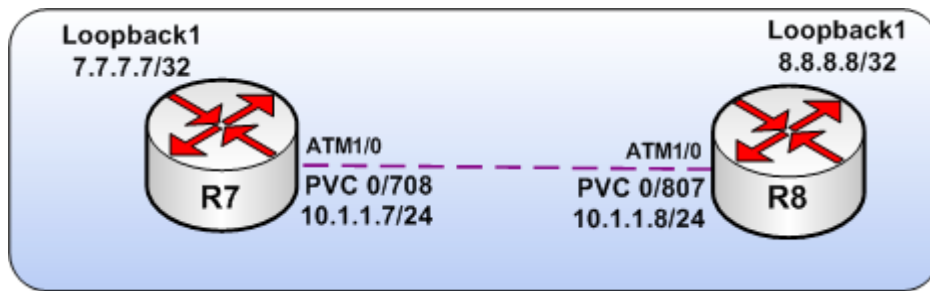


## Lab 1 - ATM Encapsulation Types



**Task 1:** Configure an ATM PVC between R7 and R8 using the physical interface and aal5snap encapsulation. Do not use static maps.

Add the loopbacks 7.7.7.7/32 and 8.8.8.8/32 to each respective router.

### Solution:

Note - When using inverse arp with ATM, you will be unable to ping the routers own interface address, This is due to the ip not being dynamically mapped to a pvc.

### R7 Configuration:

```
interface loopback 1
ip addr 7.7.7.7 255.255.255.255
no shut
!
interface ATM1/0
ip address 10.1.1.7 255.255.255.0
no atm enable-ilmi-trap
no clns route-cache
pvc 0/708
encapsulation aal5snap
!
end
```

### R8 Configuration:

```
interface loopback 1
ip addr 8.8.8.8 255.255.255.255
no shut
!
interface ATM1/0
ip address 10.1.1.8 255.255.255.0
no atm enable-ilmi-trap
```

```
no clns route-cache
pvc 0/807
encapsulation aal5snap
!
end
```

### Verification on R7:

```
R7#ping 10.1.1.8
```

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 10.1.1.8, timeout is 2 seconds:

!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 8/16/40 ms

```
R7#
```

```
R7#show atm pvc
```

Interface	Name	VCD /	VPI	VCI	Type	Encaps	SC	Kbps	Peak Avg/Min Burst	Cells	Sts
1/0	1		0	708	PVC	SNAP	UBR	155000			UP

```
R7#show atm map
```

Map list ATM1/0\_ATM\_INARP : DYNAMIC

ip 10.1.1.8 maps to VC 1, VPI 0, VCI 708, ATM1/0

```
R7#show atm pvc 0/708
```

ATM1/0: VCD: 2, VPI: 0, VCI: 708

UBR, PeakRate: 155000

**AA15-LLC/SNAP**, etype:0x0, Flags: 0xC20, VCmode: 0x0

OAM frequency: 0 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 status: Not Managed

ILMI VC status: Not Managed

**InARP frequency: 15 minutes(s)**

InPkts: 1, OutPkts: 3, InBytes: 28, OutBytes: 84

InPRoc: 1, OutPRoc: 3, Broadcasts: 0

InFast: 0, OutFast: 0, InAS: 0, OutAS: 0

Giants: 0

OAM cells received: 0

F5 InEndloop: 0, F5 InSegloop: 0, F5 InAIS: 0, F5 InRDI: 0

OAM cells sent: 0

F5 OutEndloop: 0, F5 OutSegloop: 0, F5 OutAIS: 0, F5 OutRDI: 0

OAM cell drops: 0

Status: UP

## Verification on R8

R8#ping 10.1.1.7

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 10.1.1.7, timeout is 2 seconds:

!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 4/8/12 ms

R8#show atm pvc

Interface	Name	VPI	VCI	Type	Encaps	SC	Kbps	Kbps	Cells	Sts
1/0	1	0	807	PVC	SNAP	UBR	155000			UP

R8#show atm map

Map list ATM1/0\_ATM\_INARP : DYNAMIC

ip 10.1.1.7 maps to VC 1, VPI 0, VCI 807, ATM1/0

R7#show atm pvc 0/708

ATM1/0: VCD: 2, VPI: 0, VCI: 708

UBR, PeakRate: 155000

**AAL5-LLC/SNAP**, etype:0x0, Flags: 0xC20, VCmode: 0x0

OAM frequency: 0 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 status: Not Managed

ILMI VC status: Not Managed

**InARP frequency: 15 minutes(s)**

InPkts: 1, OutPkts: 3, InBytes: 28, OutBytes: 84

InPRoc: 1, OutPRoc: 3, Broadcasts: 0

InFast: 0, OutFast: 0, InAS: 0, OutAS: 0

Giants: 0

OAM cells received: 0

F5 InEndloop: 0, F5 InSegloop: 0, F5 InAIS: 0, F5 InRDI: 0

OAM cells sent: 0

F5 OutEndloop: 0, F5 OutSegloop: 0, F5 OutAIS: 0, F5 OutRDI: 0

OAM cell drops: 0

Status: UP

**Task 2: Shut the ATM interface, Change the PVC encapsulation to AAL5NLPID then activate the interface.**

**Solution:**

Note – AAL5SNAP is the only ATM encapsulation type that Inverse Arp supports. If any other type of encapsulation is used inverse arp is disabled. The use of static maps is then required to regain connectivity.

### **R7 Configuration:**

```
interface ATM1/0
ip address 10.1.1.7 255.255.255.0
no atm enable-ilmi-trap
no clns route-cache
pvc 0/708
 encapsulation aal5nlpid
!
end
```

### **R8 Configuration:**

```
interface ATM1/0
ip address 10.1.1.8 255.255.255.0
no atm enable-ilmi-trap
no clns route-cache
pvc 0/807
 encapsulation aal5nlpid
!
end
```

### **Verification on R7:**

```
R7#ping 10.1.1.8
```

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 10.1.1.8, timeout is 2 seconds:

.....

Success rate is 100 percent (5/5), round-trip min/avg/max = 8/16/40 ms

```
R7#show atm pvc 0/708
```

```
ATM1/0: VCD: 2, VPI: 0, VCI: 708
```

```
UBR, PeakRate: 155000
```

```
AAL5-NLPID, etype:0x2, Flags: 0xC21, VCmode: 0x0
```

```
OAM frequency: 0 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 status: Not Managed
```

```
ILMI VC status: Not Managed
```

**InARP DISABLED**

InPkts: 0, OutPkts: 0, InBytes: 0, OutBytes: 0  
InPRoc: 1, OutPRoc: 3, Broadcasts: 0  
InFast: 0, OutFast: 0, InAS: 0, OutAS: 0  
Giants: 0  
OAM cells received: 0  
F5 InEndloop: 0, F5 InSegloop: 0, F5 InAIS: 0, F5 InRDI: 0  
OAM cells sent: 0  
F5 OutEndloop: 0, F5 OutSegloop: 0, F5 OutAIS: 0, F5 OutRDI: 0  
OAM cell drops: 0  
Status: UP

**Verification on R8**

R8#ping 10.1.1.7

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 10.1.1.7, timeout is 2 seconds:

.....

Success rate is 100 percent (5/5), round-trip min/avg/max = 4/8/12 ms

R8#show atm pvc 0/807

ATM1/0: VCD: 2, VPI: 0, VCI: 807

UBR, PeakRate: 155000

**AAL5-NLPID**, etype:0x2, Flags: 0xC21, VCmode: 0x0

OAM frequency: 0 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 status: Not Managed

ILMI VC status: Not Managed

**InARP DISABLED**

InPkts: 0, OutPkts: 0, InBytes: 0, OutBytes: 0  
InPRoc: 1, OutPRoc: 1, Broadcasts: 0  
InFast: 0, OutFast: 0, InAS: 0, OutAS: 0  
Giants: 0  
OAM cells received: 0  
F5 InEndloop: 0, F5 InSegloop: 0, F5 InAIS: 0, F5 InRDI: 0  
OAM cells sent: 0  
F5 OutEndloop: 0, F5 OutSegloop: 0, F5 OutAIS: 0, F5 OutRDI: 0  
OAM cell drops: 0  
Status: UP

**Task 3: Change the encapsulation type allow ip traffic using AAL5MUX**

**Solution:**

Note – AAL5MUX allows both voice and ip traffic, When configuring this encapsulation type you must specify what type of traffic will be carried. As Inverse Arp does not support this encapsulation type, Static Maps are required as per AAL5NLPID

**R7 Configuration:**

```
interface ATM1/0
ip address 10.1.1.7 255.255.255.0
no atm enable-ilmi-trap
no clns route-cache
pvc 0/708
 encapsulation aal5mux ip
!
end
```

**R8 Configuration:**

```
interface ATM1/0
ip address 10.1.1.8 255.255.255.0
no atm enable-ilmi-trap
no clns route-cache
pvc 0/807
 encapsulation aal5mux ip
!
end
```

**Verification on R7:**

```
R7#ping 10.1.1.8
```

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 10.1.1.8, timeout is 2 seconds:

.....

Success rate is 100 percent (5/5), round-trip min/avg/max = 8/16/40 ms

```
R7#show atm pvc 0/708
```

ATM1/0: VCD: 2, VPI: 0, VCI: 708

UBR, PeakRate: 155000

**AAL5-MUX**, etype:0x800, Flags: 0xC24, VCmode: 0x0

OAM frequency: 0 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 status: Not Managed

ILMI VC status: Not Managed

**InARP DISABLED**

InPkts: 0, OutPkts: 0, InBytes: 0, OutBytes: 0

InPRoc: 1, OutPRoc: 3, Broadcasts: 0

InFast: 0, OutFast: 0, InAS: 0, OutAS: 0

Giants: 0

OAM cells received: 0

F5 InEndloop: 0, F5 InSegloop: 0, F5 InAIS: 0, F5 InRDI: 0

OAM cells sent: 0

F5 OutEndloop: 0, F5 OutSegloop: 0, F5 OutAIS: 0, F5 OutRDI: 0

OAM cell drops: 0

Status: UP

**Verification on R8**

R8#ping 10.1.1.7

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 10.1.1.7, timeout is 2 seconds:

.....

Success rate is 100 percent (5/5), round-trip min/avg/max = 4/8/12 ms

R8#show atm pvc 0/807

ATM1/0: VCD: 2, VPI: 0, VCI: 807

UBR, PeakRate: 155000

**AAL5-MUX**, etype:0x800, Flags: 0xC24, VCmode: 0x0

OAM frequency: 0 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 status: Not Managed

ILMI VC status: Not Managed

**InARP DISABLED**

InPkts: 0, OutPkts: 0, InBytes: 0, OutBytes: 0

InPRoc: 1, OutPRoc: 1, Broadcasts: 0

InFast: 0, OutFast: 0, InAS: 0, OutAS: 0

Giants: 0

OAM cells received: 0

F5 InEndloop: 0, F5 InSegloop: 0, F5 InAIS: 0, F5 InRDI: 0

OAM cells sent: 0

F5 OutEndloop: 0, F5 OutSegloop: 0, F5 OutAIS: 0, F5 OutRDI: 0

OAM cell drops: 0

Status: UP

**Task 4: Change the encapsulation type back to AAL5NLPID and configure a single static map on each device.**

**Solution:**

Note – AAL5MUX allows both voice and ip traffic, When configuring this encapsulation type you must specify what type of traffic will be carried. As Inverse Arp does not support this encapsulation type, Static Maps are required as per AAL5NLPID

**R7 Configuration:**

```
interface ATM1/0
ip address 10.1.1.7 255.255.255.0
no atm enable-ilmi-trap
no clns route-cache
pvc 0/708
encapsulation aal5nlpid
protocol ip 10.1.1.8
!
end
```

**R8 Configuration:**

```
interface ATM1/0
ip address 10.1.1.8 255.255.255.0
no atm enable-ilmi-trap
no clns route-cache
pvc 0/807
encapsulation aal5nlpid
protocol ip 10.1.1.7
!
end
```

**Verification on R7:**

```
R7#ping 10.1.1.8
```

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 10.1.1.8, timeout is 2 seconds:

!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 8/10/16 ms

```
R7#show atm map
Map list ATM1/0pvc2C4 : PERMANENT
ip 10.1.1.8 maps to VC 2, VPI 0, VCI 708, ATM1/0
```

```
R7#show atm pvc
      VCD /                               Peak Avg/Min Burst
Interface Name  VPI VCI Type Encaps SC Kbps Kbps Cells Sts
1/0    2      0 708 PVC  NLPID  UBR 155000      UP
R7#
```

### Verification on R8

```
R8#ping 10.1.1.7
```

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 10.1.1.7, timeout is 2 seconds:

!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 4/14/40 ms

```
R8#show atm map
Map list ATM1/0pvc327 : PERMANENT
ip 10.1.1.7 maps to VC 2, VPI 0, VCI 807, ATM1/0
```

```
R8#show atm pvc
      VCD /                               Peak Avg/Min Burst
Interface Name  VPI VCI Type Encaps SC Kbps Kbps Cells Sts
1/0    2      0 807 PVC  NLPID  UBR 155000      UP
R8#
```

### Task 5: Change the encapsulation to AAL5MUX for ip and confirm connectivity

#### Solution:

Note – AAL5MUX allows both voice and ip traffic, When configuring this encapsulation type you must specify what type of traffic will be carried. As Inverse Arp does not support this encapsulation type, Static Maps are required as per AAL5NLPID

#### R7 Configuration:

```
interface ATM1/0
ip address 10.1.1.7 255.255.255.0
no atm enable-ilmi-trap
```

```
no clns route-cache
pvc 0/708
  encapsulation aal5mux ip
  protocol ip 10.1.1.8
!
end
```

### R8 Configuration:

```
interface ATM1/0
ip address 10.1.1.8 255.255.255.0
no atm enable-ilmi-trap
no clns route-cache
pvc 0/807
  encapsulation aal5mux ip
  protocol ip 10.1.1.7
!
end
```

### Verification on R7:

```
R7#ping 10.1.1.8
```

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 10.1.1.8, timeout is 2 seconds:

!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 8/8/12 ms

```
R7#show atm map
```

Map list ATM1/0pvc2C4 : PERMANENT

```
ip 10.1.1.8 maps to VC 2, VPI 0, VCI 708, ATM1/0
, aal5mux
```

```
R7#show atm pvc
```

VCD /				Peak Avg/Min Burst						
Interface	Name	VPI	VCI	Type	Encaps	SC	Kbps	Kbps	Cells	Sts
1/0	2	0	708	PVC	MUX	UBR	155000		UP	

### Verification on R8

```
R8#ping 10.1.1.7
```

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 10.1.1.7, timeout is 2 seconds:

!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 8/9/12 ms

R8#show atm map

Map list ATM1/0pvc327 : PERMANENT

ip 10.1.1.7 maps to VC 2, VPI 0, VCI 807, ATM1/0

, **aal5mux**

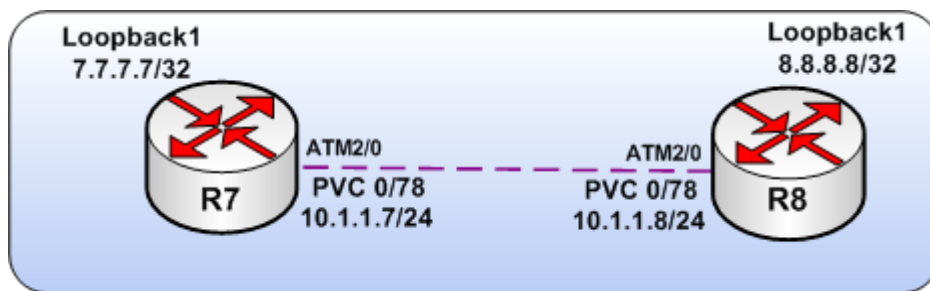
R8#show atm pvc

Interface	Name	VPI	VCI	Type	Encaps	SC	Kbps	Kbps	Cells	Sts
1/0	2	0	807	PVC	<b>MUX</b>	UBR	155000			UP

R8#

**Lab completed, Erase config and continue to next lab.**

## Lab 2 - ATM PVC Back to Back



**Task 1:** Configure a Back2Back ATM PVC between R7 and R8 using the physical interface and aal5snap encapsulation.

Add the loopbacks 7.7.7.7/32 and 8.8.8.8/32 to each respective router.

### Solution:

Note – This task can be performed using either Dynamic or Static maps.

#### R7 Configuration:

```
interface loopback 1
ip addr 7.7.7.7 255.255.255.255
no shut
!
interface ATM2/0
no shut
ip address 10.1.1.7 255.255.255.0
no atm enable-ilm-trap
no clns route-cache
pvc 0/78
encapsulation aal5snap
!
end
```

#### R8 Configuration:

```
interface loopback 1
ip addr 8.8.8.8 255.255.255.255
no shut
!
interface ATM2/0
no shut
ip address 10.1.1.8 255.255.255.0
```

```
no atm enable-ilmi-trap
no clns route-cache
pvc 0/78
encapsulation aal5snap
!
end
```

### Verification on R7:

```
R7#ping 10.1.1.8
```

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 10.1.1.8, timeout is 2 seconds:

!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 8/8/12 ms

```
R7#show atm pvc
```

VCD /				Peak Avg/Min Burst						
Interface	Name	VPI	VCI	Type	Encaps	SC	Kbps	Kbps	Cells	Sts
2/0	2	0	78	PVC	SNAP	UBR	155000			UP

```
R7#show atm map
```

Map list ATM2/0\_ATM\_INARP : DYNAMIC

ip 10.1.1.8 maps to VC 2, VPI 0, VCI 78, ATM2/0

### Verification on R8

```
R8#ping 10.1.1.7
```

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 10.1.1.7, timeout is 2 seconds:

!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 8/19/44 ms

```
R8#show atm pvc
```

VCD /				Peak Avg/Min Burst						
Interface	Name	VPI	VCI	Type	Encaps	SC	Kbps	Kbps	Cells	Sts
2/0	2	0	78	PVC	SNAP	UBR	155000			UP

```
R8#show atm map
```

Map list ATM2/0\_ATM\_INARP : DYNAMIC

ip 10.1.1.7 maps to VC 2, VPI 0, VCI 78, ATM2/0

**Lab completed, Erase config and continue to next lab.**