Implementation Options

This section contains the following topics:

SFP Overview

The ESR6300 supports two WAN ports with RJ45 and optical/copper SFP ports.

The 2 Combo-WAN ports are g0/0/0 and g0/0/1. Each port can either be in Copper RJ45 or SFP mode, which is software configurable.

The SFP Ports have the following characteristics:

- Optical interface and Copper RJ45 are supported

- Whichever link is connected first is detected as default by software

- Auto-negotiation is supported for 10Mbps, 100Mbps and 1000Mbps

- Both Optical and Cu SFPs are supported, GE and FE alike

- Copper FE SFPs are not supported on ESR6300

- Auto-negotiation for 10Mbps, 100Mbps, 1000Mbps in full-duplex and half-duplex mode is supported. For half duplex, Cisco supports only 10Mbps and 100Mbps.

- Auto-select is supported. Whichever interface is detected first is selected. Typically fiber SFP will come up faster than RJ45 Copper, and is faster than Copper SFP.

- RJ45 to SFP mode conversion involves an interface reset (shut/no shut, interface DOWN/UP). The syslog can be observed accordingly.

Note Prior to release 17.2.1, Jumbo MTU support is not available on the ESR6300. MTU>1500 packets will be fragmented. From release 17.2.1 going forward, MTU support is 64 - 9216 on the interface. If there are bursts of fragmented traffic expected beyond the device Non-drop rate capability, software implements a throttling mechanism and transmits MAC Pause frames to the other end to reduce rate of traffic. To resume normal operation, arp has to sent again to re-negotiate. The default ip arp timeout is 14,000 seconds. In these rare case scenarios, it is recommended to have much shorter arp timeout configurations.

Supported SFPs are found in the ESR6300 Hardware Technical Guide here:

https://www.cisco.com/c/en/us/td/docs/routers/embedded/6300/hardware/tech-guide/ESR6300-tech-guide.html#pgfId-106538

SFP Command Line

To configure the WAN port as an RJ45 or an SFP:

```
Router#config terminal
Router(config)#config terminal
Router(config)#interface g0/0/{0|1}
Router(config-if)#media type ?
auto-select  Use whichever connector is attached
  rj45         Use RJ45 connector
  sfp          Use SFP connector
```

To configure auto-failover:

```
Router(config-if)#media-type {rj45|sfp} ?
  auto-failover  Automatic Fail over
  <cr>           <cr>
```

To validate your changes, use the following commands.

If SFP is detected:

```
Router#show inventory
```

To see if your configuration has taken effect:

```
Router#show run int g0/0/{0|1}
```

To reload the gigabit ethernet module:

```
Router#hwmodule subslot 0/0 reload force
```

Power over Ethernet

Power over Ethernet (PoE) is typically used to power up Access points, IP Cameras and IP Phones connected to the device's Ethernet ports.

The ESR6300 supports Power over Ethernet (PoE and PoE+) on the 4 LAN ports. PoE is NOT supported on the WAN ports. The power allocation is as follows:

• Supply 30W (PoE+) per port simultaneously on 4 LAN ports

- Supply 15.4W (PoE) per port simultaneously on 4 LAN ports

- The system integrator must have a 120W power supply

Note
The Powered Device (PD) will be detected if it is IEEE-compliance or a Cisco standard device. Support for CDP and LLDP is available for power negotiation, and must be enabled on the ESR6300.

Note
CDP and/or LLDP must be enabled on the ESR6300, and the PD must support CDP and/or LLDP for the device to be able to negotiate power levels between 15 and 30 watts.

Device Detection and Power Allocation

The router will detect a Cisco Pre-standard or an IEEE-compliant PD when the PoE is enabled and the connected device is not being powered by an AC adapter.

After device detection, the router determines the power requirements based on power classification class. Depending on the available power in the power budget, the router determines if a port can be powered. The router initially allocates this power when it detects and powers the device. Power negotiation using CDP/LLDP protocols happens thereafter.

Maximum power budget for 4 LAN ports combined at any time is 30W x4 = 120W. On reload the PoE ports are powered down.(i.e they are powered down at rommon stage).

CLI for PoE

This section describes the CLI to use for configuring and displaying PoE.

Before you configure Power over Ethernet (PoE), note the following:

- **show inventory** and **show diag** commands will not display details of the vendor/system integrator's PoE controller.

- **show run** command will not reflect the current PoE configuration.

- On connecting a PD, power negotiation happens almost instantly. However, it takes 3-5 minutes to reflect accurate statistics using **show power inline**

- The default software mode is PoE and not PoE+ to prevent overdraw.

- There is limited support for LLDP-MED and LLDP-MDI.

Note
Implementation of PoE is a partner option. The integrator is responsible for proper implementation into the finished product, therefore, it may or may not be available.

To configure auto or off:

```
power inline auto | never
```

Configuration example:

```
Router#config terminal
Router#interface g0/1/<1,2,3,4>
Router(config-if)#power inline {auto|never}
```

To enable CDP:

```
Router#config terminal
Router(config)#cdp run
Router(config#exit
```

To enable LLDP:

```
Router#config terminal
Router(config)#lldp run
Router(config#exit
```

To Verify your configuration:

```
Router#show power inline
Available:120.0(w)  Used:21.1(w)  Remaining:98.9(w)

Interface Admin  Oper        Power   Device              Class Max
                             (Watts)
--------- ------ ---------- ------- ------------------- ----- ----
Gi0/1/0   auto   on          14.7    IP Phone 8865       4     30.0
Gi0/1/1   auto   on          6.3     IP Phone 8811       2     30.0
Gi0/1/2   auto   off         0.0     n/a                 n/a   30.0
Gi0/1/3   auto   off         0.0     n/a                 n/a   30.0
Router#
```

To show power on a particular interface:

```
Router#show power inline {interface-id}
```

Displays PoE status for a router for the specified interface.

```
show power inline interface-id detail
```

To show power consumption:

```
Router#show power
Main PSU :
    Total Power Consumption from 3.3V Line : 0.36
    Total Power Consumption from 5V Line : 6.20
    Configured Mode : N/A
    Current runtime state same : N/A
    PowerSupplySource : External PS
POE Module :
    Configured Mode : N/A
    Current runtime state same : N/A
    Total power available : 120 Watts
Router#
```

The list of commands for debugging PoE follows:

Command	Description
Debug ilpower controller	Display PoE controller debug messages

Command	Description
Debug ilpower event	Display PoE event debug messages
Debug ilpower port	Display PoE port manager debug messages
Debug ilpower powerman	Display PoE power management debug messages
Debug ilpower cdp	Display PoE CDP debug messages
Debug ilpower registries	Display PoE registries debug messages
Debug ilpower scp	Display PoE scp debug messages

Working with External USB3.0

The ESR6300 provides access to a single USB 3.0 Type A device.

External USB3.0

The following details are important when working with an external USB device:

- The USB is for storage only and can be gracefully mounted/unmounted using IOS CLI.

- The USB is accessible in ROMMON and IOS applications.

- USB device must have single partition, and in ext2, Fat16, or Fat32 format only.

- The user can copy files between usbflash0: to/from flash:/bootflash:

- In both ROMMON and IOS, use **dir usbflash0:** to view USB:

⚠️

Caution   No hot-plug support in rommon mode. On insertion of USB, reboot (rommon1>reset) to view usb.

⚠️

Caution   Cisco USBs are strongly recommended and are the only ones supported. Many generic USBs may not work. Some branded USBs which comply with protocol standards such as Kingston USB3.0 may work.

USB CLI Commands:

To access the USB file system through ROMMON, use the following command:

```
ROMMON>dir usbflash0:
```

To access the USB file system through IOS, use the following command:

```
Router#dir usbflash0:
```

To plug in and unplug the USB device gracefully, disable it first:

```
Router conf t
Router(config)#platform usb disable
```

```
Router#show platform usb status
USB disabled
```

To gracefully activate a mounted USB in IOS:

```
Router#no platform usb disable
Router#show platform usb status
USB enabled
```

The USB port could be considered a potential security risk. You may wish to disable it if it is not in use. To gracefully remove a USB when in IOS mode:

```
Router conf t
Router(config)#platform usb disable
Jun 4 05:44:52.339: %IOSD_INFRA-6-IFS_DEVICE_OIR: Device usbflash0 removed
Router#show platform usb status
USB disabled
```

To re-enable USB port:

```
Router(config)#no platform usb disable
*Jun 4 05:45:20.890: %IOSD_INFRA-6-IFS_DEVICE_OIR: Device usbflash0 added
Router#show platform usb status
USB enabled
```