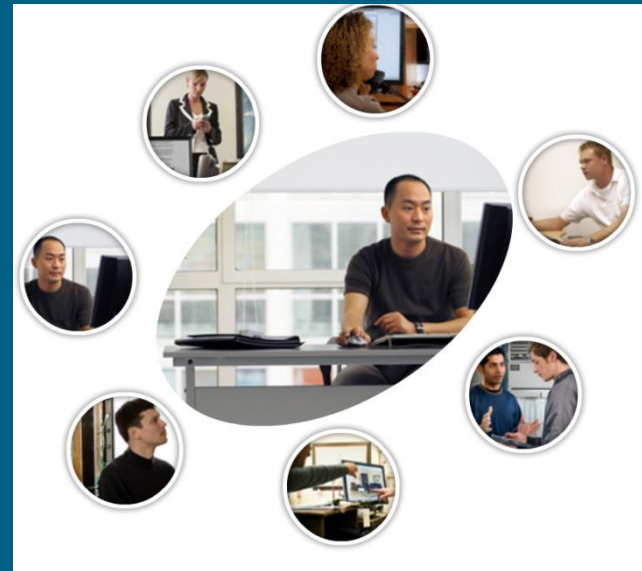




# Introduction to IOS

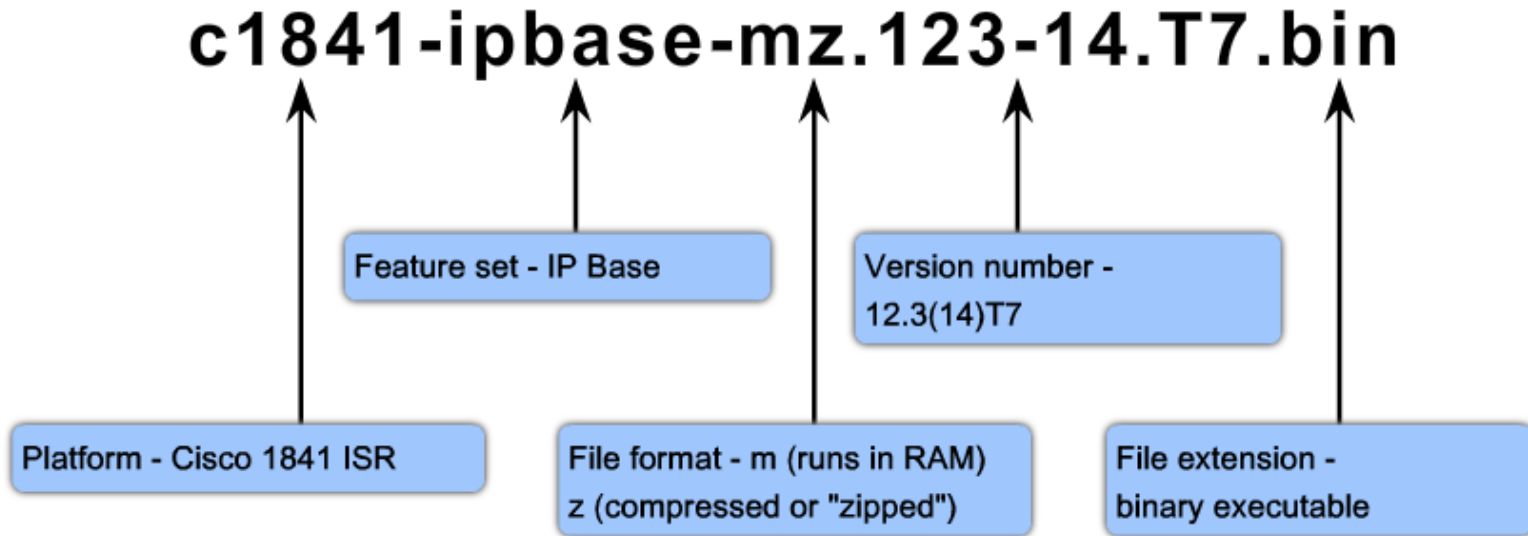


# What is IOS?

- Internetwork Operating System (IOS) is the Cisco Devices Operating System (Just like Microsoft Windows ® For PC)

# What is IOS?

## Cisco IOS File Naming Conventions





# Introduction to IOS 15 CLI Licensing Commands

A. Peter Anderson  
Associate Professor  
August 4, 2013



# Introduction to IOS 15 CLI Licensing Commands (Verification, Activation, Uninstall)

# License Management Commands

- Display License Info
- Enable / Disable Technology Package Licenses
- Additional Resources:
  - [Cisco IOS Software Activation Command Reference](#)
  - [Software Activation Configuration Guide 15M&T](#)

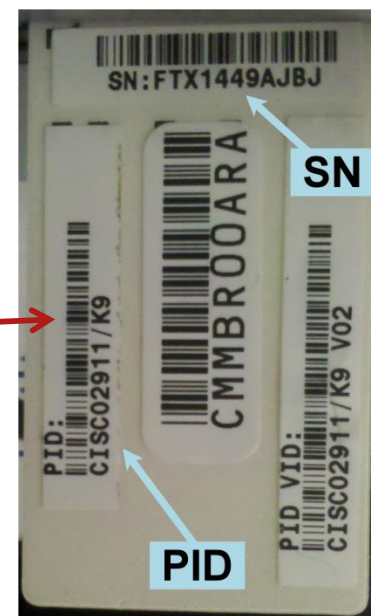
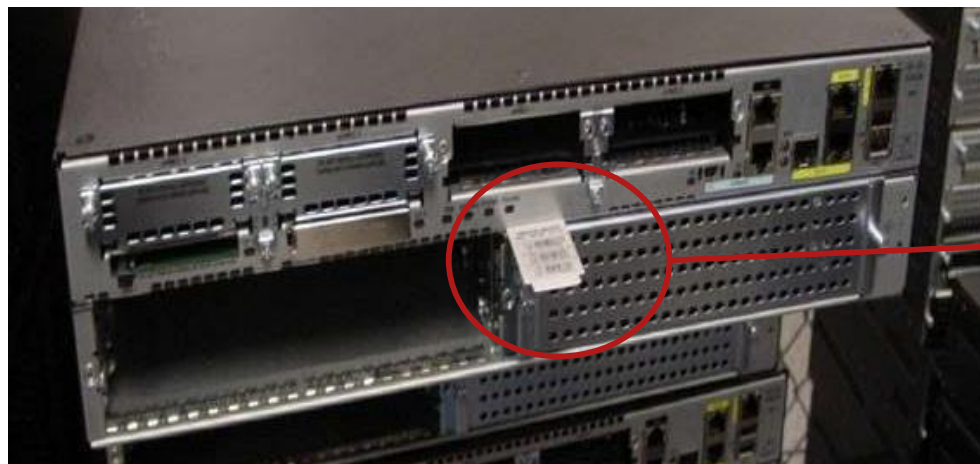
Yes Officer, I  
have a  
License.



# Command: **show license udi**

- Displays all the unique device identifier (UDI) values

```
Router#show license udi
Device#  PID                SN                UDI
-----
*0       CISC02911/K9             FTX1449AJBJ      CISC02911/K9:FTX1449AJBJ
```



# Command: show version

- Displays the hardware and Technology Package License information.

```
Router#show version | begin UDI
License UDI:

-----
Device#    PID                SN
-----
*0         CISC02911/K9       FTX1449AJBJ

Technology Package License Information for Module:'c2900'

-----
Technology  Technology-package  Technology-package
Current     Type                Next reboot
-----
ipbase      ipbasek9            Permanent
security    securityk9          Permanent
uc          disable             None
data        disable             None

Configuration register is 0x2102
```

Determine Technology license Determine Technology license status at Next Boot Determine Technology Package Status



# Command: show license

- Displays detailed information about **all** feature licenses.
- Type of license
  - Evaluation or Permanent
- Actual usage time of the license
  - Time used and left in the evaluation

```
Router#show license
Index 1 Feature: ipbasek9
      Period left: Life time
      License Type: Permanent
      License State: Active, In Use
      License Count: Non-Counted
      License Priority: Medium
Index 2 Feature: securityk9
      Period left: Life time
      License Type: Permanent
      License State: Active, In Use
      License Count: Non-Counted
      License Priority: Medium
Index 3 Feature: uck9
      Period left: 624 weeks 6 days
      Period Used: 1 hour 20 minutes
      License Type: Evaluation
      License State: Active, Not in Use, EULA accepted
      License Count: Non-Counted
      License Priority: Low
Index 4 Feature: datak9
      Period left: 624 weeks 6 days
      Period Used: 18 minutes 59 seconds
      License Type: Evaluation
      License State: Active, Not in Use, EULA accepted
      License Count: Non-Counted
      License Priority: Low
Index 5 Feature: gatekeeper
      Period left: Not Activated
      Period Used: 0 minute 0 second
      License Type: Evaluation
      License State: Not in Use, EULA not accepted
      License Count: Non-Counted
      License Priority: None
Index 6 Feature: SSL_VPN
      Period left: Not Activated
      Period Used: 0 minute 0 second
      License Type: Evaluation
      License State: Not in Use, EULA not accepted
      License Count: 5000/0/0 (Active/In-use/Violation)
      License Priority: None
```

# Command: show license feature

- Lists the **available licenses** on the device

```
Router#show license feature
Feature name      Enforcement  Evaluation  Subscription  Enabled
ipbasek9         no          no          no            yes
securityk9      yes         yes         no            yes
uck9             yes         yes         no            no
datak9           yes         yes         no            no
gatekeeper       yes         yes         no            no
SSL_VPN          yes         yes         no            no
ios-ips-update   yes         yes         yes           no
SNASw            yes         yes         no            no
hseck9          yes         no          no            no
cme-srst         yes         yes         no            no
WAAS_Express     yes         yes         no            no
UCVideo          yes         yes         no            no
```

# Activate/Deactivate Technology Package Licenses

- Available Technology Package Licenses:
  - Data, Unified Communications and Security

## Enable:

```
Router(config)# license boot module C2900 technology-package datak9  
                                <Model>                <Package>
```

## Disable:

```
Router(config)# no license boot module C2900 technology-package datak9 [disable]
```

← OR →

# Verifying A Technology Package License


**Step 1:** Issue **show version | begin UDI** (verify data license is disabled)

```
Router#show version | begin UDI
License UDI:

-----
Device#    PID                SN
-----
*0         CISCO2911/K9       FTX1449AJBJ

Technology Package License Information for Module:'c2900'

-----
Technology    Technology-package    Technology-package
Current       Type                  Next reboot
-----
ipbase        ipbasek9              Permanent            ipbasek9
security      securityk9            Permanent            securityk9
uc            disable               None                 disable
data          disable               None                 disable
```



# Activating A Technology Package License

**Step 2:** Activate the data technology package license

Router(config)# **license boot module c2900 technology-package datak9**

```
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#license boot module c2900 technology-package datak9
% use 'write' command to make license boot config take effect on next boot

Router(config)#
*May 19 05:20:05.499: %IOS_LICENSE_IMAGE_APPLICATION-6-LICENSE_LEVEL: Module name = c2900 Next reboot level = datak9 and License = datak9
Router(config)#
```

# Verify A Technology Package License Status after Next Reboot

## Step 3: Verify activated license:

```
Ro Router(config)#
Router(config)#do show version | begin UDI
License UDI:

-----
Device#      PID                      SN
-----
*0           CISC02911/K9            FTX1449AJBJ

Technology Package License Information for Module:'c2900'

-----
Technology    Technology-package      Technology-package
              Current                Type                   Next reboot
-----
ipbase        ipbasek9               Permanent              ipbasek9
security      securityk9             Permanent              securityk9
uc            disable                 None                   disable
data          disable                 None                   datak9
```



# Uninstalling A Technology Package License

**Step 1: no license boot module c2900 technology-package datak9 OR**

**– license boot module c2900 technology-package datak9**

```
Router(config)#no license boot module c2900 technology-package datak9
% use 'write' command to make license boot config take effect on next boot

Router(config)#do show version | begin UDI
License UDI:
-----
Device#      PID                SN
-----
*0           CISCO2911/K9      FTX1449AJBJ

Technology Package License Information for Module:'c2900'
-----
Technology    Technology-package  Technology-package
              Current           Type               Next reboot
-----
ipbase        ipbasek9           Permanent         ipbasek9
security      securityk9         Permanent         securityk9
uc            disable            None              disable
data          disable            None              None
```

**Step 2:**  
**dis**

use is









# Overview of IOS 15 Licensing and Process

A. Peter Anderson  
Associate Professor  
August 4, 2013



# Introduction to Licensing

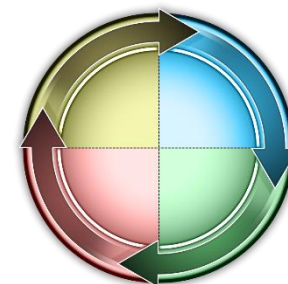
# Available License Types on ISR G2

- Permanent Licenses
- Evaluation Licenses
- Feature Licenses:
  - Software Activation Feature Licenses
  - Right to Use Feature Licenses
- Subscription Licenses
- Counted Licenses



# What is a Permanent License?

- A Permanent License **never expires**.
- Once a permanent license is installed on a router, it is good for that particular feature set for the life of the router **even across IOS versions**. For example, once a UC, Security or Data license is installed on a router, the subsequent features for that license will be active even if the router is upgraded to a new IOS release.
- A permanent license is the most common license type used when a feature set is purchased for a device.



# What is a Evaluation License?



- A Evaluation License is good for a **limited amount of time**.
- ISR G2 includes a full set of 60 day Evaluation License(s) for the Data, UC and Security feature sets.
- These can be activated and deactivated at any time to evaluate a feature set before making the decision to convert to a Permanent License.
- They also provide a mechanism that gives the user some flexibility before upgrading to a Permanent License.
- Only the time a Evaluation License is active counts against the 60 day allotted time.
- Once an Evaluation License expires, it cannot be extended.

# What are Feature Licenses?

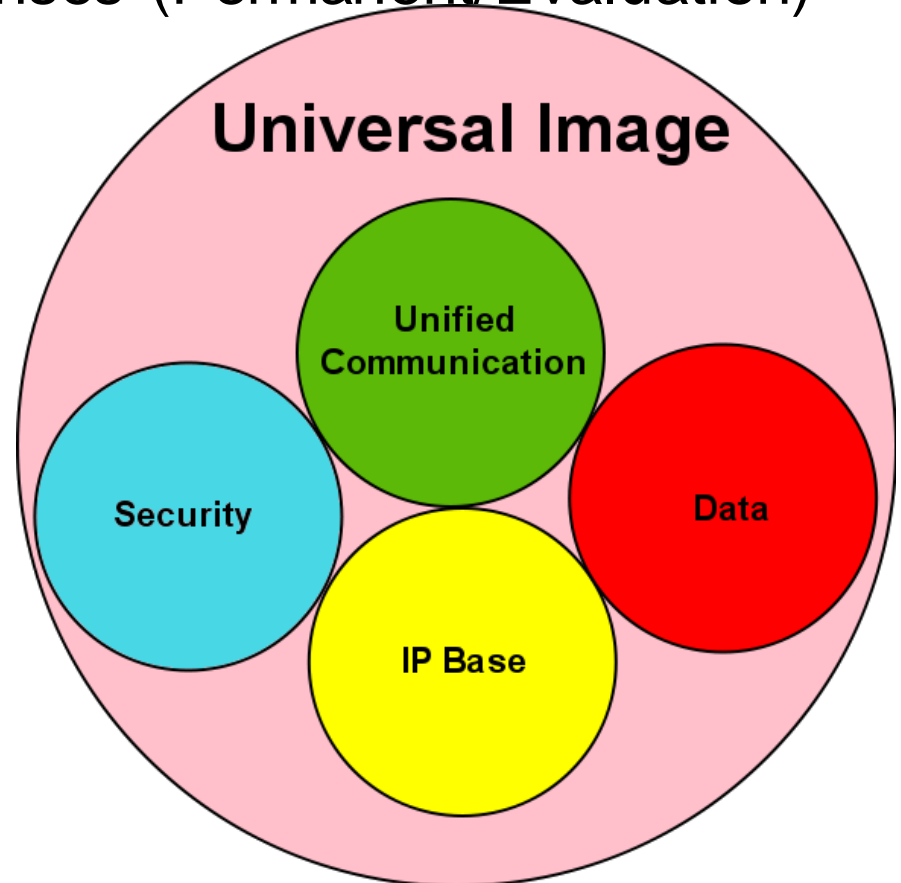
- Software Activation Feature Licenses
  - Typically upgrades to one or more technology Package Licenses (**Data**, **UC** or **Security**)
  - Can be delivered with new router or upgraded at a later time.
  - Licenses are enforced through Cisco Software Licensing framework
- Right to Use Feature Licenses
  - Does not require software activation (honor system)
  - Can be ordered with new router or upgraded at a later time.

# What are Subscription and Counted Licenses?

- May be Software Activation or Right-to-Use Feature Licenses
- Subscription Licenses
  - Time-based licenses
  - Software Activation Feature Licenses - Intrusion Prevention, Content Filtering
- Counted Licenses
  - Enable a defined number of users
  - Software Activation Feature Licenses – SSLVPN, CUE
  - Right-to-Use Feature Licenses – VXML, CME, SRST, CUBE

# Technology Package Licenses

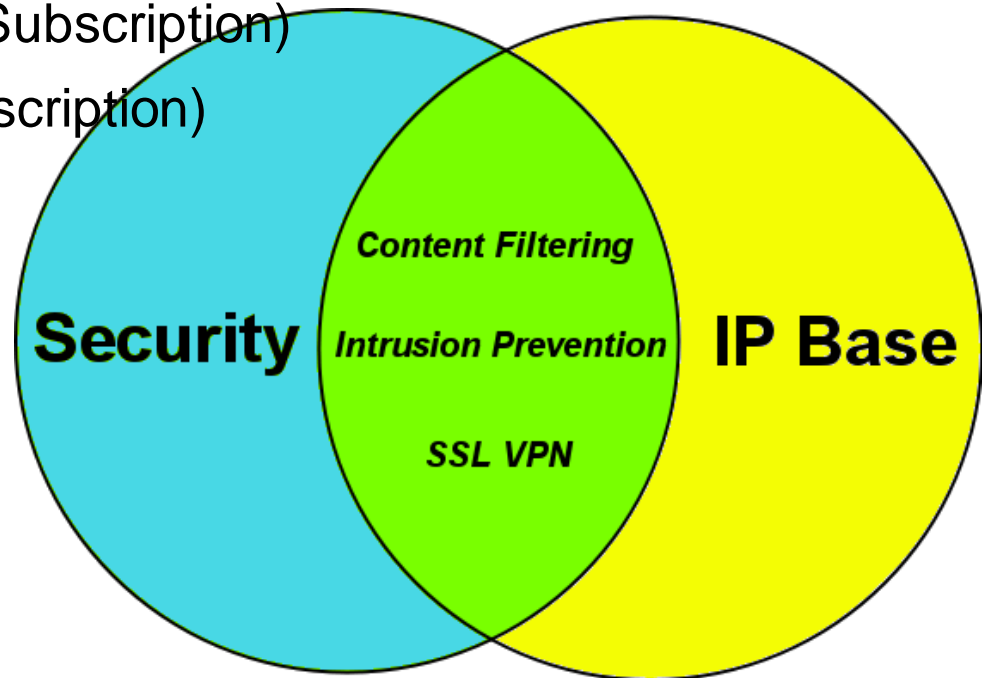
- Technology Package Licenses (Permanent/Evaluation)
  - IP Base (Permanent Only)
  - Security
  - Data
  - Unified Communication





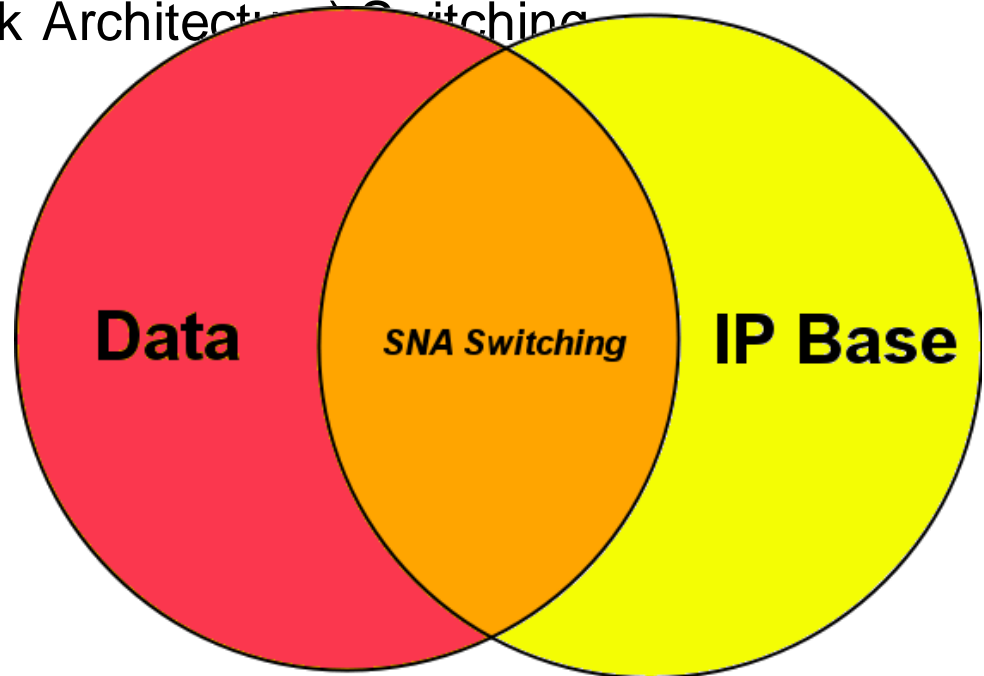
# Technology Package License: Security

- Security Technology Package License activated:
  - Additional Software Activation Feature Licenses
    - Intrusion Prevention (Subscription)
    - Content Filtering (Subscription)
    - SSL VPN )Counted)



# Technology Package License :Data

- Data Technology Package License activated:
  - Additional Software Activation Feature License
    - SNA (Systems Network Architecture) Switching



# Technology Package License :UC

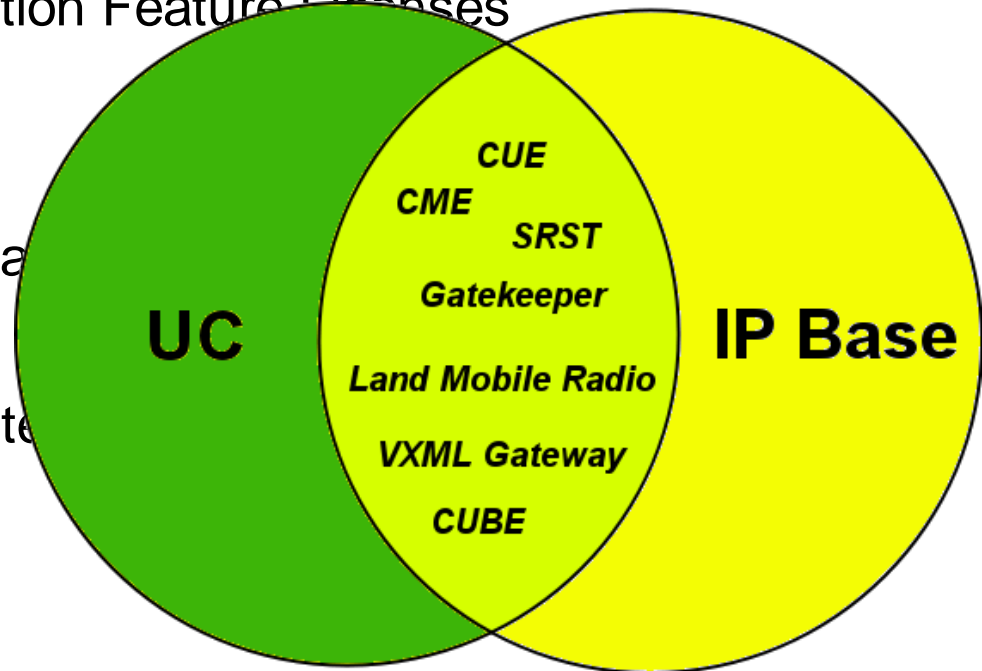
- Unified Communication Technology Package License activated:

- Additional Software Activation Feature Licenses

- Gatekeeper
- CUE (Counted)

- Additional Right to Use Features

- Land Mobile Radio
- VXML Gateway (Counted)
- CME (Counted)
- SRST (Counted)
- CUBE (Counted)



# Licensing Process

- Step 1: Purchase the Software Package or Feature to Install
  - A Product Authorization Key (PAK) will be provided upon payment
    - Acts as a Receipt
    - Used to obtain a license
- Step 2: Obtain A License file
  - Option 1 -Cisco License Manager, which is a free software application available at <http://www.cisco.com/go/clm>.
  - Option 2 -Cisco License Registration Portal: [www.cisco.com/go/license](http://www.cisco.com/go/license)
  - An e-mail containing the license information that you can use to install the license is received





Cisco Networking Academy  
Mind Wide Open

# Introduction to IOS 15 Trains, Numbering, and System Image Packaging

A. Peter Anderson

Associate Professor

August 4, 2013



# Universal IOS Image



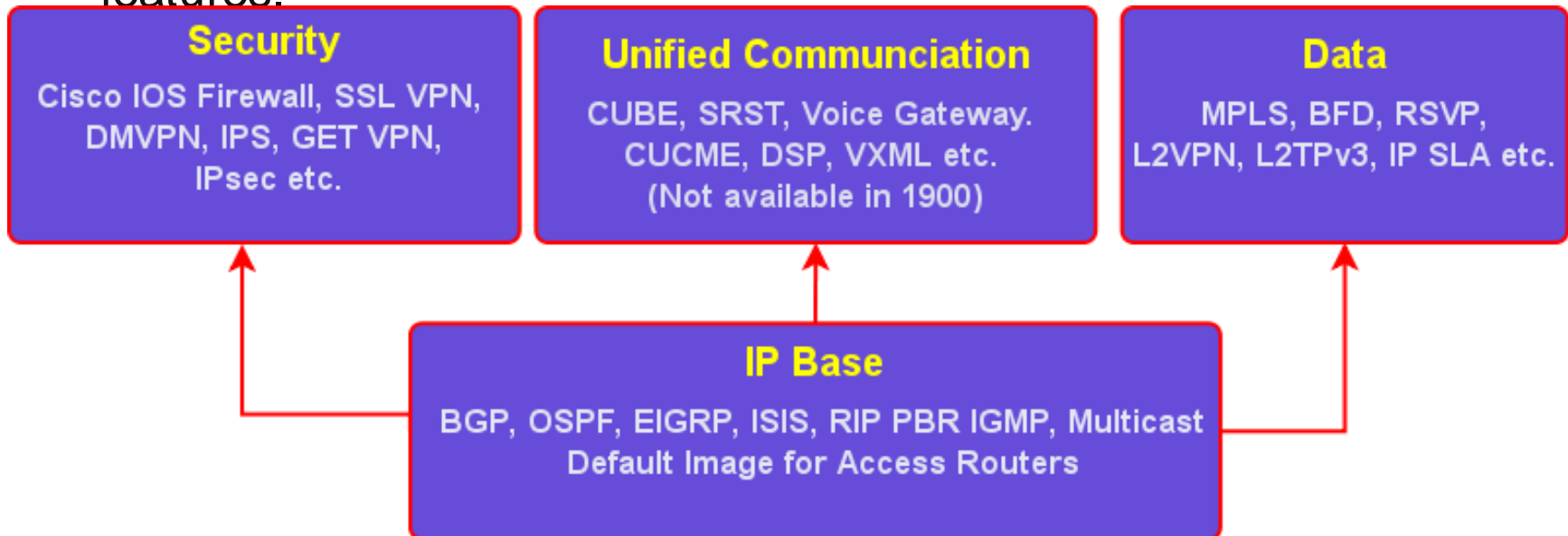
# What is a Universal Image?

- Universal IOS Image contains all Cisco IOS features.
- Single universal IOS Image is shipped with the ISR G2 devices.
- IOS functionality is determined by the specific licenses applied to the devices.
- Only two IOS images for each release:
  - **universalk9**: This universal image offers all the Cisco IOS features including strong crypto features such as VPN payload, Secure UC, etc.
  - **universalk9\_npe (no payload encryption)**: This universal image satisfies requirements of import restricted countries. It does not support any strong payload encryption, such as VPN payload, secure voice, etc.
- **Examples:**
  - c2900-universalk9-mz.SPA.151-4-M.bin
  - c2900-universalk9\_npe-mz.SPA.151.4-M.bin



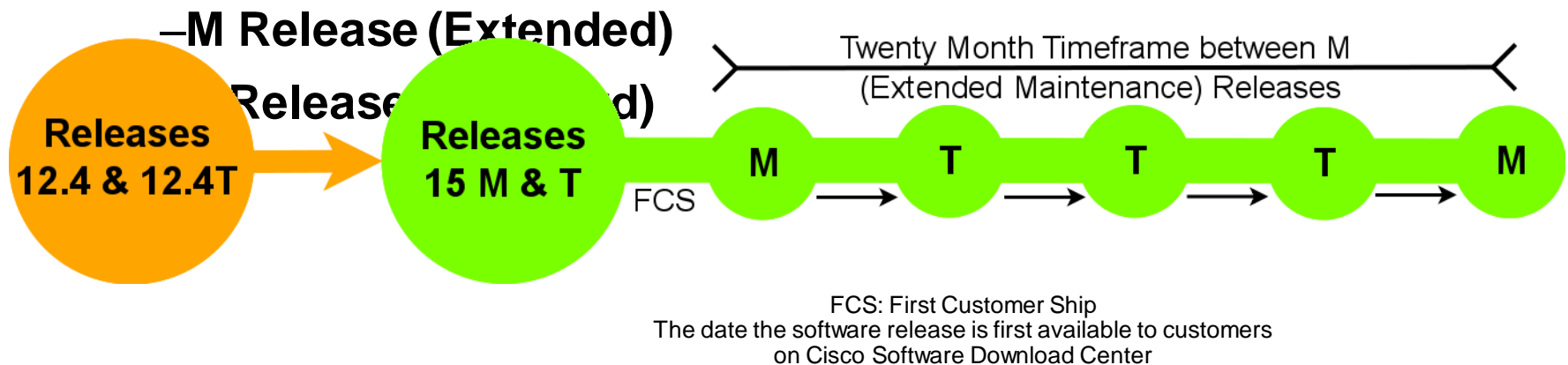
# Universal IOS Images

- Includes all the available features in a model.
- Four technology packages available: **IP Base**, **Security**, **UC** and **Data**
  - IP Base Technology Package is *enabled by default*.
  - Security, UC and Data Technology Package licenses activate more features.



# IOS Release 15 Timeline

- Feature inheritance and platform support from 12.4T and 12.4 Mainline
- Two major maintenance releases for IOS :15



# What are the Maintenance Releases?

## 15 M (Extended Maintenance Release):

- Ideal for long-term maintenance, enabling customers to qualify, deploy, and remain on the release for an extended period.
- Provides **44** months of support.
- Incorporates features delivered in previous releases plus incremental new feature enhancements and hardware support.

## 15 T (Standard Maintenance Release):

- Short deployment releases ideal for latest new features and hardware support before the next M release becomes available.
- Provides regular bug fix maintenance rebuilds for **12** months, plus 6 additional months of critical fix support for network affecting bugs.
- Incorporates features and hardware support delivered in previous releases.

# The New IOS 15 Naming Convention

c2900-universalk9-mz.SPA.151-4.M1.bin

**Major Release Number**

**Minor Release Number**

New Feature Release Number

M/T = Ext./Std Maintenance

Maintenance Rebuild Number

