Axis firmware management

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AXIS
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Summary

Axis offers product firmware management according to either the active track or the long-term support (LTS) tracks. Being on the active track means continuously getting access to all the latest product features, while the LTS tracks provide a fixed platform with periodic releases focused mainly on bug fixes and security updates.

Using firmware from the active track is recommended if you want to access the newest features and functionalities, or if you use Axis end-to-end system offerings. Active-track firmware is released with the product, and updated at least every three months.

The LTS tracks are recommended if you use third-party integrations, which are not continuously validated against the latest active track. With LTS, the products can maintain cybersecurity without introducing any significant functional changes or affecting any existing integrations. Since a new LTS track is scheduled every 18-24 months, it is still possible to upgrade and add functionality at that interval.

1. Introduction

This white paper explains the firmware management approach for Axis network cameras and video encoders, and provides recommendations for which firmware track to choose. The paper also contains information about what firmware is and how firmware releases are denoted.

2. What is firmware?

In an Axis network video product, the firmware basically functions as an operating system, being the software that manages all aspects of the product's performance. That includes, for example:

> The imaging pipeline that collects and processes raw video data
> The web server that transmits video over a network
> The camera's web interface for access via an internet browser
> The event handling system that relays alarms and messages to users
> All API interfaces (like VAPIX and ONVIF) for handling integration with other systems

The firmware is customized for each product, to support both the imaging hardware and any product-specific features. Before a new product is released, the stability of the firmware is ensured through extensive testing of the product's features.

After release, firmware updates are scheduled to add features, or sometimes required to fix bugs. These updates are also tested extensively, both to ensure continued stability and to maintain backwards compatibility with older implementations. Firmware updates are divided into two categories:

> Major releases - proactive firmware changes that incorporate major and minor upgrades to features and functionality
> Minor releases - small, reactive firmware changes to fix reported bugs and potential security vulnerabilities

The frequency of major and minor releases depends on which firmware management approach, or track, is used.

3. Firmware development

Firmware development for Axis network cameras and video encoders follows a specific procedure and a specific naming convention.

3.1 The development procedure

Firmware development for new products starts with the branching off of a product firmware (PFW) from the common firmware (CFW). The CFW is a shared firmware platform that contains the combined features of all video products that have been integrated into it. The new PFW branch is built upon throughout the project lifecycle to become the initial firmware release for that product.

The PFW is then merged back to the CFW, integrating the new product to the shared platform and enabling it to receive scheduled firmware updates.
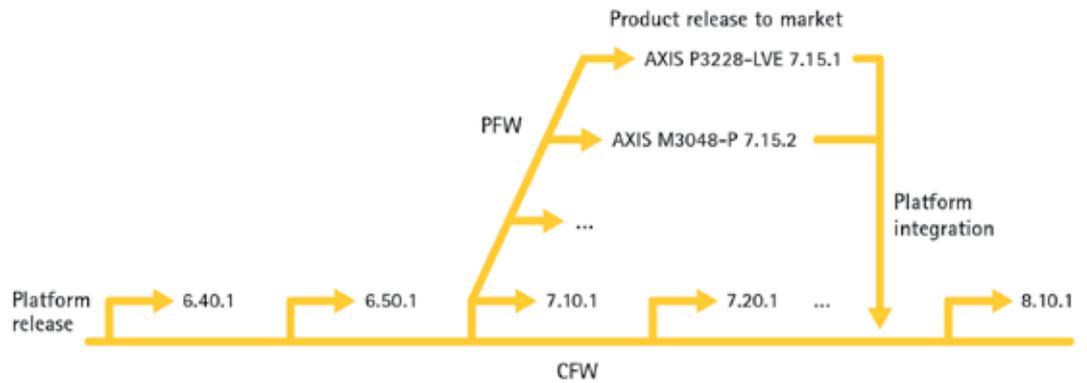
Figure 1. Diagram outlining the firmware development procedure with product firmware branches from the common firmware platform.

Some products are exempt from this process and cannot be merged into the CFW. Instead, they maintain PFW throughout their lifetime and receive separate updates.

3.2   Firmware naming

Each firmware release is denoted by a unique number combination given by the year and type of the release. The significance of each number is explained in the figures below.

Figure 2. Number combination denoting the second minor release of the common firmware version 7.10.1., which was the first major release in 2017.
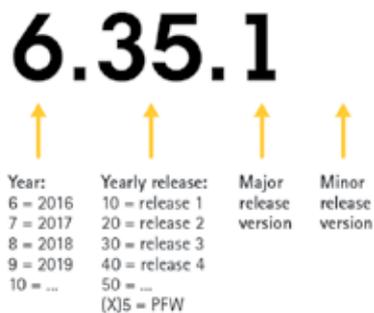

Figure 3. Number combination denoting the first major release of a product firmware branched off of the 6.30.1 common firmware.

4. Firmware management

Axis offers two separate tracks of firmware management, each with their own release intervals. For most Axis products linked to the CFW platform, you can choose which track to use.

4.1 The active track

The active track suits most customers, especially if you use Axis software to manage your systems. Firmware releases on this track are aligned with development on the CFW platform. Most new Axis video products reside on the active track, which means that they get immediate access to any new features and feature updates, as soon as these are released.

4.2 The long-term support (LTS) tracks

Perhaps you prefer to update your products less frequently? If your focus is to keep your products well integrated with third-party equipment or software, you can access any necessary bug fixes and security updates through a long-term support (LTS) firmware track. These tracks enable maintained cybersecurity in your products by offering firmware updates with minimized risk of negatively affecting the existing integration.

An LTS firmware track is a fixed firmware platform. It is issued every 18-24 months, and it is based on the, at the time of release, most current CFW. Subsequent major and minor releases for the LTS track focus on fixing bugs and patching vulnerabilities, but there is also a possibility to switch LTS tracks (if there is a newer track available) in order to acquire new features.

4.3 The firmware maintenance process

4.3.1 Major releases

The release process for major firmware releases is outlined in the below diagram, with the active track in yellow and the LTS tracks in blue.
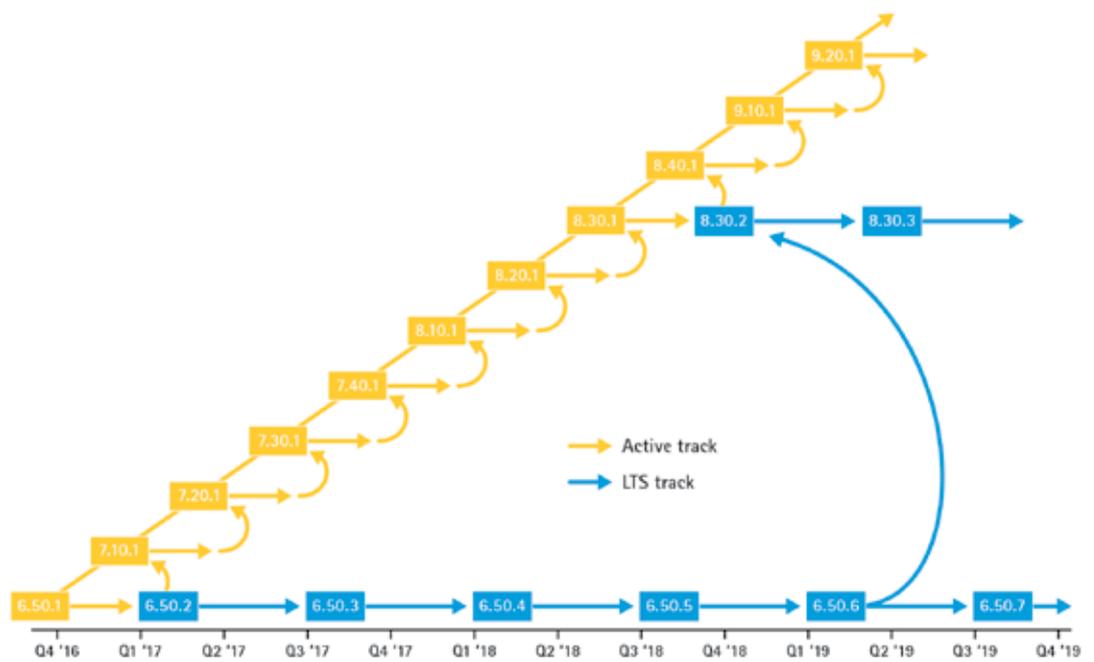

Figure 4: Diagram outlining the major firmware release cycle for product maintenance. Please note that actual firmware notation and release dates may differ from those in the diagram.

The active track has a major release scheduled every two to three months. The horizontal yellow arrows in the figure indicate the release of a new major version. Only one active track is maintained at a time. The curved arrows demonstrate the upgrading path.

For an LTS track, major releases are issued at variable intervals, becoming less frequent during the 5-10-year lifecycle of the firmware. Upon release of the next LTS track, a path (the curved blue arrow in the figure) will exist for some products to update and acquire access to new features and functionalities by switching LTS tracks. There will be regular, pro-active releases during the first years, but when there is a newer track available, the older track will get less regular, reactive releases.

4.3.2   Minor releases

The active track, with its major releases scheduled every two to three months, has a limited need for minor releases. They are issued if necessary, and generally address high-priority bug fixes and security patches that cannot wait until the next major release.

When an LTS track still receives regular major releases, minor releases are issued only to address bug fixes and vulnerabilities. As the track matures, major releases become less frequent and minor releases will be the norm.

5.   Firmware update strategy

Maintaining a firmware upgrade strategy ensures that your Axis product receives continuous improvements to its firmware. Axis Technical Services will also recommend that you update to the latest firmware upon the reporting of any issue concerning an Axis product. But since there may be several coexisting firmware tracks, which "latest firmware" should you choose?

5.1   LTS or active track?

If you use an LTS track, you should normally update to the latest firmware version on the same LTS track. If you use the active track, you should update to the latest available firmware of the active track.

> **User question 1**: With my Axis product running on the 6.50 LTS track, should I consider updating to the latest active track firmware?
>
> **Answer:** It is recommended to stay on the 6.50 LTS track but update to the latest firmware version on that track, if there is no strong need for new features available from the active track.
>
> **User question 2**: I would like to run my Axis product on an LTS track, but currently there is no LTS track available?
>
> **Answer:** It is recommended to continuously update the product on the active track until an LTS track is available. See figure 5 for a description of the update path in this case.
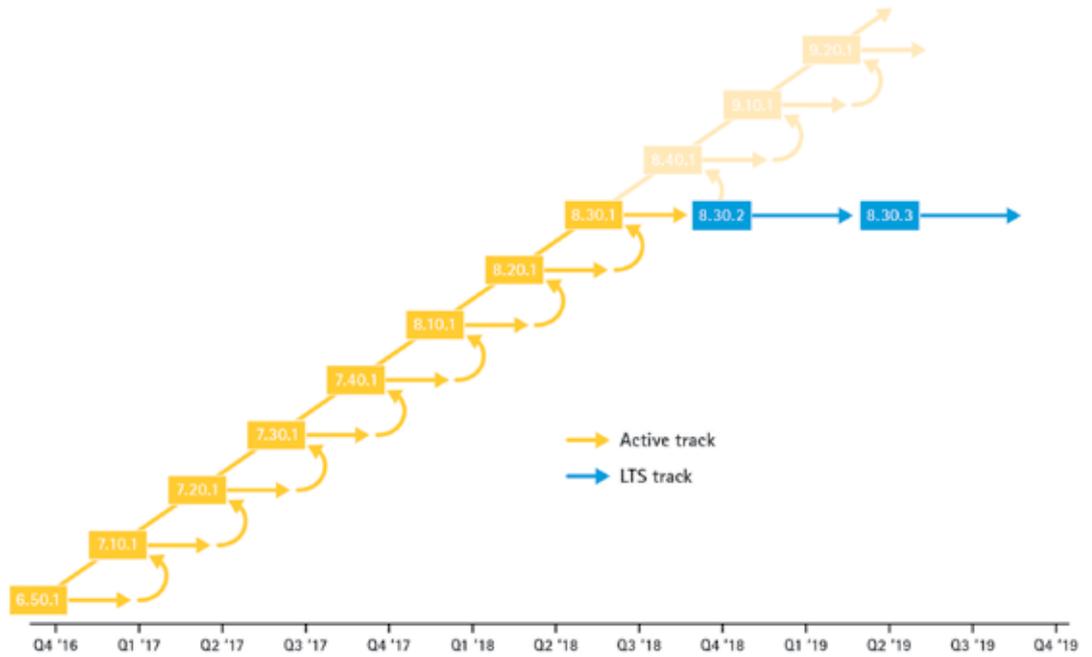
Figure 5: Recommended upgrade path for user question 2, updating the product on the active track until an LTS track is available.

5.2   Switching LTS tracks

With time, there will be several LTS tracks available for a product. All LTS tracks maintain a high level of stability through long-term bug fixing without adding new features. At some point though, technical limitations may make it impossible to update certain components of the firmware. In a long-term perspective, it is therefore recommended to switch to a newer LTS track.

Please note that a newer LTS track may include new features, changes to default settings, and performance adjustments that could affect compatibility with your system. The products should be updated in a controlled and supervised manner after verification that firmware on the new LTS track works as expected in your third-party environment.

> **User question 3**: With my Axis product running on the 6.50 LTS track, should I consider updating to the new LTS track?

> **Answer:** Yes, but you should coordinate the change with your other schedules, e.g., VMS upgrade, network maintenance, and camera replacement cycle. Figure 6 illustrates this update path.
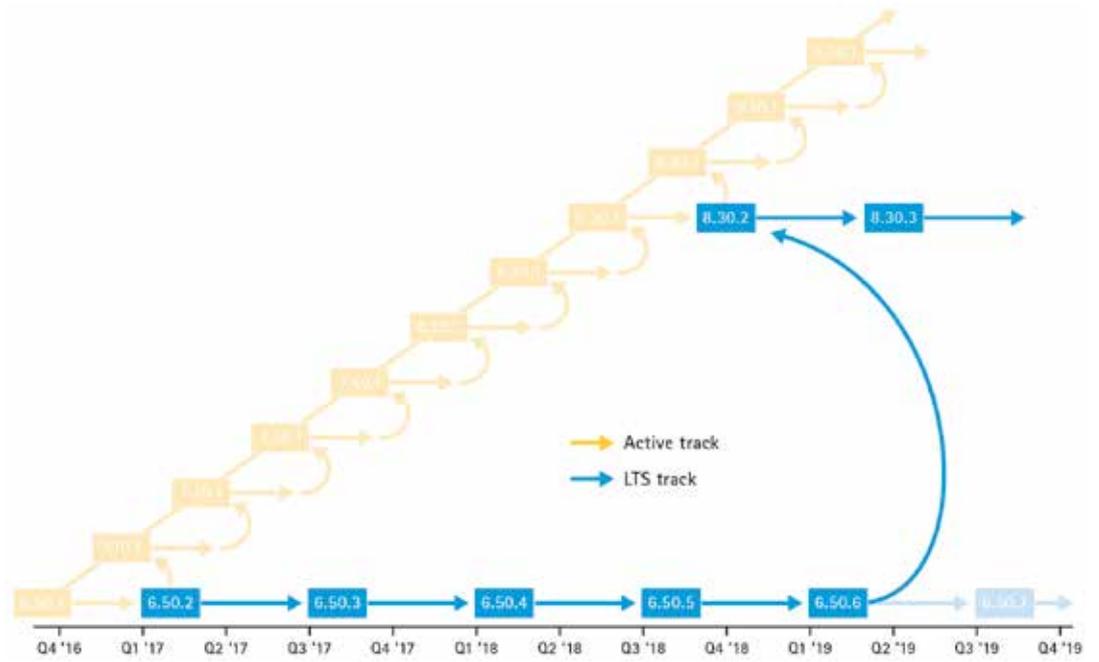
Figure 6: Recommended upgrade path for user question 3, switching LTS tracks when a new LTS track is available.

About Axis Communications

Axis enables a smarter and safer world by creating network solutions that provide insights for improving security and new ways of doing business. As the industry leader in network video, Axis offers products and services for video surveillance and analytics, access control, and audio systems. Axis has more than 3,000 dedicated employees in over 50 countries and collaborates with partners worldwide to deliver customer solutions. Founded in 1984, Axis is a Sweden-based company listed on the NASDAQ Stockholm under the ticker AXIS.

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