### IOS DOWNLOADS

Older systems (pre-version 15 ios, pre-2900-series routers) feature-sets were determined by version of ios file downloaded & installed. The business model depended on honesty.

Now, the web download requires licensing verification and downloads files are universal—they contain all features for whatever architecture they match. An additional licensing layer has been added to enable specific feature sets ("technology packages") within the universal on a specific machine *if* the user is entitled.

| TECHNOLOGY PACKAGE | FEATURES |
|---|---|
| IP Base | Basic functionality—always enabled |
| Unified Communications | IP Telephony, CME (Communications Manager Express) |
| Security | IOS Firewall, IPsec, DMVPN, VPN |
| Application Experience | Performance Routing (PfR), WAAS, NBAR2 |

### CENTRALIZED LICENSING

Cisco One Licensing—*Not part of CCENT yet*. In the future, "Cisco One" licensing will centralize license management for an entire enterprise based solely on the number of devices and number of feature sets licensed. This may allow technology package licenses to be transferred to newer equipment over time.

Cisco License Manager—GUI Application (PC, RedHat, Solaris)
- Communicates with Cisco over internet
- Communicates with your routers to install license keys
- Tracks which license keys have been assigned where
- Feature licenses can be purchased from any Cisco reseller

### MANUAL LICENSING

UDI (Unique Device Identifier) has two portions
- PID (Product ID)—Model number
- SN (Serial Number)

```
R5# show license udi
Device#  PID                 SN              UDI
--------------------------------------------------------------------
*0       CISCO2821           FTX1146A4GE     CISCO2821:FTX1146A4GE
```

PAK (Product Authorization Key)—Receipt from a reseller showing that a feature has been licensed (paid for). Each can be used on any router of the same model (once).

Manual Activation—to download a license key file

- "Fulfilling a PAK"—On Cisco.com website's Product License Registration Portal, enter UDI and PAK

- Cisco's servers do some checks

- Download a license key file ".lic" that personalizes that feature purchase to that one device (or have it e-mailed)

- Put the license file somewhere the router can read from (TFTP, USB flash, etc.) and use the command

```
R2# license install usbflash0:FTX38932892974_20130211428793.lic
R2# reload
```

Verifying

```
R2# show license
```
        *Long output organized by index#, where each index is a feature (ipbase, esecurity, uck9, etc.)*
        *"Period Left" at the top of each index section tells if licensed*

```
R2# show license feature
```
        *Tabular output, each line is a feature, one column (second from right) tells if enabled.*

```
R2# show version
```
        *Tells licensed technologies near bottom, and differentiates between current and next reboot*

### EVALUATION LICENSES

Right to Use Licenses—60-day evaluation sales tool. Expiration unenforced.

```
R2# license boot module c2900 technology-package securityk9
```

- "show licenses" command displays a license-type of "EvalRightToUse" for that technology