



## Q&A

# Cisco 3800 Series ATM OC-3 Network Modules

**Q.** What platforms support the new Cisco® 3800 Series ATM OC-3 network modules? What is the part number of this new ATM OC-3 network module?

**A.** The new ATM OC-3 network modules are supported on Cisco 3800 integrated services routers, but not on the Cisco 3700 Series multiservice access routers or Cisco 3600 Series multiservice platforms. The part number of this new network module is NM-1A-OC3-POM.

**Q.** What is the minimum Cisco IOS® Software release required to support the ATM OC-3 network modules?

**A.** Cisco IOS Software 12.4(3) Mainline is the minimum Cisco IOS Software release required. The new ATM OC-3 network modules will also be supported on the 12.4(2.2)T or any later T images.

**Q.** What Cisco IOS Software feature sets are the ATM OC-3 network modules supported on?

**A.** The network module is supported on the following Cisco IOS Software feature sets:

- SP Services (spservicesk9)
- Enterprise Services (entservicesk9)
- Advanced IP Services (advipservicesk9)
- Advanced Enterprise Services (adventerprisek9)

**Q.** Are there any additional DRAM memory requirements for this network module?

**A.** No, there are no additional flash or DRAM memory requirements to support the ATM OC-3 network modules; the minimum memory requirements specified in the supported Cisco IOS Software release are sufficient.

**Q.** How do the Cisco 2691, 3600 Series and 3700 Series Network Modules (product ID's: NM-1A-OC3MM, NM-1A-OC3SMI, NM-1A-OC3SML, NM-1A-OC3MM-EP, NM-1A-OC3SMI-EP, and NM-1A-OC3SML-EP) differ from the Cisco 3800 Series NM-1A-OC3-POM?

**A.** Based on a completely different design, the new network module uses innovative technology to deliver greater flexibility and much better performance than the traditional OC-3 network modules. The new module incorporates Small Form-Factor Pluggable (SFP) optics, which could be used with different types of POMs and SFPs to allow for maximum flexibility. Refer to the next question for more details about POMs and SFPs. Basically the new network module, which supports a modular POM or SFP, replaces six different network modules. The older network modules will not be supported on the Cisco 3800 platforms.

**Q.** What is a SFP? What is a POM? What SFPs/POMs are supported on this new network module?

**A.** A POM is a pluggable optical module (POM) that can be inserted into the SFP socket. SFP is the Cisco industry-standard Small Form-Factor Pluggable (SFP) Interface Converter. Both POM and SFP are hot-swappable optical interfaces for ATM applications that plug into a variety of ports on Cisco router interfaces. They both can support multimode, short-reach, intermediate-reach, and long-reach applications.

Only Cisco SFPs/POMs are compatible with the new ATM OC-3 network modules; any SFPs/POMs manufactured by other vendors will not be supported.

Cisco Systems® is changing the product codes from POM to SFP. There is no change in functionality, compatibility, or compliance of the SFP modules. Both POM and SFP will be supported on this new network module. The new SFP product codes are orderable now and the network module can be purchased with any combination of optics or even without SFPs. Table 1 details the POM and new SFP product code that will be applicable for NM-1A-OC3-POM.

**Table 1.** Cisco POM/SFP Part Number and Product Code Transition

| Current Product Code | New Product Code | Product Description                      |
|----------------------|------------------|--|
| POM-OC3-MM           | SFP-OC3-MM       | OC-3/STM-1 multimode SFP module          |
| POM-OC3-SMIR         | SFP-OC3-IR1      | OC-3/STM-1 intermediate-reach SFP module |
| POM-OC3-SMLR         | SFP-OC3-LR1      | OC-3/STM-1 long-reach (40 km) SFP module |

**Q.** What are the different physical interfaces supported by the new OC-3 ATM network module?

**A.** The network module supports three different options for OC-3 connectivity (multimode, single-mode intermediate reach, and single-mode long reach) by using different POMs/SFPs. The flexibility eases stock management and deployment for customers. Refer to the previous question for the supported POM and SFPs part numbers.

**Q.** Is online insertion and removal (OIR) supported on this network module?

**A.** Yes, but the Cisco 3845 Integrated Services Router is the only platform that supports OIR for this network module. It is always safer to power down the router when you perform any hardware changes, but following are some recommendations if you need to perform an OIR (the system may indicate a hardware failure if you do not follow proper procedures):

- The interface must be shut down prior to removal.
- Insert only one card at a time, allowing time for the system to complete insertion steps; you must allow the system time to complete the preceding tasks before you remove or insert another interface processor. Disruption of the sequence before the system completes its verification can cause the system to detect spurious hardware failures.
- Insert the cards swiftly and firmly, but do not shove them in.
- If present, be sure to use the little plastic levers on the side of the card to lock the card in.
- If the OIR is successful, there is no need to schedule a reload of the router.

**Q.** Is OIR supported on the SFP module slot?

**A.** Yes, OIR is supported on the SFP module slot. When the SFP is inserted and removed when the system is operational, a syslog message like the following is generated:

```
Jun 17 23:30:30.519: %ATMOC3POM-6-SFP_OUT: Interface ATM1/0 SFP has been removed. Jun 17  
23:30:44.551: %ATMOC3POM-6-SFP_IN: Interface ATM1/0 OC3 MM SFP has been
```

**Q.** What cables should be used for this module? What is the maximum distance supported?

**A.** The cable distance depends on the medium and cables used; refer to Table 2.

**Table 2.** SFP Distances Supported

| POM Part Number  | Cable  | Wavelength | Maximum Distance |
|--|--|------------|------------------|
| <ul style="list-style-type: none"><li>• POM-OC3-MM</li><li>• SFP-OC3-MM</li></ul>    | Multimode 62.5/125 micron fiber cable LC connector   | 1310 nm    | 2 km             |
| <ul style="list-style-type: none"><li>• POM-OC3-SMIR</li><li>• SFP-OC3-IR1</li></ul> | Single-mode 62.5/125 micron fiber cable LC connector | 1310 nm    | 15 km            |
| <ul style="list-style-type: none"><li>• POM-OC3-SMLR</li><li>• SFP-OC3-LR1</li></ul> | Single-mode 62.5/125 micron fiber cable LC connector | 1310 nm    | 40 km            |

**Q.** How many ATM OC-3 network modules are supported in the Cisco 3825 and 3845?

**A.** A maximum of one ATM OC-3 network module is supported on the Cisco 3825; a maximum of two are supported on the Cisco 3845. The second OC-3 network module in the Cisco 3845 is supported for connectivity purposes only, and line rate is not guaranteed.

**Q.** What ATM Adaptation Layers (AALs) are supported over OC-3 ATM?

**A.** Only AAL5 is supported on this new OC-3 network module.

**Q.** Is Packet Over SONET (POS) supported on the new OC-3 network modules?

**A.** NM-1A-OC3-POM is a ATM network module. Packet Over SONET (POS) is not supported on this new OC-3. network module.

**Q.** What ATM service categories are supported on the new OC-3 network modules?

**A.** UBR, CBR, VBR-rt, VBR-nrt, and ABR; UBR+ will be supported on SVCs only.

**Q.** Is voice over IP (VoIP) over ATM supported on this new OC-3 network module?

**A.** Yes, VoIP over ATM can be supported over the WAN using real-time variable bit rate (VBR-rt) class of service switched virtual circuits (SVCs) using the currently available voice or fax network modules and associated voice interface cards.

**Q.** Does the new OC-3 network module support traffic shaping?

**A.** Yes, the new OC-3 network module supports Layer 2 per-virtual circuit queuing at the hardware level, and implements Layer 2 traffic-shaping capabilities in hardware using available bit rate (ABR), unspecified bit rate (UBR), VBR-rt, non-real-time VBR (VBR-nrt), or constant bit rate (CBR) ATM traffic classes. Each of these services classes has a unique way to shape traffic for specific customer requirements. The Layer 2 per-virtual circuit queuing support for ATM traffic shaping has a simple mechanism that helps ensure that one or a few virtual circuits do not consume all the transmit resources on the router. This is done by limiting the number of transmit buffers available on a per-connection basis, thereby prohibiting a single virtual circuit or virtual path from oversubscribing the transmit resources of the interface. The new OC-3 network modules have only one transmit queue for all virtual circuits.

**Q.** What is the maximum number of virtual circuits supported on the new ATM OC-3 network module? Can users always configure the maximum number of virtual circuits on the new network module?

**A.** A maximum of 1024 virtual circuits are supported for each network module. However, internally one virtual circuit descriptor is reserved for operation, administration, and maintenance (OAM), and users can use only 1023 virtual circuits. Cisco 3845 can support up to 1400 virtual circuits even though maximum two ATM OC-3 network modules are supported on the platform.

Optimizing the maximum 1023 virtual circuits may require users to select their virtual path identifier/virtual channel identifier (VPI/VCI) combinations carefully. More VPI numbers consume more memory resources. Cisco also recommends using consecutive VCI numbers and starting on multiples of 8. If a single VPI is employed, users can easily open 1023 consecutive VCIs. Alternatively, up to 511 different VPIs can be opened, with multiple VCIs corresponding to each VPI-again assuming consecutive VCI numbers are used and VCIs are opened on a multiple of 8. Given the worst case, users can open 511 completely sparse channels.

**Q.** Can we change the permanent virtual circuit (PVC) parameters while another PVC with a higher-priority traffic class is sending traffic at line rate?

**A.** No, the PVC parameter cannot be changed while another PVC with a higher traffic class is sending traffic at line rate. The PVC with lower priority will remain inactive after any parameter changes. The PVC will be active again as long as there is bandwidth relief from higher-priority traffic.

According to ATM forum standard, CBR has the highest traffic class priority. VBR-rt has priority over VBR-nrt, and both ABR and UBR are at the lowest priority.

**Q.** What is the total bandwidth reserved for the interface on the network module?

**A.** The rate of the OC-3 interface is 155,000 kbps; 5,240 kbps is reserved for SONET overhead, leaving 149,760 kbps for data. That is also true for the traditional ATM OC-3 network modules; however, the show interface output on the traditional network module shows 155,000 kbps as the interface bandwidth instead of 149,760 kbps. The numbers reported in the new network module are consistent with the output from ATM OC-3 network modules on other Cisco Systems platforms.

**Q.** What is the maximum throughput on the new OC-3 network module?

**A.** Without any services turned on, the new OC-3 network modules are capable of running at bidirectional line rate traffic with larger or Internet mix (IMIX) packet sizes on Cisco 3800 platforms. When using two network modules in a Cisco 3845, there is no guarantee of line rate.

**Q.** What are permanent virtual paths (PVPs)? What is the maximum number of PVPs that can be supported on the new ATM network module?

**A.** A PVP is a connection that is manually configured by a network operator and is provisioned by configuring ATM switch-to-switch cells using only the VPI in the cell header. The network module can support up to three PVPs.

**Q.** Is the tx-ring-limit command still available under PVC on the new modules?

**A.** No, the tx-ring-limit configuration is no longer available on the per-virtual circuit level on this new ATM network module. Traditionally the tx-ring-limit command, which is available per virtual circuit level, is used as a lever to control latency when a virtual circuit is overdriven. A lower value given by this command is used to achieve less latency on latency-sensitive traffic at the cost of increased drops on the background traffic, whereas a higher value is used to have fewer drops in the background traffic by providing greater latency. This network module uses a new software scheme to improve the performance; the traditional tx-ring-limit concept is not applicable to this interface on the new network module. Therefore, the option to adjust the latency by tuning the tx-ring-limit configuration is not available on this module.

**Q.** What new debug commands are supported on the new ATM modules?

**A.** The following new debug commands are supported on the new modules:

```
pippin1#debug atm oc3 pom ?
data Data debug
flow flow control messages
pa PA debug
sar SAR debug
sfp SFP debug
trace SAR CMD/ACK trace
```

**Q.** How are traffic shaping rates (peak cell rate [PCR], sustainable cell rate [SCR], and maximum cell rate [MCR]) calculated in the new ATM network module? Can the new network module support 100-percent accuracy for traffic shaping?

**A.** The traffic shaping rates are configured in kbps and communicated to the traffic-shaping processor by converting the configured rate, specified in cells per second, to the ATM Forum rate format (per TM 4.1). Converting to the ATM Forum format rate does not allot the user infinite precision. As a result, the number calculated using the ATM rate format is slightly different from the configured PCR. Because shaping rates are rounded down (for PCR, SCR, and MCR), the actual rates may fall slightly below the specified rates, but always within 1 percent of the specified rates. Rounding down is necessary to avoid violating a downstream device with a higher rate than that specified. For this reason the new network module can support 99 percent or more accuracy for traffic shaping.

The configured shaping rate is shown in the show atm vc output, but the actual received rate might be slightly different and the difference will be less than 1 percent.

**Q.** Is there network clocking support on the new ATM OC-3 network module?

**A.** Yes, network clocking is supported. The clock can be derived from OC-3 ATM link and passed to the backplane time-division multiplexing (TDM) bus. The clock can also be taken from the backplane TDM bus to lock the network module to the derived clock.

**Q.** What is the ATM Bandwidth Manager feature?

**A.** The ATM Bandwidth Manager feature keeps track of the bandwidth used by a virtual circuit on a per-interface basis. This user-configurable feature prevents oversubscription of the ATM link. Bandwidth Manager for CBR is turned on automatically for all interfaces supporting CBR. All other ATM service categories need to be manually configured.



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