, run, and report on device update jobs.
- Intuitive interface to initiate updates of Host MCU, Ayla Production Agent (Black Box), or Ayla Integrated Agent (White Box) firmware.

Ayla's latest release of OTA provides even more flexibility and control for scheduling and running firmware updates to connected devices:

- Unlimited device OTAs, so that there is no limit on the number of devices that match the rules.
- Filter-based OTAs
  - All devices meeting filter criteria are targeted in OTA.
- Continuous OTAs
  - The Ayla Platform automatically re-evaluates which devices meet OTA criteria. Devices are evaluated during connected, activated, registered, and managed stages, ensuring the most optimal time for the OTA update.

## 1.1 About this Guide

This document describes Ayla's Over-the-Air (OTA) features, including how upload and edit Host MCU software, and create, monitor, and edit Host MCU and Ayla Module OTA jobs.

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**NOTE** This guide only covers how to create and manage Host MCU Images. Ayla images are read-only in the Ayla Customer Dashboard and are part of the Ayla modules available for OTA jobs.

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## 1.2 Audience

This document is for Ayla OEM administrators and support managers. Only OEM admins and OEM Support Managers are allowed to execute OTA Host jobs in the Ayla Customer Dashboard.

## 1.3 Related Documentation

You can also refer to the following documents available on [support.aylanetworks.com](https://support.aylanetworks.com):

- *Host OTA Instructions App Note* (AY006ATA3)
- *Ayla Customer Dashboard User's Guide* (AY006UDB3)

## 1.4 Ayla Terminology

Platform	Type	Wi-Fi Solution	Cellular Solution
End Device	Production Modules	Ayla Wi-Fi Production Module (Black Box)	Ayla Cellular Production Module
	Software Agents	Ayla Integrated Agent (White Box)	
		Ayla Portable Agent	
		Ayla Linux Agent	
		Ayla Android Agent	
Gateway	Gateway Agents	Ayla Dynamic Gateway Agent (Generic Gateway)	
		Ayla Static Gateway Agent (Quantum Bridge)	

## 1.5 Glossary

<b>Cloud Templates</b>	Ayla templates are a group of properties applied to a device in the Ayla Cloud. They are designed to reduce the work requirement for customers to create a product.
<b>Host MCU</b>	The product's microcontroller unit (MCU) that communicates directly with the Ayla enabled Wi-Fi module.
<b>Properties</b>	Cloud-defined values that when aggregated define what and how product features and functionality are experienced by the end user.
<b>Wi-Fi Module</b>	Hardware that has an MCU containing the Ayla agent and Wi-Fi component used to allow connectivity to Ayla's Cloud Services.

## 2 OTA Images

Ayla OTA images consists of either Ayla firmware or OEM host MCU images. The Ayla firmware images are Ayla-supplied Production Agent (Black Box). In the Ayla Customer Dashboard, Ayla images are read-only (so cannot be modified) and are part of the Ayla module that you can select when configuring OTA jobs.

OEM Host software images (referred to as Host MCU images) are firmware images that will be applied on the Host MCU and are developed by or for the OEM. This includes the firmware image that comes with the Ayla Integrated Agent (White Box). This section describes how you can monitor the OTA status of existing Host MCU images, create new images for OTA deployments, and edit existing images using the Ayla Customer Dashboard.

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**NOTE** Refer to [Section 1.4 for Ayla's terminology](#) for production modules, and software and gateway agents.

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### 2.1 Monitor the OTA Status of Host MCU Images

1. Navigate and log in to the Ayla Customer Dashboard:
  - US: <https://dashboard.aylanetworks.com>
  - EU: <https://dashboard-field-eu.aylanetworks.com/>
  - CN: <https://dashboard.ayla.com.cn/>
2. Click **Intelligent OTA** in the Navigation menu on the left side.
3. In the drop-down for OEM Model, select OEM model from the list of OEM models. These are the model numbers of the OEM's host application board, which are extracted from each Ayla template associated with your OEM admin role.



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**NOTE** Only OEM admins and OEM support managers are allowed to execute OTA Host jobs in the Ayla Customer Dashboard. Refer to the [Ayla Customer Dashboard User's Guide](#) for more information on Ayla Roles and Templates.

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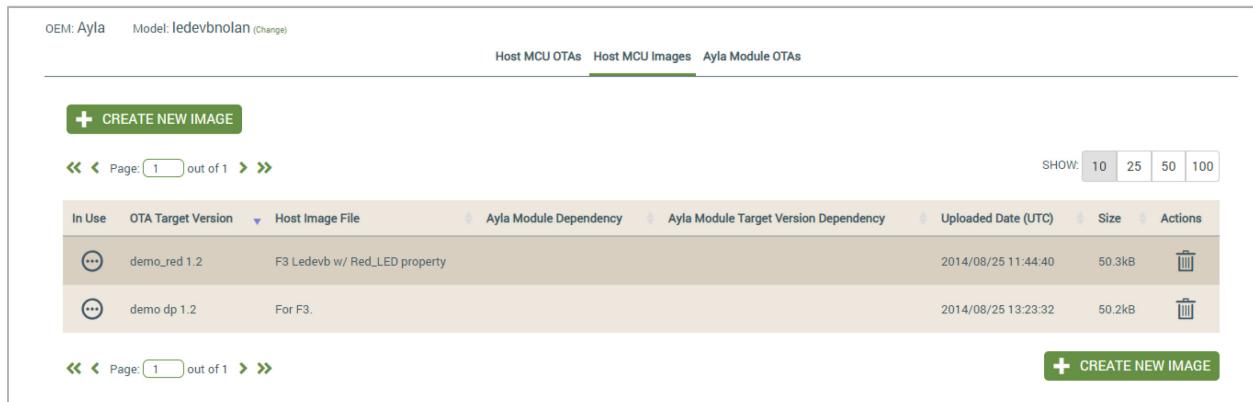
Notice that your OEM name and the OEM model selected displays at the top left of the OTA landing page, as shown below. Click **(Change)** to select a different OEM Model from any of the tabs on the OTA landing page.



4. Click the **Host MCU Images** tab located at the top of the OTA landing page.



5. Use the table on this tab to review and monitor information on existing images for the selected OTA model, as shown below:



In Use		OTA Target Version	Host Image File	Ayla Module Dependency	Ayla Module Target Version Dependency	Uploaded Date (UTC)	Size	Actions
	demo_red 1.2	F3 Ledevb w/ Red_LED property				2014/08/25 11:44:40	50.3kB	
	demo dp 1.2	For F3.				2014/08/25 13:23:32	50.2kB	

- NOTE** You can click the column heading to sort the information in that column (including OTA Target Version, Host Image File, Ayla Module Dependency, Ayla Module Target Version Dependency, and Uploaded Date).

Following are descriptions of the information available in this table of existing Host MCU Images on the Host MCU Images table.

- In Use
  - Indicates that the image is not included in any active OTA.
  - Indicates that the image is included in an active OTA for one or more OEMs/OEM Models.
- OTA Target Version
  - The firmware version of the image that was uploaded for migration via this OTA update.
- Host Image File
  - The file name of the firmware image on the Ayla Module that is assigned to the OTA update about to be migrated to the field.
- Ayla Module Dependency
  - This is the Ayla module firmware image that came with the Ayla device(s) which should receive this OTA update. Specifying the Ayla module dependency is important because the module may be changed over the lifecycle of a device.

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**NOTE** The Ayla platform filters out all other modules except for the one you selected for Ayla Module Dependency, and then deploys the OTA update only to the devices with that particular Ayla module. This is an efficient way to send firmware updates to select devices.

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- Ayla Module Target Version Dependency
  - The Ayla firmware release/version that will be sent to devices via the OTA update.
- Uploaded Date (UTC)
  - The date/time (in Coordinated Universal Time) that the Host image file was uploaded to the dashboard.
- Size
  - The size of the image file.
- Actions
  -  Used to delete the Host MCU image. A confirmation message box displays to make sure that you wish to delete the image from the system.

## 2.2 Create New Host MCU Images

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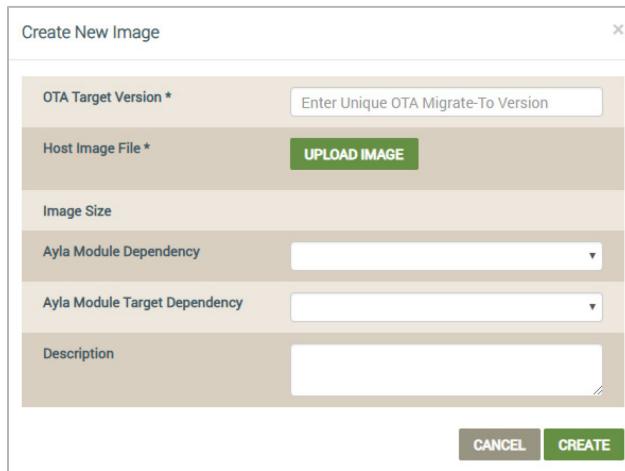
When you create a new Host MCU image in the Ayla Customer Dashboard, you are configuring an image profile. You can modify this profile as explained in Section 2.3, but cannot completely change it.

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**NOTE** As stated at the beginning of Section 2, you can create a new firmware image for the Ayla Integrated Agent (White Box) in the Ayla Customer Dashboard, as instructed in this section.

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1. If you are not logged in to the Ayla Customer Dashboard, complete steps 1-4 in [Section 2.1](#) above.
2. On the **Host MCU Images** tab, click the **CREATE NEW IMAGE** button to open the Create New Image dialog box, shown below:



The dialog box is titled 'Create New Image'. It contains the following fields:

- OTA Target Version \***: Text input field with placeholder 'Enter Unique OTA Migrate-To Version'.
- Host Image File \***: Text input field with a 'UPLOAD IMAGE' button to its right.
- Image Size**: Text input field.
- Ayla Module Dependency**: A dropdown menu.
- Ayla Module Target Dependency**: A dropdown menu.
- Description**: Text input field.

At the bottom are 'CANCEL' and 'CREATE' buttons.

**NOTE** Fields with an asterisk (\*) are mandatory to complete the configuration. The other fields are optional; therefore, leaving them blank does not have any effect.

3. For OTA Target Version (mandatory), type the name/firmware version of the image that you are uploading for the OTA update.
4. For Host Image File (mandatory), click **UPLOAD IMAGE** to navigate to and upload the Host MCU image file.

**NOTE** Image Size displays the size of the Host MCU image file once it is uploaded.

5. For Ayla Module Dependency (optional), select the Ayla module that has the firmware that came with the Ayla device(s) which should receive this OTA update. Specifying the Ayla module dependency is important because the module may be changed over the lifecycle of a device.

**NOTE** The Ayla platform filters out all other modules except for the one you selected for Ayla Module Dependency, and then deploys the OTA update only to the devices with that particular Ayla module. This is an efficient way to send firmware updates to select devices.

6. For Ayla Module Target Dependency (optional), select the Ayla module firmware release/version to send to devices via this OTA update.

**NOTE** If you configure Ayla Module Dependency (in Step 5), you must also enter the version of the Ayla module firmware to deploy to those devices in the Ayla Module Target Dependency field.

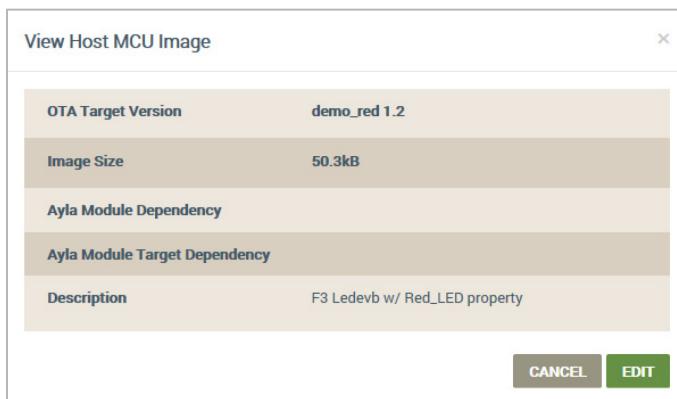
7. For Description (optional), type information on this Host MCU image for OTA migration, for example, "this is the software to update the ATM module from version 1.2 to 1.3.2."

8. Click the **CREATE** button to add this host MCU image to the list of images that can be used in OTA updates. Or, click the **CANCEL** button to close this dialog box without saving.

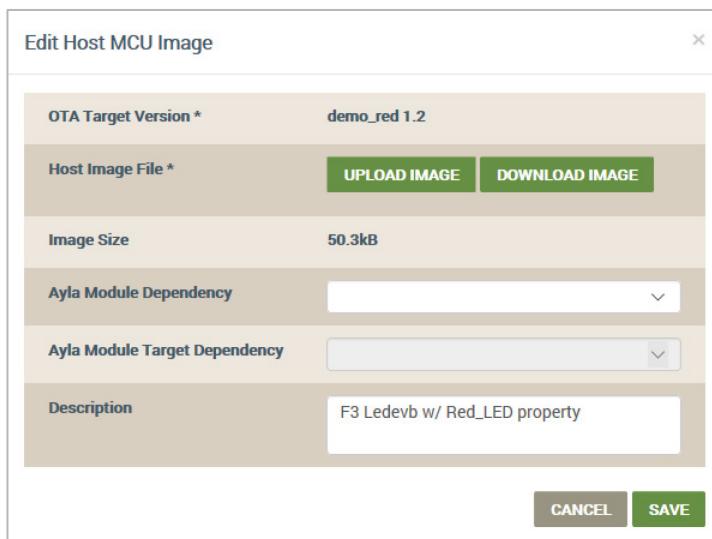
## 2.3 Edit Existing Host MCU Images

You can modify the image profile that you created in Section 2.2, but you cannot change it completely, as described in the steps below.

1. If you are not logged in to the Ayla Customer Dashboard, complete steps 1-4 in [Section 2.1](#) above.
2. On the **Host MCU Images** tab, click the image you wish to edit in Host Image File column of the table listing. This opens the View Host MCU Image dialog box, shown below:



3. Click **EDIT** to change the dialog box to Edit Host MCU Image, as shown below:



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**NOTE** Fields with an asterisk (\*) are mandatory to complete the configuration. The other fields are optional; therefore, leaving them blank does not have any effect.

Also, notice that you cannot the OTA Target Version field; this is configured when you create the original image profile. (Refer to the previous Section 2.2).

---

4. In Host Image File (mandatory), click **UPLOAD IMAGE** to replace the current Host MCU image with a different one, or click **DOWNLOAD IMAGE** to back up this image in another location.
- 

**NOTE** Image Size displays the size of the new Host MCU image file once it is uploaded.

---

5. For Ayla Module Dependency (optional), select the Ayla module that has the firmware that came with the Ayla device(s) which should receive this OTA update. Specifying the Ayla module dependency is important because the module may be changed over the lifecycle of a device.
- 

**NOTE** The Ayla platform filters out all other modules except for the one you selected for Ayla Module Dependency, and then deploys the OTA update only to the devices with that particular Ayla module. This is an efficient way to send firmware updates to select devices.

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6. For Ayla Module Target Dependency (optional), select the Ayla module firmware release/version to send to devices via this OTA update.
- 

**NOTE** If you configure Ayla Module Dependency (in Step 5), you must also enter the version of the Ayla module firmware to deploy to those devices in the Ayla Module Target Dependency field.

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7. In Description (optional), change the information for this new Host MCU image that you uploaded.
8. Click **SAVE** to make your changes to the information for this Host MCU image in the table listing. Or click **CANCEL** to close this dialog box without saving.

## 3 Creating and Managing OTA Updates

Ayla's Intelligent OTA enables customers who have OEM admin permissions in the Ayla Customer Dashboard to accomplish the following:

- Upload device firmware images in the Ayla platform (as described in Section 2), and then identify the group of device serial numbers (DSNs) for the images. (The images are pushed to that group of DSNs.)
- Report on the status of OTA firmware runs to provide operations teams with a clear understanding of the outcome of current and historic OTA runs.
- Perform remote management functions, including monitoring, updates, and storage and management of host MCU and Ayla firmware images.
- Organize and index hierarchical or dynamic device groups and perform any action over-the-air (OTA) for multiple devices in real-time or on a schedule.

This section describes how to create and edit OTA jobs for Host MCU and Ayla Module firmware images, and how to use the OTA remote management features.

### 3.1 Create a New Host MCU OTA Job

1. Navigate and log in to the Ayla Customer Dashboard:
  - US: <https://dashboard.aylanetworks.com>
  - EU: <https://dashboard-field-eu.aylanetworks.com/>
  - CN: <https://dashboard.ayla.com.cn/>
2. Click **Intelligent OTA** in the Navigation menu on the left side.
3. In the drop-down for OEM Model, select OEM model from the list of OEM models. These are the model numbers of the OEM's host application board, which are extracted from each Ayla template associated with your OEM admin role.



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**NOTE** Only OEM admins are allowed to execute OTA Host jobs in the Ayla Customer Dashboard. Refer to the [Ayla Customer Dashboard User's Guide](#) for more information on Ayla Roles and Templates.

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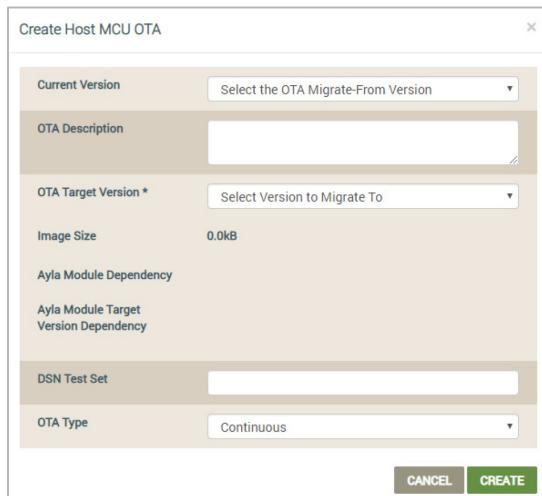
Notice that your OEM role and the OEM model selected displays at the top left of the OTA landing page, as shown below. Click **(Change)** to select a different OEM Model from any of the tabs on the OTA landing page.



4. Click the **Host MCU OTAs** tab located at the top of the OTA landing page.



5. Click the **CREATE HOST MCU OTA** button to open the Create Host MCU OTA dialog box, shown below:



**NOTE** Fields with an asterisk (\*) are mandatory to complete the configuration. The other fields are optional; therefore, leaving them blank does not have any effect.

6. In Current Version (optional), select the version number of the Host MCU firmware that is on the devices that will receive this OTA update.

**IMPORTANT!** If you do not select a firmware version in the drop-down list for this Current Version field, the OTA update is deployed to every device that has any of the firmware versions provided in the drop-down list.

7. In OTA Description (optional), type any additional pertinent information for this OTA that may be a useful reference later, for example, "Migrate the device from 2.5 beta to 2.5.4 beta."
8. In OTA Target Version (optional), select the firmware version of the module that will be deployed by this OTA update.

**NOTE** Image Size displays the size of the Host MCU image file for the module you selected to receive the OTA Target Version. The file size can be used to estimate the time and effort that the device agent requires for downloading and installation. The image is stored on the Ayla platform until deleted by the user.

9. For Ayla Module Dependency (optional), select the Ayla module that has the firmware that came with the Ayla device(s) which should receive this OTA update. Specifying the Ayla module dependency is important because the module may be changed over the lifecycle of a device.

**NOTE** The Ayla platform filters out all other modules except for the one you selected for Ayla Module Dependency, and then deploys the OTA update only to the devices with that particular Ayla module. This is an efficient way to send firmware updates to select devices.

10. For Ayla Module Target Dependency (optional), select the Ayla module firmware release/version to send to devices via this OTA update.

**NOTE** If you configure Ayla Module Dependency (in Step 9), you must also enter the version of the Ayla module firmware to deploy to those devices in the Ayla Module Target Dependency field.

11. For DSN Test Set (optional), enter as many as 50 Device Serial Numbers (DSNs) of devices in the field that will be processed by this OTA update. Use a comma (,) to separate the DSNs. This field enables you to specify an exclusive set of DSNs to test the OTA update.

**NOTE** You can only enter a maximum of 50 DSNs in this field and it cannot be used for [Continuous OTA](#). The devices must meet the OTA rule criteria.

If you use the DSN Test Set option, the following error message appears to make sure that you understand how this test option affects the OTA job.



12. For OTA Type (optional), select either of the following options to specify which OTA criteria should be applied to this OTA update:

- Continuous (Default) – When this OTA update is active, the Ayla platform automatically continues to evaluate which devices in the field meet the OTA criteria for this OTA update, and if new devices that match the criteria are added, the platform will identify those devices as candidates and push this OTA update at runtime to those new devices when they are online. For example, when a device connects to the Ayla cloud and it processes the device from the “unknown” to “known” state, the Ayla platform will check to see if the device meets the OTA rules for continuous OTA updates, and if the device matches the OTA rules, the OTA update is pushed to that new device.

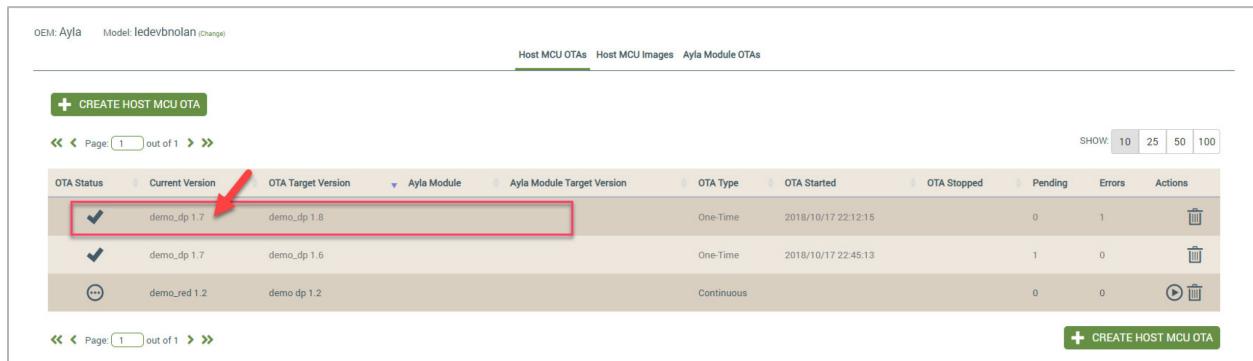
- One Time – Once this OTA update is activated, the Ayla platform evaluates which devices match the OTA criteria for this update, and then pushes the update to those devices. This evaluation only happens one time upon activating the OTA update.
13. Click the **Create** button to add this host MCU OTA job to the list of images that can be used in OTA updates. Or, click the **Cancel** button to close this dialog box without saving.

## 3.2 Edit and View Details of a Host MCU OTA Job

From the Host MCU OTA tab, you can edit existing OTA jobs and view additional details about the job.

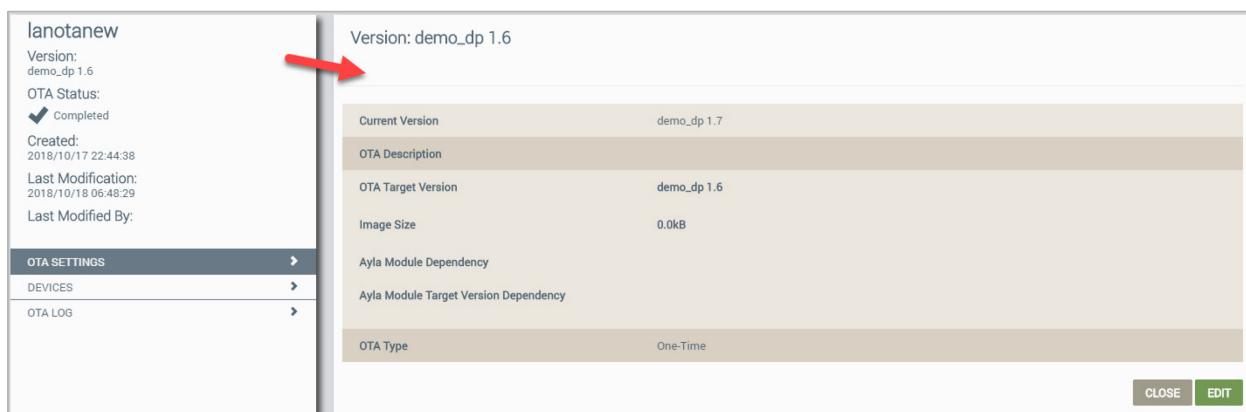
### 3.2.1 Edit Host MCU OTA Jobs

1. On the Host MCU OTA tab, click the Host MCU OTA job you wish to edit, as shown:



OTA Status	Current Version	OTA Target Version	Ayla Module	Ayla Module Target Version	OTA Type	OTA Started	OTA Stopped	Pending	Errors	Actions
✓	demo_dp 1.7	demo_dp 1.8			One-Time	2018/10/17 22:12:15		0	1	
✓	demo_dp 1.7	demo_dp 1.6			One-Time	2018/10/17 22:45:13		1	0	
...	demo_red 1.2	demo_dp 1.2			Continuous			0	0	

2. On the right, notice a dialog box similar to the [Create Host MCU OTA dialog box](#); see the following as an example:



lanotanew

Version: demo\_dp 1.6

OTA Status:  Completed

Created: 2018/10/17 22:44:38

Last Modification: 2018/10/18 06:48:29

Last Modified By:

**OTA SETTINGS**

**DEVICES**

**OTA LOG**

Version: demo\_dp 1.6

Current Version: demo\_dp 1.7

OTA Description: demo\_dp 1.6

OTA Target Version: demo\_dp 1.6

Image Size: 0.0kB

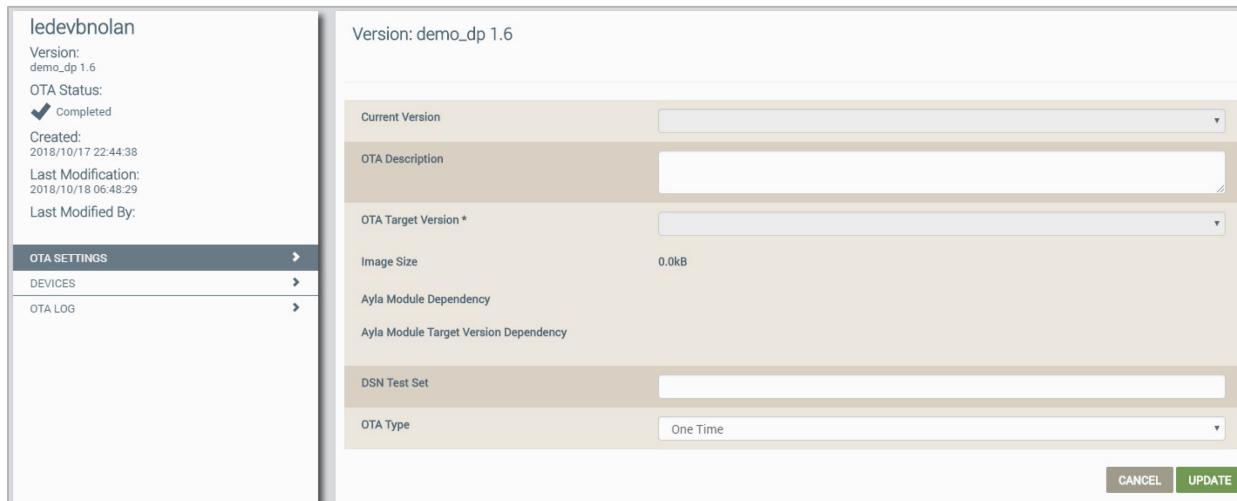
Ayla Module Dependency: Ayla Module Target Version Dependency

OTA Type: One-Time

**CLOSE** **EDIT**

**NOTE** You cannot edit active OTA jobs. Stop the OTA update on the Host MCU OTAs tab to enable the editing capabilities. Refer to [Actions in Section 3.3](#) to do this.

3. Click the EDIT button to display the edit view, as shown:



ledevbnolan

Version: demo\_dp 1.6

OTA Status:  Completed

Created: 2018/10/17 22:44:38

Last Modification: 2018/10/18 06:48:29

Last Modified By:

**OTA SETTINGS** >

**DEVICES** >

**OTA LOG** >

Version: demo\_dp 1.6

Current Version: demo\_dp 1.6

OTA Description:

OTA Target Version \*: demo\_dp 1.6

Image Size: 0.0kB

Ayla Module Dependency:

Ayla Module Target Version Dependency:

DSN Test Set:

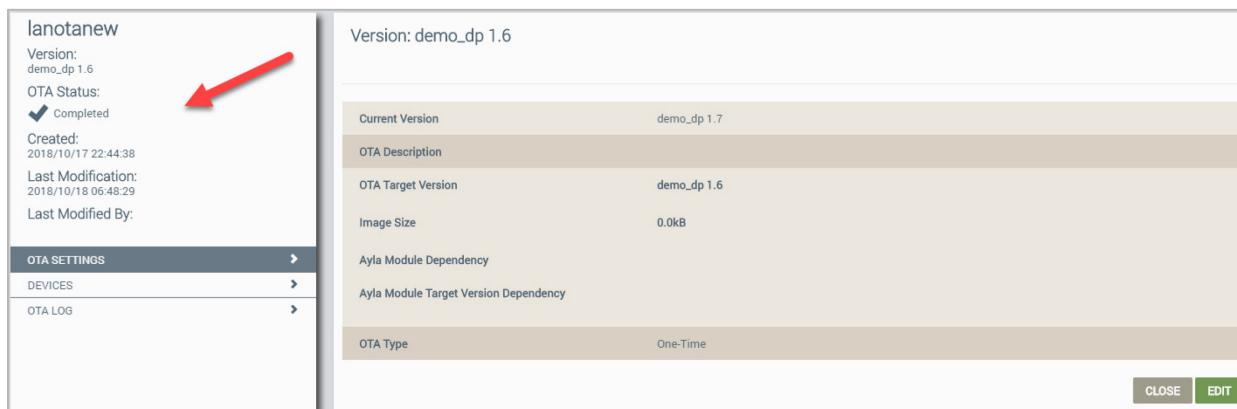
OTA Type: One Time

**CANCEL** **UPDATE**

4. Edit or enter new information for any of the fields in this dialog box; refer to [steps 6-12](#) in Section 3.1 for an explanation of the information needed in each field.
5. Click the **UPDATE** button to save your changes. Or, click the **Cancel** button to close this edit view without saving.

### 3.2.2 View Additional Details on Host MCU OTA Jobs

1. On the Host MCU OTA tab, click the Host MCU OTA job for which you wish to review the details. (Refer to [step 1 in Section 3.2.1](#) above for an example.)
2. On the left side of the page with OTA SETTINGS selected (which is the default), review the status information on the selected OTA job. Refer to the following example:



lanotanew

Version: demo\_dp 1.6

OTA Status:  Completed

Created: 2018/10/17 22:44:38

Last Modification: 2018/10/18 06:48:29

Last Modified By:

**OTA SETTINGS** >

**DEVICES** >

**OTA LOG** >

Version: demo\_dp 1.6

Current Version: demo\_dp 1.7

OTA Description: demo\_dp 1.6

OTA Target Version: demo\_dp 1.6

Image Size: 0.0kB

Ayla Module Dependency:

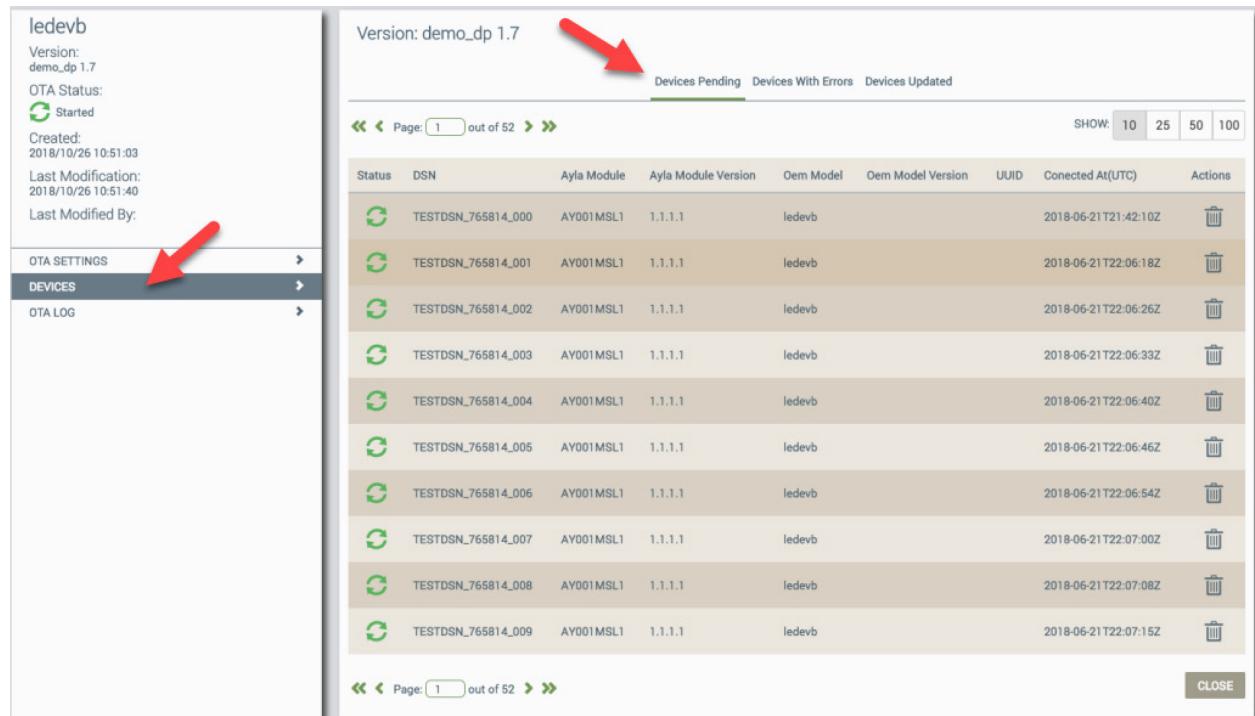
Ayla Module Target Version Dependency:

OTA Type: One-Time

**CLOSE** **EDIT**

3. Click **DEVICES** (also on left side) to view the following information on the devices for this OTA job:

- Devices Pending – This tab shows all devices (as many as one million) that are scheduled to receive this OTA update (based on the definition of the OTA job).



Version: demo\_dp 1.7

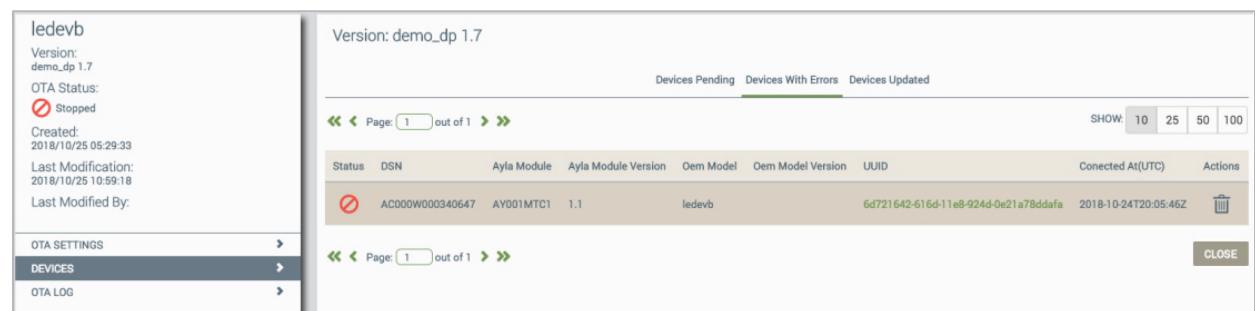
Devices Pending Devices With Errors Devices Updated

Status	DSN	Ayla Module	Ayla Module Version	Oem Model	Oem Model Version	UUID	Connected At(UTC)	Actions
↻	TESTDSN_765814_000	AY001MSL1	1.1.1.1	ledevb			2018-06-21T21:42:10Z	
↻	TESTDSN_765814_001	AY001MSL1	1.1.1.1	ledevb			2018-06-21T22:06:18Z	
↻	TESTDSN_765814_002	AY001MSL1	1.1.1.1	ledevb			2018-06-21T22:06:26Z	
↻	TESTDSN_765814_003	AY001MSL1	1.1.1.1	ledevb			2018-06-21T22:06:33Z	
↻	TESTDSN_765814_004	AY001MSL1	1.1.1.1	ledevb			2018-06-21T22:06:40Z	
↻	TESTDSN_765814_005	AY001MSL1	1.1.1.1	ledevb			2018-06-21T22:06:46Z	
↻	TESTDSN_765814_006	AY001MSL1	1.1.1.1	ledevb			2018-06-21T22:06:54Z	
↻	TESTDSN_765814_007	AY001MSL1	1.1.1.1	ledevb			2018-06-21T22:07:00Z	
↻	TESTDSN_765814_008	AY001MSL1	1.1.1.1	ledevb			2018-06-21T22:07:08Z	
↻	TESTDSN_765814_009	AY001MSL1	1.1.1.1	ledevb			2018-06-21T22:07:15Z	

Page: 1 out of 52

CLOSE

- Devices with Errors – This tab shows all devices on which the OTA update did not complete due to a hard error, such as a timeout or a device that is no longer online. Refer to [Section 4 for examples of errors](#).



Version: demo\_dp 1.7

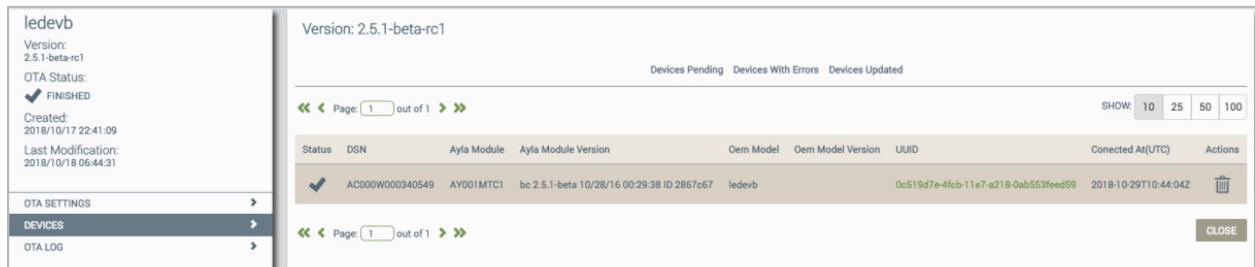
Devices Pending Devices With Errors Devices Updated

Status	DSN	Ayla Module	Ayla Module Version	Oem Model	Oem Model Version	UUID	Connected At(UTC)	Actions
🚫	AC000W000340647	AY001MTC1	1.1	ledevb		6d721642-616d-11e8-924d-0e21a78ddafa	2018-10-24T20:05:46Z	

Page: 1 out of 1

CLOSE

- Devices Updated – This tab shows all the devices that have completed this OTA.

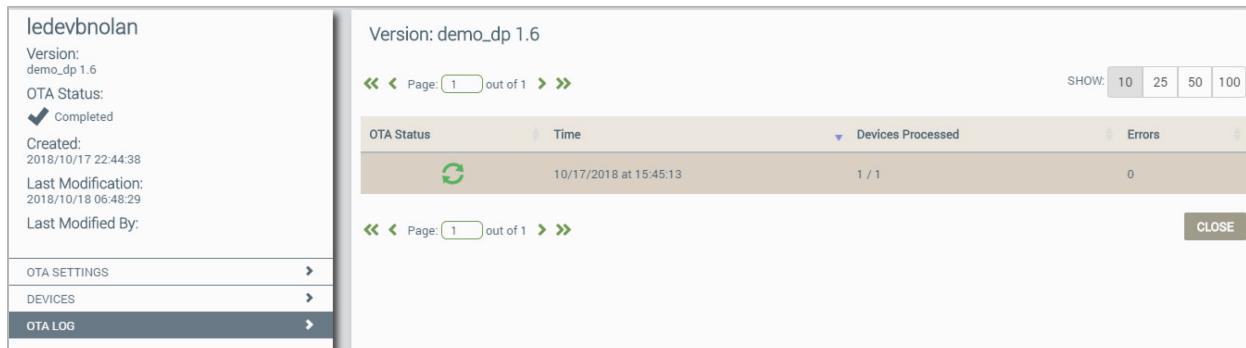


Status	DSN	Ayla Module	Ayla Module Version	OEM Model	OEM Model Version	UUID	Connected At(UTC)	Actions
✓	AC000W000340549	AY001MTC1	bc 2.5.1-beta 10/28/16 00:29:38 ID 2867c67	ledevb		0c519d7e-4fcf-11e7-a218-0ab553feed59	2018-10-29T10:44:04Z	

All the Devices tabs provide the following information and options:

- Status - The OTA status of the device; refer to [step 4](#) below for a list and descriptions of these statuses.
- DSN - The Device Serial Number of the device.
- Ayla Module - The ID of the Ayla module that is on the selected OEM model.
- Ayla Module Version - The version number of the firmware on the Ayla module, which is on the selected OEM model.
- OEM Model – the name/ID of the selected OEM model.
- UUID – The Universally Unique Identifier on the selected OEM model.
- Connected At (UTC) – The time/date stamp (in Universal Time) that the OTA job was started for this device.
- Actions – The OTA actions that you can apply to this device; refer to [Actions in Section 3.3](#) for the complete list and descriptions of these OTA actions.
- CLOSE – This button enables you to return to the Host MCU OTAs tab.

- Click **OTA LOG** to view a history of the selected OTA job, as shown below. The OTA Log is used for debugging purposes.



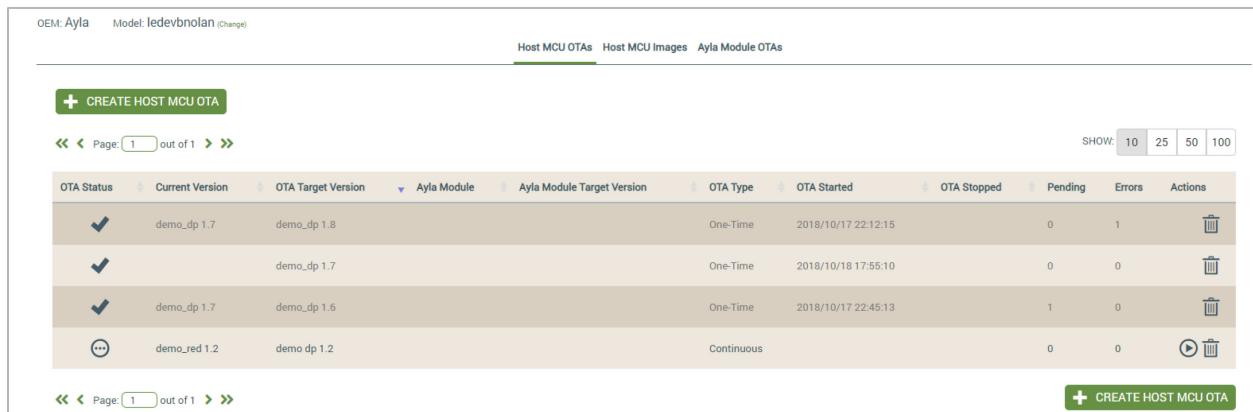
OTA Status	Time	Devices Processed	Errors
	10/17/2018 at 15:45:13	1 / 1	0

Following is a description of the information and options shown in the OTA log:

- OTA Status:
  -  Indicates pending OTA update (not started yet).
  -  Indicates a completed OTA update. **NOTE:** For Continuous OTA jobs, this status may change to Active for new devices that come online and match the OTA criteria for the continuous OTA job.
  -  Indicates an active OTA update. This displays when the OTA job becomes active and remains until it is completed or canceled.
  -  Indicates that the OTA update was cancelled (or stopped).
- Time (Depends on the OTA status):
  - Indicates the start time for active OTA updates.
  - Indicates the stop time for stopped or cancelled OTA updates.
- Devices Processed – When the OTA update is stopped or cancelled, displays the number of devices that received the OTA update.
- Errors - When the OTA update is stopped or cancelled, displays the number of devices that had errors during this OTA update.
- CLOSE – This button enables you to return to the Host MCU OTAs tab.

### 3.3 Manage OTAs for Host MCU Applications

All the tabs on the OTA page enable you to manage your OTA jobs remotely, so that you can, for example, report to your operations teams with a clear understanding of current and historic OTA runs. This section provides an example and descriptions of the information and functions available on the Host MCU OTAs tab.



OTA Status	Current Version	OTA Target Version	Ayla Module	Ayla Module Target Version	OTA Type	OTA Started	OTA Stopped	Pending	Errors	Actions
✓	demo_dp 1.7	demo_dp 1.8			One-Time	2018/10/17 22:12:15		0	1	
✓		demo_dp 1.7			One-Time	2018/10/18 17:55:10		0	0	
✓	demo_dp 1.7	demo_dp 1.6			One-Time	2018/10/17 22:45:13		1	0	
...	demo_red 1.2	demo dp 1.2			Continuous			0	0	 

Following is a description of the information shown on this tab (some are the same as shown in the OTA log as defined in Section 3.2):

- OTA Status:
  -  Indicates pending OTA update (not started yet).
  -  Indicates a completed OTA update. **NOTE:** For Continuous OTA jobs, this status may change to Active for new devices that come online and match the OTA criteria for the continuous OTA job.
  -  Indicates an active OTA update. This displays when the OTA job becomes active and remains until it is completed or canceled.
  -  Indicates that the OTA update was cancelled (or stopped).
- Current Version – Displays the name/version number of the module that should receive this OTA update.
- OTA Target Version – Displays the firmware version of the module that will be deployed by this OTA update.
- Ayla Module – Displays the name/ID of the Ayla module that is on the selected OEM model.
- Ayla Module Target Version – Displays the Ayla firmware release/version that is about to be pushed to devices via the OTA update
- OTA Type
  - Continuous – When new devices that match the criteria of this OTA job are added and online, the Ayla platform will push this OTA update at runtime of those new devices.
  - One Time – This OTA update is pushed only one time to the devices that match the OTA criteria upon activating the OTA job.
- OTA Started -The timestamp for the start of this OTA job. **NOTE:** If the Current Version associated with this OTA job is active in another, you must stop that job before starting this one.
- OTA Stopped – The timestamp of the end of this OTA job, whether it was stopped upon completing all processing, or manually stopped for other reasons.
- Pending- The number of devices that are scheduled to receive this OTA update based on the OTA job. If a filter is applied to the OTA job, only devices within the filter range receive the update. Refer to [Section 2.2 for a description of the Ayla Module Dependency and Ayla Module Target Version filters](#).
- Errors - When the OTA update is stopped or cancelled, displays the number of devices that had errors during this OTA update.

- Actions:



Click to start/activate an OTA job.



Click to stop an active OTA job.



Click to delete the OTA job. If the OTA update is running, a confirmation displays to make sure you want to delete this job while it is active.

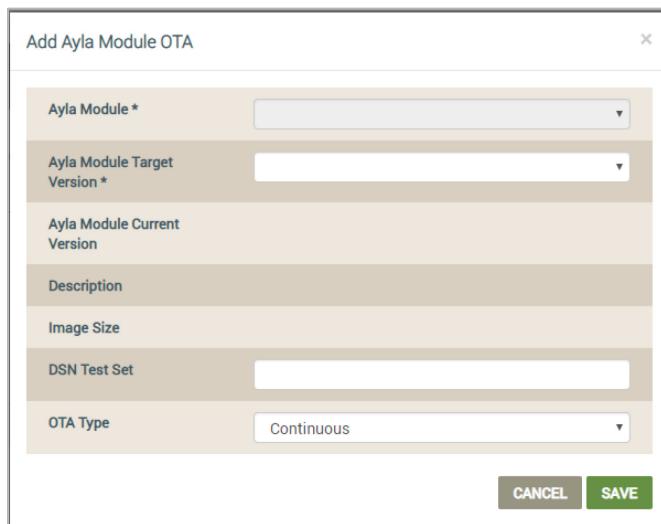
## 3.4 Create a New Ayla Module OTA Job

As stated in Section 2 of this document, Ayla images are part of the Ayla module that you select when configuring OTA jobs in the Ayla Customer Dashboard. This is done when you add a new Ayla module OTA job, which is explained in this section.

1. If you are not logged in to the Ayla Customer Dashboard, follow [steps 1-3 in Section 3.1](#).
2. Click the **Ayla Module OTAs** tab located at the top of the OTA landing page.



3. Click the **ADD AYLA MODULE OTA** button to open the Add Ayla Module OTA dialog box, shown below:



**NOTE** Fields with an asterisk (\*) are mandatory to complete the configuration. The other fields are optional; therefore, leaving them blank does not have any effect.

4. In the Ayla Module drop-down list (mandatory), select the name/ID of the Ayla module on the OEM model you selected.
5. In Ayla Module Target Version (mandatory), select the version of the module that will be deployed by this OTA update.

**NOTE** The following fields populate based on your entries in Steps 4 and 5:

- The current version of the Ayla module firmware image that you selected in Step 4 displays in the Ayla Module Current Version field once you have completed steps 4 and 5. Only devices with this version of the Ayla module will receive this OTA update.
- If a description was entered in the original image profile of the Ayla module firmware image that you selected in Step 4, this description displays in the Description field once you have completed steps 4 and 5.
- Image Size displays the size of Ayla image file for the module you select for OTA Target Version. The file size can be used to estimate the time and effort that the device agent requires for downloading and installation. The image is stored on the Ayla platform until deleted by the user.

6. For DSN Test Set (optional), enter as many as 50 Device Serial Numbers (DSNs) of devices in the field that will be processed by this OTA update. Use a comma (,) to separate the DSNs. This field enables you to specify an exclusive set of DSNs to test the OTA update.

**NOTE** You can only enter a maximum of 50 DSNs in this field and it cannot be used for [Continuous OTA](#). The devices must meet the OTA rule criteria.

If you use the DSN Test Set option, the following error message appears to make sure that you understand how this test option affects the OTA job.



7. For OTA Type (optional), select either of the following options to specify which OTA criteria should be applied to this OTA update:
  - a. Continuous (Default) – When this OTA update is active, the Ayla platform automatically continues to evaluate which devices in the field meet the OTA criteria for this OTA update, and if new devices that match the criteria are added, the platform will identify those devices as candidates and push this OTA update at runtime to those new devices

when they are online. For example, when a device connects to the Ayla cloud and it processes the device from the “unknown” to “known” state, the Ayla platform will check to see if the device meets the OTA rules for continuous OTA updates, and if the device matches the OTA rules, the OTA update is pushed to that new device.

- b. One Time – Once this OTA update is activated, the Ayla platform evaluates which devices match the OTA criteria for this update, and then pushes the update to those devices. This evaluation only happens one time upon starting the OTA update.
8. Click the **SAVE** button to add this Ayla OTA job to the list that can monitored or changed on the Ayla Module OTAs tab. Or, click the **Cancel** button to close this dialog box without saving.

## 3.5 Edit and View Details of a Ayla Module OTA Job

From the Ayla Module OTAs tab, you can edit existing OTA jobs and view additional details about the job.

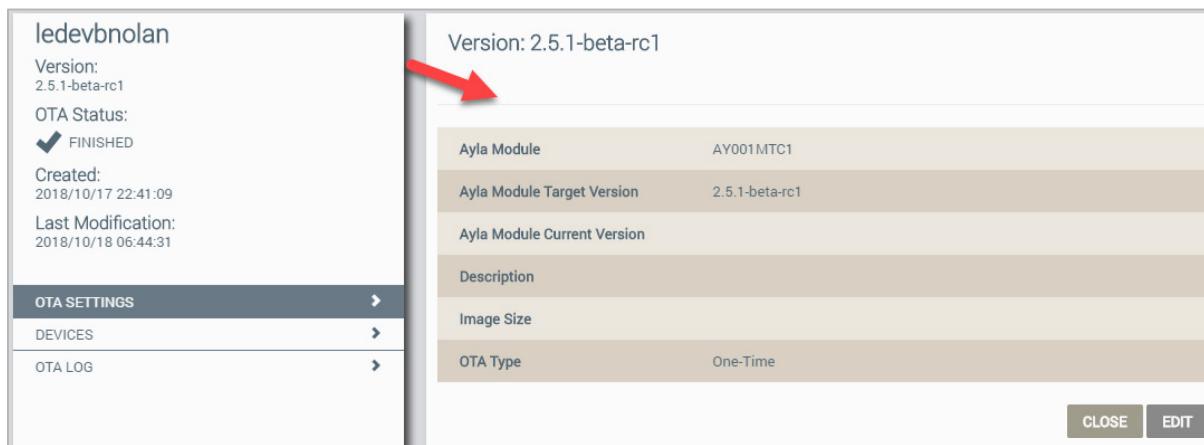
### 3.5.1 Edit an Ayla Module OTA Jobs

1. On the Ayla Module OTAs tab, click the Ayla Module OTA job you wish to edit, as shown:



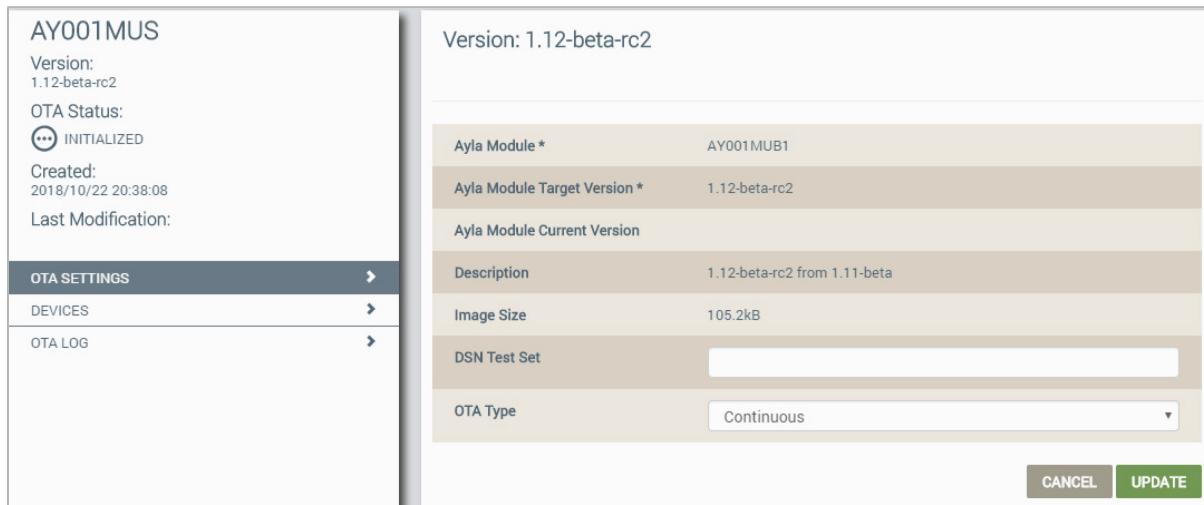
OTA Status	Module Model	Ayla Module Current Version	Ayla Module Target Version	HomeKit	Description	OTA Started	OTA Stopped	OTA Type	Pending	Errors	Actions
<input checked="" type="checkbox"/>	AY001MTC1	2.5.1-beta-rc1	<input type="checkbox"/>	2.5.1-beta-rc1 from 2.5-beta	2018/10/17 22:41:17	2018/10/17 22:41:17	One-Time	0	0		
<input checked="" type="checkbox"/>	AY001MTC1	2.6-beta	<input type="checkbox"/>	test	2018/10/17 21:32:50	2018/10/17 21:32:50	One-Time	0	1		

2. On the right, notice a dialog box similar to [Add Ayla Module OTA dialog box](#); see the following as an example:



**NOTE** You cannot edit active OTA jobs. Stop the OTA update on the Host MCU OTAs tab to enable the editing capabilities. Refer to [Actions in Section 3.3](#) to do this.

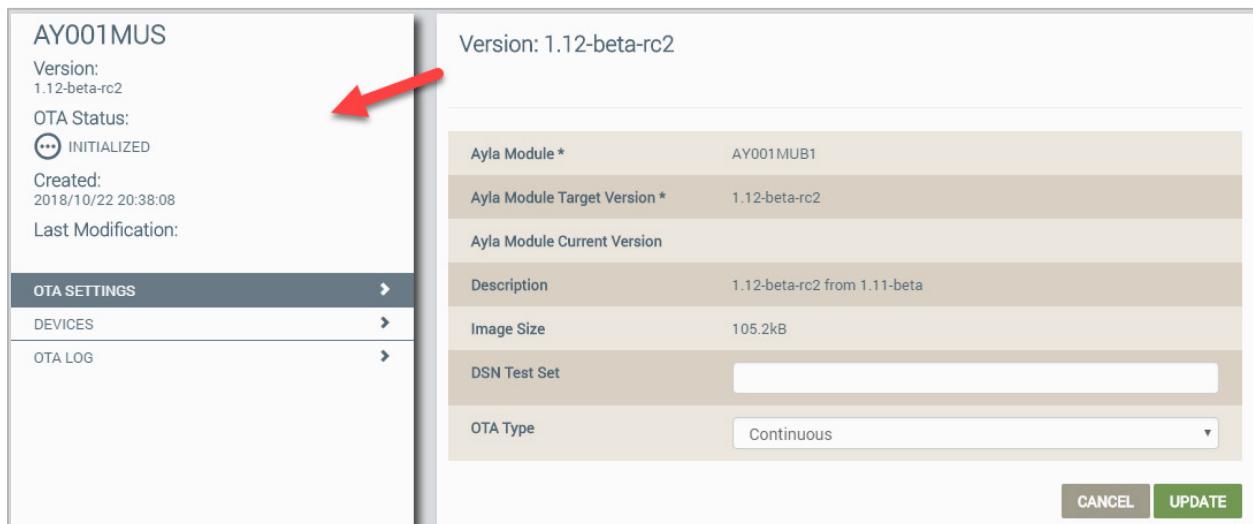
3. Click the **EDIT** button to display the edit view, as shown:



4. Edit or enter new information for any of the fields in this dialog box; refer to [steps 4-8](#) in Section 3.4 for an explanation of the information needed in each field.
5. Click the **UPDATE** button to save your changes. Or, click the **Cancel** button to close this edit view without saving.

### 3.5.2 View Additional Details on Ayla Module OTA Jobs

1. On the Ayla Module OTAs tab, click the Ayla Module OTA job for which you wish to review the details. (Refer to [step 1](#) in Section 3.5.1 above for an example.)
2. On the left side of the page with OTA SETTINGS selected (which is the default), review the status information on the selected OTA job. Refer to the following example:



3. Click **DEVICES** (also on left side) to view the following information on the devices for this OTA job:
  - a. Devices Pending – This tab shows all devices that are scheduled to receive this OTA update (based on the OTA rules for the defined OTA job).
  - b. Devices with Errors – This tab shows all devices on which the OTA update did not complete due to a hard error, such as a timeout or the device not being online.
  - c. Devices Updated – This tab shows all the devices that have completed this OTA.

All the Devices tabs provide the following information and options:

- Status - The OTA status of the device; refer to [step 4](#) below for a list and descriptions of these statuses.
- DSN - The Device Serial Number of the device.
- Ayla Module - The ID of the Ayla module that is on the selected OEM model.
- Ayla Module Version - The version number of the firmware on the Ayla module, which is on the selected OEM model.
- OEM Model - the name/ID of the selected OEM model.
- OEM Model Version - This is the Host software (SW) version.
- UUID - The Universally Unique Identifier on the selected OEM model.
- Connected At (UTC) - The time/date stamp (in Universal Time) that the OTA job was started for this device.
- Actions - The OTA actions that you can apply to this device; refer to [Actions in Section 3.3](#) for the complete list and descriptions of these OTA actions.
- CLOSE - This button enables you to return to the Host MCU OTAs tab.

4. Click **OTA LOG** to view a history of the selected OTA job, as shown below. The OTA log is used for debugging purposes as well.



The screenshot shows the Ayla Intelligent Over-the-Air (OTA) Solution interface. On the left, a sidebar for the user 'ledevbnolan' displays the following information:

- Version: demo\_dp 1.6
- OTA Status: ✓ Completed
- Created: 2018/10/17 22:44:38
- Last Modification: 2018/10/18 06:48:29
- Last Modified By:

The sidebar also lists three tabs: **OTA SETTINGS**, **DEVICES**, and **OTA LOG**, with **OTA LOG** being the active tab.

The main content area shows the **Version: demo\_dp 1.6**. Below it is a table with the following data:

OTA Status	Time	Devices Processed	Errors
	10/17/2018 at 15:45:13	1 / 1	0

At the bottom of the main content area are navigation buttons: << < Page: 1 out of 1 > >> and a **CLOSE** button.

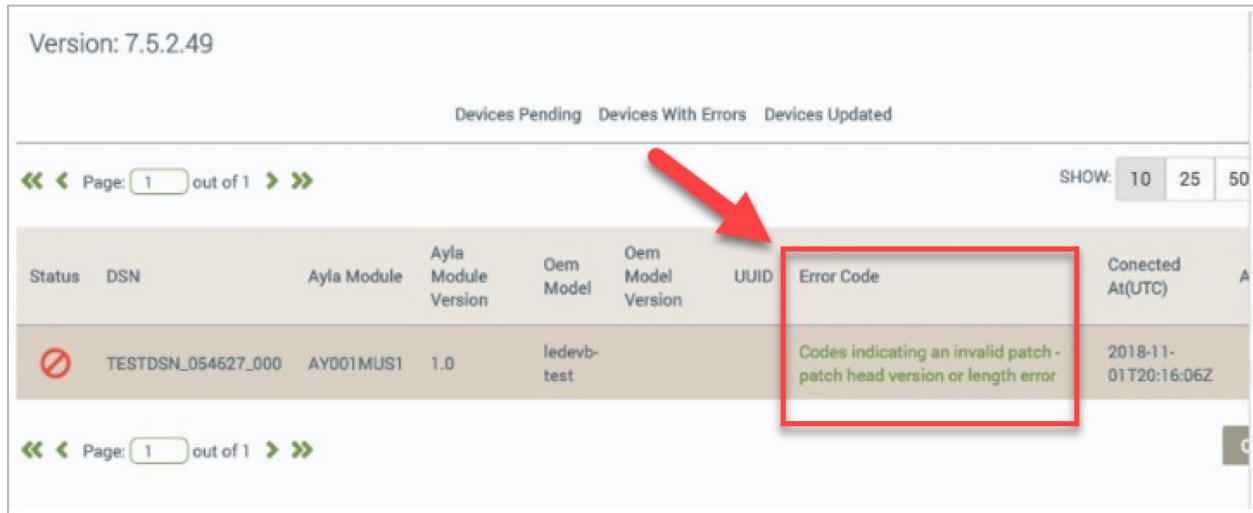
Following is a description of the information shown in the OTA log:

- **OTA Status:**
  - Indicates pending OTA update (not started yet).
  - Indicates a completed OTA update. **NOTE:** For Continuous OTA jobs, this status may change to Active for new devices that come online and match the OTA criteria for the continuous OTA job.
  - Indicates an active OTA update. This displays when the OTA job becomes active and remains until it is completed or canceled.
  - Indicates that the OTA update was cancelled (or stopped).
- **Time (Depends on the OTA status):**
  - Indicates the start time for active OTA updates.
  - Indicates the stop time for stopped or cancelled OTA updates.
- **Devices Processed** – When the OTA update is stopped or cancelled, displays the number of devices that received the OTA update.
- **Errors** - When the OTA update is stopped or cancelled, displays the number of devices that had errors during this OTA update.

5. Click the **CLOSE** button to return to the Ayla Module OTAs tab.

## 4 Commands and Error Codes

This section provides the commands used to exchange messages between the Ayla module and the host MCU during the OTA update process along with the status codes. Following is an example of how the error code appears in the Ayla Customer Dashboard.



Version: 7.5.2.49

Devices Pending Devices With Errors Devices Updated

Page: 1 out of 1 SHOW: 10 25 50

Status	DSN	Ayla Module	Ayla Module Version	Oem Model	Oem Model Version	UUID	Error Code	Connected At(UTC)
	TESTDSN_054627_000	AY001MUS1	1.0	ledevb-test			Codes indicating an invalid patch - patch head version or length error	2018-11-01T20:16:06Z

Page: 1 out of 1

Type of Error	Error Codes
OTA status code (integer)	0 – no error, or completely patched block 1 – block would have CRC error after patch 3 – resource problem (not re-tried)
Problems with the download	7 – failed to notify Host application 8 – failed to connect to image server 9 – service gave error during download 10 – invalid URL protocol or path for OTA 11 – invalid patch type 12 – request did not provide version 13 – request did not provide size 14 – other errors with OTA command
Codes indicating an invalid patch	16 – patch file decompression error 17 – segment length extends past end-of-file 18 – unspecified fatal error in applying patch 19 – segment has invalid opcode 20 – patch program in invalid state 21 – block has CRC error before the patch 22 – more than one block is in copied state

Type of Error	Error Codes
Codes indicating an invalid patch (continued)	23 – patch head version or length error 24 – patch file has CRC error
Possible hardware issues	32 – block erase failed 33 – block write-back failed 34 – scratch block length too short 35 – old and new code are in diff blocks 36 – old code of patch spans two blocks 37 – new code of patch spans two blocks 38 – scratch block erase error 39 – scratch block write error 40 – error reading/writing progress byte 41 – block to be patched is not state PB_START
Module/patcher software problems	48 – patch file not found 49 – patch file read of head failed 51 – patch file not followed by progress area 52 – invalid progress area 53 – patch file read error 54 – patch file decompression init error 55 – previous patch attempt failed 57 – error opening flash device 58 – patcher did not boot, bb may be down level

## 5 Best Practices

Following are suggested practices for moving from the Ayla Developer's Portal to the Ayla Customer Dashboard:

- Test on the Developer Environment - Any new OTA firmware update needs to be tested in the developer environment. This is because the OTA process may not recover from a faulty new image. The process should recover from any errors that occur during the download or from interrupted downloads, but the process does not recover from a faulty OTA.
- Be sure to check that you can send an OTA update from the new version as well as to it.
- Ramp up on the field environment - Start with 5-10% of field devices with an OTA job, then wait until the job is complete and make sure that all devices that are online have successfully updated to the new firmware version.
- Complete deployment in the field environment.
- Update all other field devices in blocks of 100-1000 devices.
- Make sure that each OTA update is successful for each OTA job.



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