Local Template-Based ATM PVC Provisioning

The Local Template-Based ATM Provisioning feature enables ATM permanent virtual circuits (PVCs) to be provisioned automatically as needed from a local configuration. ATM PVC autoprovisioning can be configured on a PVC, an ATM PVC range, or a VC class. If a VC class configured with ATM PVC autoprovisioning is assigned to an interface, all the PVCs on that interface will be autoprovisioned; this configuration is sometimes referred to as an *infinite range*.

Feature History

Release	Modification
12.2(15)B	This feature was introduced.
12.2(28)SB	This feature was integrated into Cisco IOS Release 12.2(28)SB.

Finding Support Information for Platforms and Cisco IOS Software Images

Use Cisco Feature Navigator to find information about platform support and Cisco IOS software image support. Access Cisco Feature Navigator at http://www.cisco.com/go/fn. You must have an account on Cisco.com. If you do not have an account or have forgotten your username or password, click **Cancel** at the login dialog box and follow the instructions that appear.

Contents

Corporate Headquarters:
Cisco Systems, Inc., 170 West Tasman Drive, San Jose, CA 95134-1706 USA

Restrictions

The number of PVCs that can be established on an interface that is configured as an infinite range is limited to the maximum number of VCs that the platform can support.

Information About Local Template-Based ATM Provisioning

Autoprovisioned ATM PVCs are not created until there is activity on the virtual path identifier (VPI)/virtual channel identifier (VCI) pair. When the interface is disabled and reenabled using the **shutdown** and **no shutdown** commands, autoprovisioned PVCs that are part of a PVC range or infinite range are removed upon shutdown and are not reestablished until the first incoming packet triggers PVC creation. During router reload, autoprovisioned PVCs are created when there is activity on the connection.

The total number of VCs that can be configured on an ATM port adapter is limited by the capacity of port adapter. In cases of ATM link oversubscription, where a PVC range or infinite range is configured to provision more PVCs than the port adapter allows, the PVCs can be configured with a timeout so that they can be dynamically brought down as needed. When the timeout expires, the idle PVCs are removed, allowing the PVC range or infinite range of PVCs to share system resources.

ATM PVC local autoprovisioning supports the following applications: PPP over ATM, PPP over Ethernet, ATM routed bridge encapsulation, and routed RFC 1483.

The Local Template-Based ATM Provisioning feature enables ATM PVCs to be created automatically as needed from a local configuration, making the provisioning of large numbers of digital subscriber line (DSL) subscribers easier, faster, and less prone to error.

How to Configure Local Template-Based ATM Provisioning

See the following sections for configuration tasks for the Local Template-Based ATM Provisioning feature. One or more of the first four tasks is required. The last task is optional.

- Configuring ATM PVC Local Autoprovisioning in a VC Class
- Configuring ATM PVC Local Autoprovisioning on a PVC
- Configuring ATM PVC Local Autoprovisioning on an ATM PVC Range
- Configuring ATM PVC Local Autoprovisioning on PVC Within a Range
- Verifying ATM PVC Autoprovisioning
- Monitoring and Maintaining ATM PVC Local Autoprovisioning

Configuring ATM PVC Local Autoprovisioning in a VC Class

To enable ATM PVC local autoprovisioning in a VC class, use the following commands beginning in global configuration mode:

	Command or Action	Purpose
Step 1	`Router(config)# vc-class atm vc-class-name`	Creates a VC class for an ATM PVC, SVC, or ATM interface and enters ATM VC class configuration mode.
Step 2	`Router(config-vc-class)# create on-demand`	Configures ATM PVC autoprovisioning, which enables a PVC or range of PVCs to be created automatically on demand.
Step 3	`Router(config-vc-class)# idle-timeout seconds [minimum-rate]`	(Optional) Configures the idle timeout parameter for tearing down ATM SVC connections or autoprovisioned ATM PVC connections.

A VC class configured with ATM PVC autoprovisioning can be assigned to an ATM interface, an ATM PVC, an ATM PVC range, and an ATM PVC with a range.

Note If a VC class that is configured with ATM PVC autoprovisioning is assigned to an ATM interface, all PVCs on the interface will be autoprovisioned.

Configuring ATM PVC Local Autoprovisioning on a PVC

To enable ATM PVC local autoprovisioning on a PVC, use the following commands beginning in global configuration mode:

	Command or Action	Purpose
Step 1	`Router(config)# interface atm slot/port`	Configures an ATM interface.
Step 2	`Router(config-if)# atm autovc retry interval`	(Optional) Configures the interval at which the router will repeat the attempt to create autoprovisioned PVCs after a failure of the initial creation attempt.
Step 3	`Router(config-if)# pvc [name] vpi/vci`	Creates an ATM PVC and enters ATM virtual circuit configuration mode.
Step 4	`Router(config-if-atm-vc)# create on-demand`	Configures ATM PVC autoprovisioning, which enables a PVC or range of PVCs to be created automatically on demand.
Step 5	`Router(config-if-atm-vc)# idle-timeout seconds [minimum-rate]`	(Optional) Configures the idle timeout parameter for tearing down ATM SVC connections or autoprovisioned ATM PVC connections.

ATM PVC local autoprovisioning can also be configured on a PVC by assigning a VC class that has been configured with ATM PVC local autoprovisioning to the PVC.

Configuring ATM PVC Local Autoprovisioning on an ATM PVC Range

To enable ATM PVC autoprovisioning on an ATM PVC range, use the following commands beginning in global configuration mode:

	Command or Action	Purpose
Step 1	`Router(config)# interface atm slot/port`	Configures an ATM interface.
Step 2	`Router(config-if)# atm autovc retry interval`	(Optional) Configures the interval at which the router will repeat the attempt to create autoprovisioned PVCs after a failure of the initial creation attempt.
Step 3	`Router(config-if)# range [range-name] pvc start-vpi/start-vci end-vpi/end-vci`	Defines a range of ATM PVCs and enters ATM PVC range configuration mode.
Step 4	`Router(config-if-atm-range)# create on-demand`	Configures ATM PVC autoprovisioning, which enables a PVC or range of PVCs to be created automatically on demand.
Step 5	`Router(config-if-atm-range)# idle-timeout seconds [minimum-rate]`	(Optional) Configures the idle timeout parameter for tearing down ATM SVC connections or autoprovisioned ATM PVC connections.

ATM PVC local autoprovisioning can also be configured on a range by assigning a VC class that has been configured with ATM PVC local autoprovisioning to the range.

Configuring ATM PVC Local Autoprovisioning on PVC Within a Range

To enable ATM PVC autoprovisioning on a PVC within an ATM PVC range, use the following commands beginning in global configuration mode:

	Command or Action	Purpose
Step 1	`Router(config)# interface atm slot/port`	Configures an ATM interface.
Step 2	`Router(config-if)# atm autovc retry interval`	(Optional) Configures the interval at which the router will repeat the attempt to create autoprovisioned PVCs after a failure of the initial creation attempt.
Step 3	`Router(config-if)# range [range-name] pvc start-vpi/start-vci end-vpi/end-vci`	Defines a range of ATM PVCs and enters ATM PVC range configuration mode.
Step 4	`Router(config-if-atm-range)# pvc-in-range [pvc-name] [[vpi/]vci]`	Defines an individual PVC within a PVC range and enables PVC-in-range configuration mode.
Step 5	`Router(cfg-if-atm-range-pvc)# create on-demand`	Configures ATM PVC autoprovisioning, which enables a PVC or range of PVCs to be created automatically on demand.
Step 6	`Router(cfg-if-atm-range-pvc)# idle-timeout seconds [minimum-rate]`	(Optional) Configures the idle timeout parameter for tearing down ATM SVC connections or autoprovisioned ATM PVC connections.

ATM PVC local autoprovisioning can also be configured on a PVC within a range by assigning a VC class that has been configured with ATM PVC local autoprovisioning to the PVC.

Verifying ATM PVC Autoprovisioning

To verify that ATM PVC local autoprovisioning is configured and working correctly, perform the tasks in the following steps:

Step 1 Enter the **show running-config** command to verify that the configuration is correct.

Step 2 Enter the **show atm pvc** command. PVCs that have been autoprovisioned will have the value "PVC-A" ("A" stands for automatic) in the Type field.

```
Router# show atm pvc

            VCD /                                          Peak  Avg/Min Burst
Interface   Name       VPI   VCI  Type   Encaps   SC     Kbps   Kbps   Cells  Sts
5/0.1       117        0     50   PVC-A   SNAP    UBR  149760                UP
5/0.1       118        0     51   PVC-A   SNAP    UBR  149760                UP
5/0.1       119        0     52   PVC-A   SNAP    UBR  149760                UP
```

Step 3 Enter the **show atm pvc** command with the *vpi*/*vci* arguments to see if ATM PVC local autoprovisioning is configured on a specific PVC. If ATM PVC local autoprovisioning is configured, the text "VC Auto Creation Enabled: local" will appear in the output.

```
Router# show atm pvc 0/51

ATM5/0.1: VCD: 118, VPI: 0, VCI: 51
UBR, PeakRate: 149760
AAL5-LLC/SNAP, etype:0x0, Flags: 0x20000C20, VCmode: 0x0
OAM frequency: 0 second(s), OAM retry frequency: 1 second(s), OAM retry frequency: 1
second(s)
OAM up retry count: 3, OAM down retry count: 5
OAM Loopback status: OAM Disabled
OAM VC state: Not Managed
ILMI VC state: Not Managed
InARP frequency: 15 minutes(s)
Transmit priority 4
InPkts: 0, OutPkts: 0, InBytes: 0, OutBytes: 0
InPRoc: 0, OutPRoc: 0, Broadcasts: 0
InFast: 0, OutFast: 0, InAS: 0, OutAS: 0
InPktDrops: 0, OutPktDrops: 0
CrcErrors: 0, SarTimeOuts: 0, OverSizedSDUs: 0, LengthViolation: 0, CPIErrors: 0
Out CLP=1 Pkts: 0
OAM cells received: 0
F5 InEndloop: 0, F5 InSegloop: 0, F5 InAIS: 0, F5 InRDI: 0
F4 InEndloop: 0, F4 InSegloop: 0, F4 InAIS: 0, F4 InRDI: 0
OAM cells sent: 0
F5 OutEndloop: 0, F5 OutSegloop: 0, F5 OutRDI: 0
F4 OutEndloop: 0, F4 OutSegloop: 0, F4 OutRDI: 0
OAM cell drops: 0
Status: UP
PPP: Virtual-Access3 from Virtual-Template1
VC Auto Creation Enabled: local
```

Monitoring and Maintaining ATM PVC Local Autoprovisioning

To monitor and maintain ATM PVC autoprovisioning, use one or more of the following commands in privileged EXEC mode:

Command or Action	Purpose
`Router# debug atm autovc {event | error | all}`	Displays information about autoprovisioned ATM PVC events and errors.
`Router# show atm pvc`	Displays all ATM PVCs and traffic information.
`Router# show atm vc`	Displays all ATM PVCs and SVCs and traffic information.

Configuration Examples

This section provides the following configuration examples:

- ATM PVC Local Autoprovisioning on an ATM Interface Example
- ATM PVC Local Autoprovisioning on a PVC Example
- ATM PVC Local Autoprovisioning on an ATM PVC Range Example
- ATM PVC Local Autoprovisioning on a PVC Within a Range Example

ATM PVC Local Autoprovisioning on an ATM Interface Example

In the following example, local autoprovisioning is enabled on all PVCs on ATM interface 5/0.

```
vc-class atm auto-pppoe
 vbr-nrt 1000 100
 protocol pppoe
 create on-demand
 idle-timeout 300 10
!
interface atm 5/0
 class-int auto-pppoe
 atm autovc retry 10
```

ATM PVC Local Autoprovisioning on a PVC Example

The following example shows the configuration of local autoprovisioning on a PVC:

```
interface atm 5/0
 pvc 1/300
  create on-demand
  idle-timeout 300 10
```

ATM PVC Local Autoprovisioning on an ATM PVC Range Example

The following example shows the configuration of local autoprovisioning on an ATM PVC range called "auto":

```
interface atm 5/0
 range auto pvc 0/100 1/200
  create on-demand
```

ATM PVC Local Autoprovisioning on a PVC Within a Range Example

The following example shows the configuration of local autoprovisioning on a PVC within a PVC range:

```
interface atm 5/0
 range auto pvc 0/100 1/200
  pvc-in-range 0/101
   create on-demand
```

Additional References

The following sections provide references related to local template-based ATM PVC provisioning.

Related Documents

Related Topic	Document Title
ATM PVC configuration	*Cisco IOS Wide-Area Networking Configuration Guide,* Release 12.2
ATM commands	*Cisco IOS Wide-Area Networking Command Reference,* Release 12.2

Standards

Standard	Title
None	—

MIBs

MIB	MIBs Link
None	To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL: http://www.cisco.com/go/mibs

RFCs

RFC	Title
None	—

Technical Assistance

Description	Link
The Cisco Technical Support & Documentation website contains thousands of pages of searchable technical content, including links to products, technologies, solutions, technical tips, and tools. Registered Cisco.com users can log in from this page to access even more content.	http://www.cisco.com/techsupport

Command Reference

This section documents new and modified commands only.

- **atm autovc retry**
- **create on-demand**
- **debug atm autovc**
- **idle-timeout**

atm autovc retry

To configure the intervals at which a router will repeat the attempt to create autoprovisioned PVCs after a failure of the initial attempt at creation fails, use the **atm autovc retry** command in interface configuration mode. To reset the retry interval to the default, use the **no** form of this command.

atm autovc retry *interval*

no atm autovc retry *interval*

Syntax Description

interval	Interval, in minutes, at which the router will repeat the attempt to create autoprovisioned PVCs after the initial attempt at creation fails. The range is from 1 to 60 minutes. The default is one minute.

Command Default

The retry interval is one minute.

Command Modes

Interface configuration

Command History

Release	Modification
12.2(15)B	This command was introduced.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.

Usage Guidelines

Use the **atm autovc retry** command to configure the retry interval for autoprovisioned ATM PVCs.

Examples

In the following example, local autoprovisioning is enabled on all PVCs on ATM interface 5/0. The retry interval is 5 minutes.

```
vc-class atm auto-pppoe
 vbr-nrt 1000 100
 protocol pppoe
 create on-demand
 idle-timeout 300 10

interface atm 5/0
 class-int auto-pppoe
 atm autovc retry 5
```

Related Commands

Command	Description
create on-demand	Configures ATM PVC autoprovisioning, which enables a PVC or range of PVCs to be created automatically on demand.

create on-demand

To configure ATM PVC autoprovisioning, which enables a PVC or range of PVCs to be created automatically on demand, use the **create on-demand** command in the appropriate mode. To disable ATM PVC autoprovisioning, use the **no** form of this command. To disable ATM PVC autoprovisioning but allow inheritance of PVC parameters, use the **default** version of this command.

create on-demand

no create on-demand

default create on-demand

Syntax Description

This command has no arguments or keywords.

Command Default

ATM PVC autoprovisioning is not enabled.

Command Modes

ATM VC configuration
ATM PVC range configuration
ATM PVC-in-range configuration
ATM VC class configuration

Command History

Release	Modification
12.2(15)B	This command was introduced.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.

Usage Guidelines

The **create on-demand** command follows existing VC class inheritance rules. This means that if the command is not explicitly configured on an ATM VC, the VC will inherit the configuration from VC classes in the following order:

- From a VC class assigned to the VC itself
- From a VC class assigned to the VC's ATM subinterface
- From a VC class assigned to the VC's ATM main interface

Examples

In the following example, local autoprovisioning is enabled on all PVCs on ATM interface 5/0:

```
vc-class atm auto-pppoe
 vbr-nrt 1000 100
 protocol pppoe
 create on-demand
 idle-timeout 300 10

interface atm 5/0
 class-int auto-pppoe
 atm autovc retry 5
```

Related Commands

Command	Description
debug atm autovc	Displays information about autoprovisioned ATM PVC events and errors.

debug atm autovc

To display information about autoprovisioned ATM PVC events and errors, use the **debug atm autovc** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

debug atm autovc {**event** | **error** | **all**}

no debug atm autovc

Syntax Description

event	Displays all autoprovisioned PVC events.
error	Displays all autoprovisioned PVC errors.
all	Displays all autoprovisioned PVC events and errors.

Command Default

No default behavior or values.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.2(15)B	This command was introduced.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.

Examples

The following is sample output for the **debug atm autovc** command:

```
Router# debug atm autovc all

AutoVC all debugging is on
Router#
00:09:03:AutoVC(ATM1/0):1/101 enqueued
! There is incoming traffic on PVC 1/101 and the pvc is enqueued to be processed.
00:09:03:AutoVC(ATM1/0):process VC 1/101
! PVC 1/101 is in the process of being autoprovisioned.
00:09:03:AutoVC(ATM1/0.1):bring up vc 1/101
! PVC 1/101 is being brought up.
00:09:03:%ATM-5-UPDOWN:Interface ATM1/0.1, Changing autovc 1/101 to UP
! This message indicates that the PVC was brought up successfully.
```

Related Commands

Command	Description
create on-demand	Configures ATM PVC autoprovisioning, which enables a PVC or range of PVCs to be created automatically on demand.

idle-timeout

To configure the idle timeout parameter for tearing down an ATM switched virtual circuit (SVC) connection or autoprovisioned ATM PVC connections, use the **idle-timeout** command in the appropriate mode. To disable the timeout parameter, use the **no** form of this command.

idle-timeout *seconds* [*minimum-rate*]

no idle-timeout *seconds* [*minimum-rate*]

Syntax Description

seconds	Number of seconds that the VC is idle, after which the ATM VC is disconnected.
minimum-rate	(Optional) Minimum traffic rate, in kbps, required on an ATM SVC to maintain the SVC connection.

Command Default

Default idle timeout for SVCs: 300 seconds.

Default idle timeout for autoprovisioned PVCs: 0 seconds

Default *minimum-rate*: 0 kbps

Command Modes

ATM virtual circuit configuration (for ATM permanent virtual circuits [PVCs] or SVCs)
VC-class configuration (for virtual circuit [VC] classes)

Command History

Release	Modification
11.3	This command was introduced.
12.2(15)B	This command was modified to configure idle timeout parameters for autoprovisioned ATM PVCs.
12.2(28)SB	This command was modified to configure idle timeout parameters for autoprovisioned ATM PVCs.

Usage Guidelines

If, within the idle timeout period, both the input and output traffic rates are below the minimum rate, the VC connection is torn down. The input and output traffic rates are set using the **ubr**, **ubr+**, or **vbr-nrt** command.

If the **idle-timeout** command is not explicitly configured on an ATM VC, the VC inherits the following default configuration (listed in order of next highest precedence):

- Configuration of the **idle-timeout** command in a VC class assigned to the VC itself.
- Configuration of the **idle-timeout** command in a VC class assigned to the VC's ATM subinterface.
- Configuration of the **idle-timeout** command in a VC class assigned to the VC's ATM main interface.
- Global default—The global idle timeout default is the value set using the **idle-timeout** interface configuration command. If the **idle-timeout** command is not configured, the default idle timeout is 300 seconds for SVCs and 0 seconds for autoprovisioned PVCs, and the minimum rate is 0 kbps.

Examples

The following example shows how to configure an ATM SVC connection to become inactive after an idle period of 300 seconds. The SVC connection is also configured so that it is considered to be inactive if the traffic rate is less than 5 kbps.

```
idle-timeout 300 5
```

The following example shows the idle timeout configured for an autoprovisioned PVC:

```
interface atm 5/0
 pvc 1/300
  create on-demand
  idle-timeout 300 10
```

Related Commands

Command	Description
create on-demand	Configures ATM PVC autoprovisioning, which enables a PVC or range of PVCs to be created automatically on demand.
ubr	Selects UBR QoS and configures the output peak cell rate for an ATM PVC, SVC, or VC class.
ubr+	Selects UBR QoS and configures the output peak cell rate and output minimum guaranteed cell rate for an ATM PVC, SVC, or VC class.
vbr-nrt	Configures the VBR-NRT QoS and specifies output peak cell rate, output sustainable cell rate, and output maximum burst cell size for an ATM PVC, SVC, or VC class.

Cisco IOS Release: Multiple releases (see the Feature History table)