

Types of Cisco IOS Software Releases

Overview

This bulletin gives basic information about the different kinds of Cisco IOS Software releases. This bulletin covers:

- Major Releases
- Early Deployment Releases
- General Deployment Releases
- Maintenance updates
- Release numbering

Applicability

This bulletin covers most Cisco IOS Software releases. Sometimes Cisco may release Cisco IOS Software that does not adhere to all of the conventions explained in this bulletin. In those cases, the information in the product literature of the particular software release supersedes the information in this bulletin.

Types of Releases

There are two main types of Cisco IOS Software releases: Major Releases, which support a fixed set of features and platforms through the life of the release; and Early Deployment Releases, which deliver support for new features and platforms in their regular maintenance updates.

Table 1 lists the main variants of Cisco IOS Software releases. These releases are described in greater detail in the following sections.

Table 1

<i>Release Type</i>	<i>Description</i>	<i>Timing</i>	<i>Numbering Example</i>
Major Release—FCS	Introduces significant features, functionality, and/or platforms on a stability-oriented release vehicle	As needed to support customer needs	12.0(1)
Major Release—scheduled maintenance updates	Periodic revisions to Major Releases: <ul style="list-style-type: none"> • fully regression tested • incorporate the most recent bug fixes • no new platforms or features—focused on stability 	Regular maintenance cycles	12.0(3)
Major Release—interim builds	Working builds—usually not regression tested, and not intended for customer use except in unusual circumstances	Weekly	12.0(4.2)

Table 1

<i>Release Type</i>	<i>Description</i>	<i>Timing</i>	<i>Numbering Example</i>
General Deployment	General deployment releases are major releases that have had extensive market exposure in a wide range of network environments, and have been qualified through extensive metrics analyzing stability and bug trends, as well as customer satisfaction surveys.	When stability of release has been proven internally by Cisco and externally by customers	12.0(8), and all subsequent maintenance updates of 12.0 [12.0(9), 12.0(10), etc.]
Early Deployment—FCS	Introduces significant new features, functionality, and/or platforms on a feature-oriented release vehicle <ul style="list-style-type: none"> • based on a Major Release • will not achieve General Deployment 	As needed to provide support for newly emerging technologies	12.0(1)T
Early Deployment—scheduled maintenance updates	Periodic revisions to ED Releases: <ul style="list-style-type: none"> • fully regression tested • incorporate the most recent bug fixes, including those from Major Release • usually deliver new platforms and/or features 	Regular maintenance cycles	12.0(3)T
Early Deployment—interim builds	Working builds—usually not regression tested, and not intended for customer use except in unusual circumstances	Generally weekly, though some ED Releases may follow a different policy	12.0(4.2)T

Note: The term “release” has two meanings. “Release” can refer to the first shipment of a product, along with all its subsequent maintenance updates. For instance, 12.0(1), 12.0(2), 12.0(3) and all subsequent maintenance updates are collectively called the “12.0 Release.” A particular maintenance update can also be called a “release,” as in the “12.0(3) release.” In this document, “Release” with a capital “R” indicates the first encompassing usage, and “release” with a small “r” indicates the second more narrow usage.

Major Releases

The goal of a Major Release is to deliver stable, high quality software for general deployment in customers’ production networks. To ensure stability, no new feature or platform support is added to a Major Release after its First Commercial Shipment (FCS). Scheduled maintenance releases contain only bug fixes for the supported feature/platform set.¹

General Deployment

General deployment certification is awarded to Cisco IOS Software that provides proven technology that has had extensive market exposure in a wide range of network environments, and has passed rigorous metrics analyzing stability and bug trends, as well as customer satisfaction surveys. A general deployment release is a Cisco IOS Software release that has achieved GD certification. A release meets the GD milestone when Cisco is satisfied that the release has been:

- **Proven** through extensive market exposure in diverse networks
- **Quantified** with metrics analyzed for stability and bug trends
- **Qualified** through customer satisfaction surveys

1. Prior to release 11.2, new platform and feature support was sometimes added to maintenance releases. Beginning with release 11.2, no new features or platforms are added to the release after its FCS. Moreover, as of September, 1996, no new features are added to maintenance releases of pre-11.2 Major Releases.

While all releases undergo significant internal and external testing prior to FCS, Cisco is unable to anticipate and test all customer network configurations. For that reason, the software deployed in customer networks is closely monitored to ensure that it meets customers' needs, and fixes to the software are delivered via regularly scheduled maintenance releases.

Once a maintenance update for a particular Major Release achieves GD, all subsequent maintenance updates for that Release are also said to be GD.

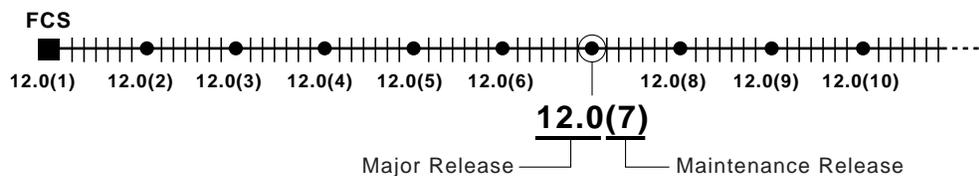
Major Release Maintenance

- Regular Maintenance - When a reasonable workaround cannot be determined, product will receive defect repairs for all severity levels of software problems.
- Mature Maintenance - When a reasonable workaround cannot be determined, a mature maintenance release will receive defect repairs for all severity levels of customer-found problems. Internally-found problems will be applied on a case-by-case basis. Releases that achieve Mature Maintenance will typically issue maintenance releases less frequently than Regular Maintenance releases.
- Restricted Maintenance - Only customer-found defects, with a severity level of S1 or S2 and/or P1 or P2, will be considered for defect repair. Customers are strongly encouraged to migrate to a more recent release.

Major Release Numbering

The release number of a Major Release identifies the Major Release and its maintenance level. In the example below, 12.0 identifies the Major Release, and 7 is its maintenance level. The complete release number is 12.0(7).

Figure 1 Major Release Numbering Scheme



Occasionally, a release number may have a lowercase letter, as in “12.0(7a)”. The “a” indicates that there have been a very small number of bug fixes applied since the associated maintenance release (in this example, since 12.0(7)). The release is in every other way identical to a regular release.

Early Deployment Releases

Early Deployment Releases (ED) as a group are based on Major Releases of Cisco IOS Software. ED Releases are a vehicle to quickly deliver new functionality, addressing the need for early availability of product. These Releases provide new technologies for customers to deploy in a limited manner in their networks.

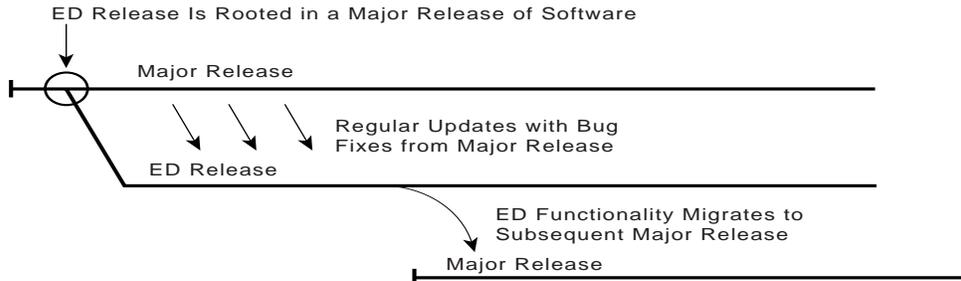
Note: Similar functionality may be available on more than one ED Release. For example, a platform may be introduced initially on the 11.1AA Release. Support for this platform may also be included in an ED Release based on 11.2, say the 11.2P Release. Since 11.2P is based on the 11.2 Major Release, the platform will support additional 11.2 features when deployed on the 11.2P Release. (See below for an explanation of Early Deployment Release numbering.)

Maintenance Updates for Early Deployment Releases

Maintenance updates for an ED Release usually deliver support for additional platforms or features, beyond what was available at the Release's FCS. While the addition of platforms and features at maintenance releases can have a destabilizing effect on the release, Early Deployment maintenance releases are subject to the same level of testing as the maintenance releases for Major Releases.

Maintenance updates for an ED Release also deliver bug fixes. As shown in the figure below, maintenance work performed on the Major Release is brought forward to the ED release. Bugs present at the FCS of the Major Release are thus corrected in maintenance releases of any ED Release based on that Major Release, as well as in maintenance releases of the Major Release. Bugs found in an ED release are analyzed to determine whether they originated in that ED Release, or in the underlying Major Release. If a bug originated in the Major Release, it is corrected in both the Major Release and the ED Release.

Figure 2 Early Deployment of Cisco IOS Software



In summary, maintenance releases for an ED Release may deliver any or all of the following:

- Bug fixes for the Major Release-based features on which the ED is based
- Bug fixes for the ED-unique features
- Support for additional platforms or features

Early Deployment Releases and General Deployment

Since an ED Release usually inherits bug fixes applied to the Major Release on which it is based, an ED Release normally benefits as the Major Release on which it is based gets more and more stable and achieves GD. ED Releases themselves, however, do not normally reach GD. Proven features and platforms in an ED Release are incorporated into a subsequent Major Release for General Deployment (see Figure 2 above).

Early Deployment Release Numbering

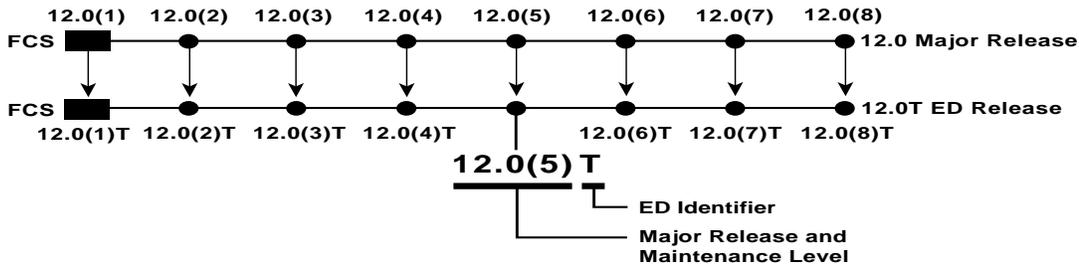
The Early Deployment Release number identifies the Major Release and maintenance level, in addition to information unique to the ED Release. In general, Early Deployment Releases are differentiated from Major Releases by the use of capital letters in their names. For instance, 11.2 is a Major Release, whereas 11.2P and 11.2BC are Early Deployment Releases.

Example —The “12.0T” ED Release

In the figure below, there is an ED Release called 12.0T which is based on the Major Release 12.0. Underlined is a specific maintenance release for 12.0T, numbered 12.0(5)T. This number indicates the following:

- The 12.0T Release is based on 12.0.
- The 12.0(5)T maintenance release has incorporated all bug fixes which have been made to the 12.0 Release through the fifth maintenance release—it is equivalent to 12.0(5) with respect to maintenance activity on the 12.0 code base.
- The 12.0(5)T maintenance release includes any additional functionality and bug fixes introduced on previous maintenance releases of the 12.0T Release.
- The 12.0(5)T maintenance release may include new functionality not previously introduced in maintenance releases of the 12.0T Release.

Figure 3 ED Release Numbering Example—The 12.0T ED Release



Other Kinds of Early Deployment Releases

Sometimes a particular ED Release may employ variations of the regular Early Deployment model. One variant is a release with an “X” in its name, like 11.3(2)XA. An “X” indicates that the release is one-time only, and maintenance for the release will come from the release on which the “X” release is based. In the case of 11.3(2)XA, for instance, bug fixes for 11.3(2)XA can be obtained in 11.3(3)T and subsequent maintenance releases of the 11.3T Release. There is not a follow-on 11.3(3)XA release.

Another variant is a Release like 11.3MA, which has maintenance releases of the form 11.3(1)MA2, 11.3(1)MA3, etc. Each subsequent maintenance release of 11.3MA contains the bug fixes that were in the previous maintenance release, plus additional bug fixes, but still springing from the original 11.3(1)MA code base.

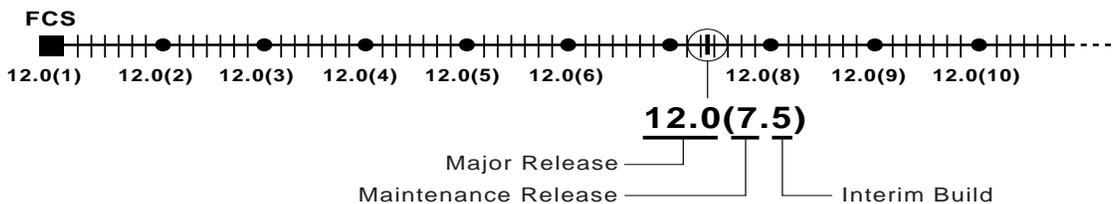
Interim Builds

As part of the normal development process, interim builds incorporating bug fixes are created between maintenance releases. Each interim build is usually tested in a limited manner. Fixes in the interim builds are incorporated in the subsequent maintenance release, which is fully regression tested.

There may be situations in which a customer needs a specific bug fix prior to its commercial availability on a fully regression tested release. Customer Advocacy (CA) may provide interim builds to customers on a case by case basis, when there is an urgent need to correct a bug. Due to the limited testing performed on interim builds, Cisco Systems strongly discourages the use of interim builds in a production environment. A customer who is given an interim build should deploy it in the network only as necessary to correct the bug. Moreover, any system running an interim build should be migrated to the next maintenance release that properly addresses the problem, which is normally the next available maintenance release.

For instance, in the figure below, 12.0(7.2) indicates that this is the second interim build after 12.0(7). Any systems running this software should normally be upgraded to the next maintenance release, 12.0(8), as soon as it is available.

Figure 4 Interim Build Numbering



Summary

The Cisco IOS Software release process is intended to meet the varied needs of the networking market. Key attributes of the process are:

- Major Releases focused on stability
- Early Deployment Releases focused on early delivery of new platforms and features
- Regular maintenance releases that improve product stability and/or add platform or feature support
- General Deployment status designating Major Releases suitable for unconstrained use in customer networks



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