iNode Provisioning / Quick Start

This section provides a step-by-step initial setup of the iNode. The following components are necessary to implement the setup:

- 1x2 iNode Controller Software

- LCS on a mobile phone or tablet

- iRPD Software support for the iNode

- Customer provided TFTP server

- Customer provided DHCP server

- Converged equipment, such as cBR-8, for DEPI and UEPI traffic

Create the DOCSIS TLV Configuration File

A configuration file is needed to indicate the suggested version of software and where the software is located (TFTP IP address). We use a standard DOCSIS TLV configuration file. Any DOCSIS config file editor can be used. No other TLVs are required and any TLVs not listed below are ignored.

The following TLV's are used to support iNode software download:

```
Vendor ID            (TLV 8)    0x08, 0x03, < 3 byte OUI/Vendor ID = 0x00,0x21,0xbe>
IPv4 TFTP Server IP (TLV 21)    0x15, 0x04, < 4 byte IPv4 IP Address>
IPv6 TFTP Server IP (TLV 58)    0x3A, 0x10, < 16 byte IPv6 IP Address>
SW Upgrade Filename (TLV 9)     0x09, <len>, <asci hex string>
   SW Upgrade Filename is typically of the form: inode-oib.01.00.02.tar.gz
Optional Vender Specific Configuration (TLV 44) 0x2c, <length of all sub-type TLVs>
   U-Boot Upgrade Filename (TLV 44, Subtype 3)  0x03, <len>, <asci hex string>
       U-Boot Filename is typically of the form: u-boot.01.00.02.tar.gz
```

Note   If both the IPv4 and IPv6 TFTP Server TLVs are provided, precedence is given to the IPv6 IP address, the IPv4 address will be ignored for software download.

Place the DOCSIS TLV configuration file created for the iNode in the appropriate TFTP download folder on the TFTP server designated to supply the iNode TLV configuration file.

Place the software upgrade files in the appropriate TFTP download folder on the TFTP server designated to supply the iNode software download files.

Prepare IPv4/IPv6 DHCP Server to Support iNode

Two types of Option Types are present:

- Default—Provided even if not requested by the iNode.

- Required—Necessary for iNode operation.

Table 1: IPv4 IP Address

Message Type and Sequence	DHCPv4 Options	Message From
DISCOVER	Provides Option: 60 Requests Options: 1, 2, 4, 66, 67, 43, or 125	iNode
OFFER	Provides IPv4 IP address and options: Default: 1, 3, 6, 15 Required: 2, 4, 66, 67, 43, or 125	DHCP Server

For IPv4 the DHCP Server should use Option 60 – Vendor Class ID provided by the iNode or it's MAC address to assign an IP address and return the requested options.

Table 2: IPv4 IP Address

DHCPv4	Type	Name	Data
Option 1	default	Subnet Mask	255.255.255.240
Option 2	required	Time Offset	Seconds adjustment to clock
Option 3	default	Default Gateway	IPv4 IP address
Option 4	required	Time Servers (TOD)	IPv4 IP address list
Option 6	default	Domain Servers	IPv4 IP address list
Option 15	default	Domain Name	Text string

DHCPv4	Type	Name	Data
Option 43	Use if option 125 is not provided	Vendor specific option	
Option 43.1	required	iNode Manager IPv4 IP address	IPv4 IP address
Option 60	required	Vendor Class ID	"Cisco.iNode.oib.1.0"
Option 66	required	IPv4 TFTP Server IP Address	IPv4 IP address
Option 67	required	Bootfile Name	DOCSIS TLV config filename
Option 125	Use if Option 43 is not provided	VIVSO Option, Cisco Enterprise ID (9)	-
Option 125.1	required	iNode Manager IPv4 IP address	IPv4 IP address

Table 3: IPv6 IP Address

Message Type and Sequence	DHCPv6 Options	Message From
SOLICIT	Provides Option 1,16 Requests Options: 17	iNode
ADVERTISE	Provides IPv6 IP address and Options: Required: 17.1, 17.32, 17.33, 17.37, 17.38	DHCP Server

For IPv6, the DHCP server should use the Vendor Class ID provided by the iNode or its DUID to assign an IP address and return the requested options.

Table 4: IPv6 IP Address

DHCP	Type	Name	Data
Option 1	default	Vendor Class ID or DUID	Derived from MAC address
Option 16	required	Cisco Enterprise ID (9), Vendor Class ID	9, "Cisco.iNode.oib.1.0"
Option 17	required	Vendor Specific Option, Cable Labs Enterprise ID (4491)	4491
Option 17.32	required	IPv6 TFTP Servers	IPv6 IP Address List

DHCP	Type	Name	Data
Option 17.33	required	Config File Name	Text string
Option 17.37	required	IPv6 Time Servers (TOD)	IPv6 IP Address List
Option 17.38	required	Time Offset	Seconds adjustment to clock
Option 17	required	Vendor Specific Info Option Cisco Enterprise ID (9)	9
Option 17.1	required	iNode Manager IPv6 IP address	IPv6 IP address

Note The iRPD may still be booting up after 7 minutes. The iNode waits for the Ethernet connection between the iNode and the iRPD to become active before it can acquire an IP address and start the downloading the software.

Note You can download the iNode software only for a factory fresh installation or if the DOCSIS TLV configuration file is providing a software version that is not yet loaded in the iNode.

Troubleshooting

1. Check to see that the iNode has an IP address and that it can reach the TFTP server. There may be more than one TFTP server, for example, one TFTP server with the configuration file and another TFTP server with the software image. Ensure that both TFTP servers are reachable.

2. Look at the var logs messages on the DHCP server using the "tail –f /var/log/messages".

3. Use Wireshark to look into packets sent and/or received.

To start the software download and upgrade again remotely, use the SNMP Reset.

Node Level and Tilt

The default values for the level and tilt pairs are, for the low level 261 MHz and tilt 39.9 dBmV, and for the high level 855 MHz and tilt 51.1 dBmV.

If the non-default values are desired, then the iNode level and tilt can be adjusted via LCS. Attach the LCS via the mobile phone or tablet to the USB port (For more information see the chapter on LCS).

Using the LCS screens:

1. Go to Port 1 (and Ports 2, 4, 5)

2. Set low end frequency and high end frequency.

3. Set low end level and high end level.

4. Frequency and level sets tilt. Tap **Save**.

5. Port 1 has to be enabled and saved on RF settings.

6. Be sure to setup, enable and save Port 1 before Auto Setup.

7. Then, go to node settings.

8. Auto Setup START button. Add Port 1 or all ports.

9. Auto Setup takes into consideration variations between units in gain and output on the iRPD.

10. Check the Max Tilt and Level.

11. Check the Status and Alarms.

   • Normal – no alarms at least for Auto Status and AGC on each port.

12. Then, check the Spectrum for each port and see what they look like (between 4 to 7 minutes after Auto Setup).

Note   iRPD has to be online and attached to the iNode.

DEPI pipes set up, downstream carriers present and turned ON giving input into the iNode.