

## **Introduction to Meg@POP**

SingTel Meg@POP is a comprehensive suite of IP services for businesses which need a secured connection to multiple locations, parties or services in Singapore. It provides a simple and cost effective one-stop IP networking solution that meets your Intranet, Internet and Applications needs. It is a MPLS enabled private IP backbone.

This section gives an overview of SingTel's Meg@POP service and its benefits. Some of its key features are:

### **Carrier-grade IP solution**

Meg@POP offers a suite of high quality, business IP solutions supported by a Multiple Protocol Layer Switching (MPLS)-enabled core routing platform that delivers unprecedented speeds and traffic management capability.

### **Security**

SingTel's Meg@POP is based on a Multiprotocol label switching (MPLS) Platform. MPLS has emerged as an elegant solution to meet the bandwidth-management and service requirements for next-generation Internet protocol (IP)-based backbone networks. MPLS provides two pleasant and inherent by-product benefits.

First, it attaches tags - or "labels" - to IP packets when they enter the MPLS-based network. Each VPN customer will be assigned a unique identifier called a Route Distinguisher (RD). This eliminates the need for each intermediate router node to delve deeply into each packet's IP header to make forwarding and handling decisions. This means packet streams can pass through an MPLS-based WAN infrastructure blindingly fast.

Second, the same labels that MPLS employs for distinguishing IP packet streams also provide secure isolation of these packets from other traffic over the same physical links.

Because the MPLS labeling hides the real IP address and other aspects of the packet stream, it provides data protection as secure as other Layer 2 technologies, including frame relay and ATM. i.e. MPLS-VPN traffic is isolated by the use of tags, much in the same way ATM and Frame Relay PVCs are kept isolated in a public ATM/Frame Relay network. This would mean that security of MPLS-VPNs is equivalent to that of Frame Relay or ATM public network services. Interception of any of these three types of traffic would require access to the service provider network.

Generally, if you are comfortable with carrying your traffic over public ATM or Frame Relay services, you should have the same level of comfort with MPLS-

VPN services. If you require additional security, encryption could be employed in addition to MPLS.

Also, since Labels are used instead of IP addresses, you can keep your existing private address schemes without requiring Network Address Translation (NAT) to pass traffic through SingTel's network.

With MPLS-enabled IP VPN networks, you can seamlessly interconnect via SingTel without changing your intranet applications and your private IP addresses. It is also much easier for customer to add, move, and change new/existing site to a VPN. Customers who lack network and routing expertise, or want to outsource the WAN infrastructure, will be able to subscribe to Managed IP services for plug-and-play simplicity in your intranets and extranets.

In summary, SingTel's Meg@POP MPLS VPN offers the following security benefits:

- Your network is not revealed to the outside world
- You can maintain your own addressing plans & freedom to use either public or private address space
- Attackers cannot gain access into SingTel's VPN and Network
- Attackers cannot insert "spoofed labels" into the MPLS network and gain access

Miercomm, an independent technology reviewer, has published an independent white paper on the security of Cisco MPLS based VPN entitled "Cisco MPLS based VPNs: Equivalent to the security of Frame Relay and ATM". For more details, you can refer to Miercomm's website at <http://www.mier.com/>.

### **Superior connectivity**

Meg@POP provides customers with the means to access corporate resources independent of access technology, geographical location or time.

### **More than bandwidth**

It allows customers to buy value-added network services over the same connection as these services become available.

### **A ready customer base**

It offers a ready customer base for ISPs / ASPs to offer their services.

### **A marketplace**

It creates a 'marketplace' where sellers and buyers of network / content / services meet.

## **The Benefits of Meg@POP**

SingTel Meg@POP is not just an IP VPN service. It is a combination of IP-based services offered over a suite of island-wide, DSL and optical-based access with access speeds ranging from 512Kbps to 155Mbps.

### **Simplicity**

One network, one connection, multiple services.

### **Cost Savings**

Minimize and protect your capital investments, as well as lower your operating costs.

### **True IP Broadband**

Supports the widest choice of transmission speeds of up to 155Mbps.

### **More than raw bandwidth**

Enables network-hosted applications such as ASPs.

### **Fast deployment**

Content providers (CPs) and Applications Service Providers (ASPs) will have a ready pool of customers.

### **Delivers increasing value**

You will enjoy access to new application services such as VoIP, video-conferencing, etc as they are progressively added to the platform (these can be provided either by SingTel or third parties).

### **One-stop solution**

Meg@POP is the one-stop solution for all your IP needs - Intranet, Internet and applications.

The benefits are clear. If you have a need to connect multiple sites - be it for intra-company or inter-company purposes, to share information or transactions, and seek a cost-effective solution that not only offers the greatest flexibility but also, the least maintenance requirement, Meg@POP is the answer.

In addition, Meg@POP adds increasing value to your network with its ability to deliver multiple services and applications over each connection.

To access Meg@POP's suite of services, there are a few access methods. These are BizLink, Ilink, DirectLink, MegaLink, EthernetLink.

## Meg@POP Access Methods

### 1. BizLink and iLink

BizLink Service is a broadband remote access service based on ADSL technology. It operates over a single, twisted copper pair of wire and provides the connection via modems. The modems are designed to exploit the physical transmission capabilities of copper lines beyond the frequencies used for normal telephony service. With the utilization of the higher frequency, high speed data can be transmitted via the copper wire.

BizLink enables users to connect to your corporate office remotely at higher speeds. There are 3 different service offerings.

- 512K Downstream, 384K Upstream
- 1M Downstream, 512K Upstream
- 1.5M Downstream, 512K Upstream

Downstream refers to the direction from your HQ to the end user while upstream refers to the direction from the end user to your HQ.

“Always On”	No dial up needed. Ready to run every minute of the day.
Remarkably Fast	Up to 24-times faster than ISDN and Up to 50-times faster than dial up modem.
Multi-tasking	Allow users to remain online even while talking on the phone or faxing.
No Rewiring Needed	Re-use existing phone lines to carry high speed data.
Supports Multiple Users	Supports multiple users in a LAN environment using a single BizLink access.

BizLink is more secure than any dialup methods as it is location sensitive and thus acts as a private leased line.

An alternative to BizLink is iLink. The main difference between the two access methods is iLink can only be used in a spoke configuration while BizLink can be used as either an any-to-any configuration or spoke configuration. The differences are shown in the table below.

<i>Speed</i>		
Downstream	512kbps	512kbps / 1Mbps / 1.5Mbps
Upstream	256kbps	384kbps/512kbps
<i>Application</i>		

Intranet Only	Yes	Yes
Extranet Only	Yes	Yes
<i>Intranet &amp; Extranet</i>	No	Yes
<i>VPN Configuration</i>	Spoke Only	Any to Any / Spoke Only

## 2. DirectLink

DirectLink is a high-quality leased line access to SingTel Meg@POP, ideal for corporate sites that require high throughput and symmetric connectivity to distribute or receive information among Virtual Private Network (VPN) connected sites.

DirectLink provides customer with the following features:

### **Comprehensive Access**

DirectLink offers a full range of access bandwidths at 64Kbps, 128Kbps, 192Kbps, 256Kbps, 384Kbps, 512Kbps, 768Kbps, 1024Kbps, 1536Kbps, 1984Kbps.

### **Guaranteed Bandwidth**

Customers are guaranteed the full bandwidth of the access speeds they are paying for. There will be no reduction in access bandwidth to Meg@POP due to transmission overhead.

### **Clear Channel**

Customer's access to Meg@POP is a synchronous and full duplex clear channel using a standard leased line interface. It allows you to run IP applications easily without having to configure any ATM or Frame Relay connection.

### **Standard Leased Line Interface**

A wide range of access bandwidths allows customers to use any standard router or even to re-use their existing router. Migration from their existing leased line network to SingTel IP services would be a hassle-free experience because DirectLink supports standard leased line interface.

Meg@POP DirectLink is best suited for the following applications:

- closed user groups requiring symmetric access with diverse speed at different sites
- low-speed sites to high-speed site grooming with occasional mesh traffic among low-speed sites
- central sites for handling aggregated traffic
- sites for potential real-time applications e.g. on-line transaction, VoIP, video over IP etc.
- sites for hosting information source
- corporations requiring guaranteed bandwidth, premium grade access to Meg@POP

Meg@POP DirectLink supports the following interface standards and connector types:

64kbps & 128kbps	V.35/V.36/X.21		25-pin D connector
192kbps to 1984kbps	V.35 V.36 X.21		34-pin Rectangular 37-pin D connector 15-pin D connector
45Mbps	T3 - Electrical	75ohm	BNC
155Mbps	STM1 - Optical Single Mode		SC

### 3. MegaLink

MegaLink is a symmetric access service that makes use of ATM technology to interconnect your sites back to Meg@POP. It is ideal for corporate sites that requires a high throughput to distribute or receive information among VPN connected sites.

The features of MegaLink are:

#### **Comprehensive Access**

MegaLink offers a full range of port access bandwidths at 2M, 34M, 45Mbps and 155Mbps.

#### **Class Of Service**

MegaLink provides the various class of service with PVC types of either UBR, VBRnrt or CBR (for Connection into SingNet).

#### **Dedicated Internet Access**

Customers can choose to subscribe to a Dedicated Internet Access which is available through SingNet. This dedicated access will be via a CBR PVC to SingNet. The customer must have an existing MegaLink Port/UBR/VBR PVC and is only required to subscribe a L2 CBR PVC.

### 4. EthernetLink

EthernetLink is a secured, high-speed Ethernet connection (of up to 1000Mbps) that enables access to MegaPop services as well as intra-building communications. It offers plug-and-play, bandwidth-on-demand access to multiple services over a single port.

#### **Bandwidth-On-Demand**

You can start off with EthernetLink's lowest speed offering of 256Kbps and upgrade their bandwidth as and when they require it, limited only to the 10 or 100BT or 1GB port subscribed.

Range of bandwidth available:

- EthernetLink islandwide - 256Kbps to 1000Mbps

- 10Mbps IP Building - 256Kbps to 10Mbps
- 100Mbps IP Building - 256Kbps to 100Mbps

### **Bandwidth Granularity**

EthernetLink gives you the choice to increase your bandwidth by increments of

- 256Kbps for 256Kbps to 1Mbps
- 1Mbps for 1 to 10Mbps
- 10Mbps for 10 to 100Mbps and
- 100Mbps for 100Mbps to 1000Mbps

### **Convenience of Familiar Interface**

As Ethernet is the de facto standard for LAN, many companies' LAN equipment already supports an Ethernet interface. This provides a hassle-free plug-and-play connection to the Ethernet port offered in EthernetLink.

### **Easy Turn-On of New Services on SingTel Meg@POP**

As EthernetLink is one of the access methods to SingTel Meg@POP, you are connected to the full suite of SingTel Meg@POP services and have ready access to new services as they become available.