



AT&T Switched Ethernet ServiceSM

2018



AT&T Carrier Ethernet Services

Making Our Network Work For You

Broad Range of Endpoints

- One of the Broadest Footprints in the Industry
- Deep 21 State Access Coverage
- Extensive interconnections with certified Ethernet access suppliers

Consistent application deployment and scaling

- AT&T Network Coverage
- 360+ Metro Markets
- Access to Internet, VPN and Wide Area Networks

Resilient Network

- Carrier Ethernet powered by AT&T MPLS
- State-of-the-Art SONET and Wave Optical Networks
- Options for Ethernet over Copper

Superior network performance to optimize and grow your business AT&T Network Performance

- Industry Leading SLAs
- Flexible traffic performance using standard classes of service

Unified, Flexible Services

- Flexible Management Options
- Ease of Migration & Hybrid Networking
- Future Proof – The Network that changes with you

Reduce operations costs and save time

- Rich Solution Options
- Customer controls IP routing
- Broad Portfolio – “Mix and Match”
- Management Tools



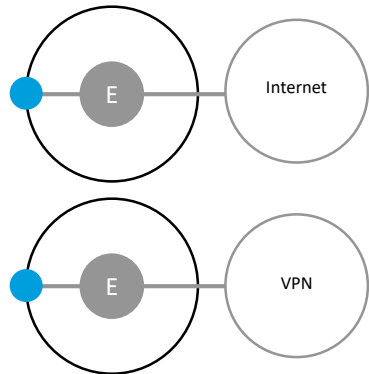
Ethernet Arrangements

Access and Network Solutions for Metro and Wide Area

One Site

E-Access

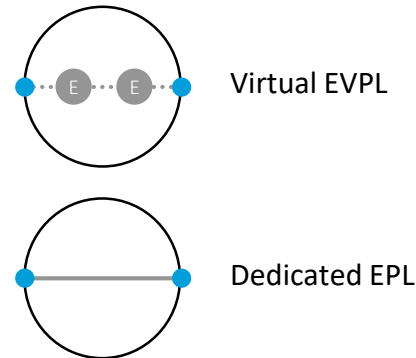
Access through the local facilities to long haul VPN and Internet



Two Sites

E-Line

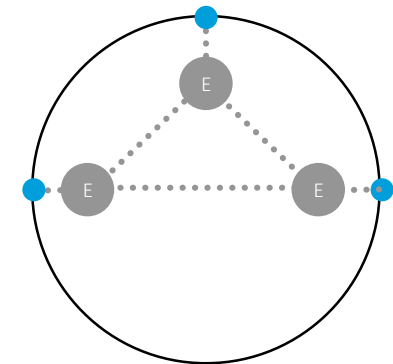
Ethernet Point to Point using the Ethernet framing for data transport



Three or More Sites

Three or More Sites

- Virtual Private LAN Service
- Multi-point irrespective of distance



AT&T Ethernet

Industry Recognition

**Best Service
Innovation of the Year**
North America

The Service Innovation - NA Award recognizes the most innovative Carrier Ethernet / Third Network connectivity service available in the North America region.

**Best Application of the Year**
Government

The Enterprise Application - Government Award recognizes the most innovative use of Carrier Ethernet services to meet the requirements of government-related applications. Application examples include: national, regional, statewide, county, and municipal.

**Best Application of the Year**
Healthcare

The Enterprise Application - Health Award recognizes the most innovative use of Carrier Ethernet services to meet the requirements of health-related applications. Application examples include: regional hospital networks, imaging, research, biotechnology, health insurance, and health care services.

**Best Practices Award**

Access the reports [here](#).



AT&T Switched Ethernet ServiceSM

Benefits

Performance

24x7 proactive monitoring and maintenance with industry-leading SLAs

Agility

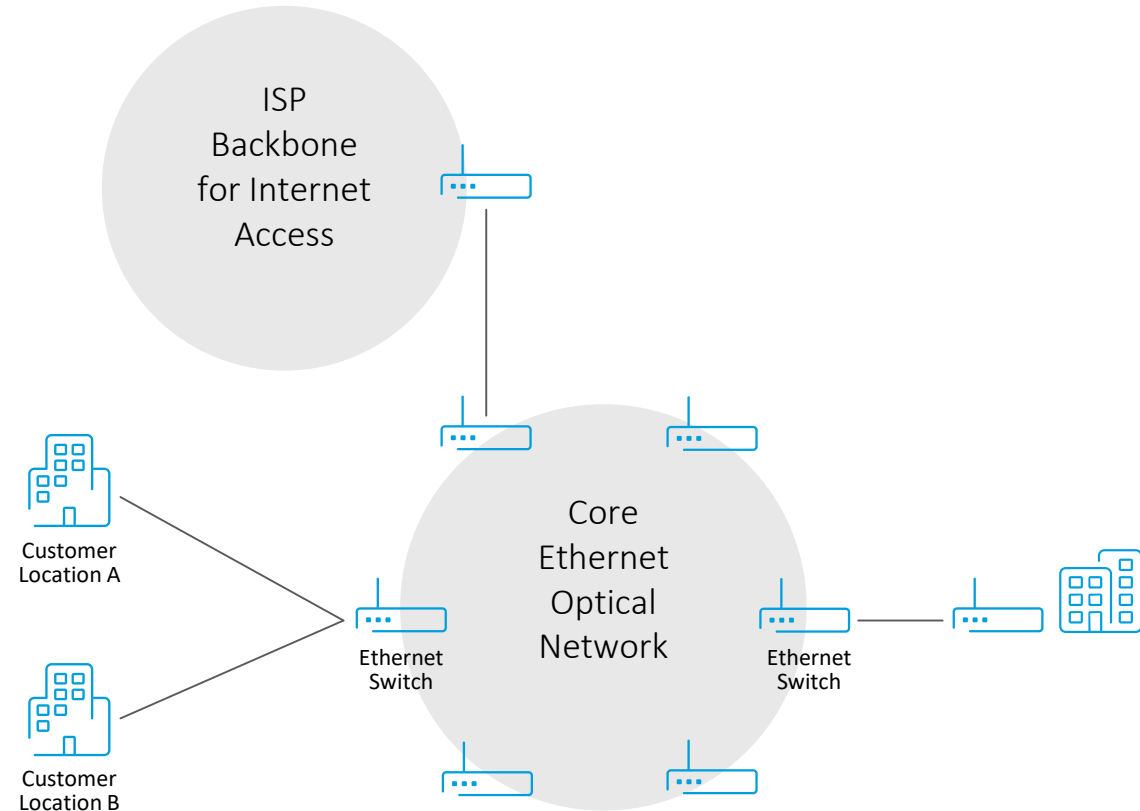
Committed bandwidth, managed NPE, multiple configurations

Control

Ethernet switching with customer LAN interface, multiple CoS

Security

AT&T network security



AT&T Switched Ethernet ServiceSM

Product Overview

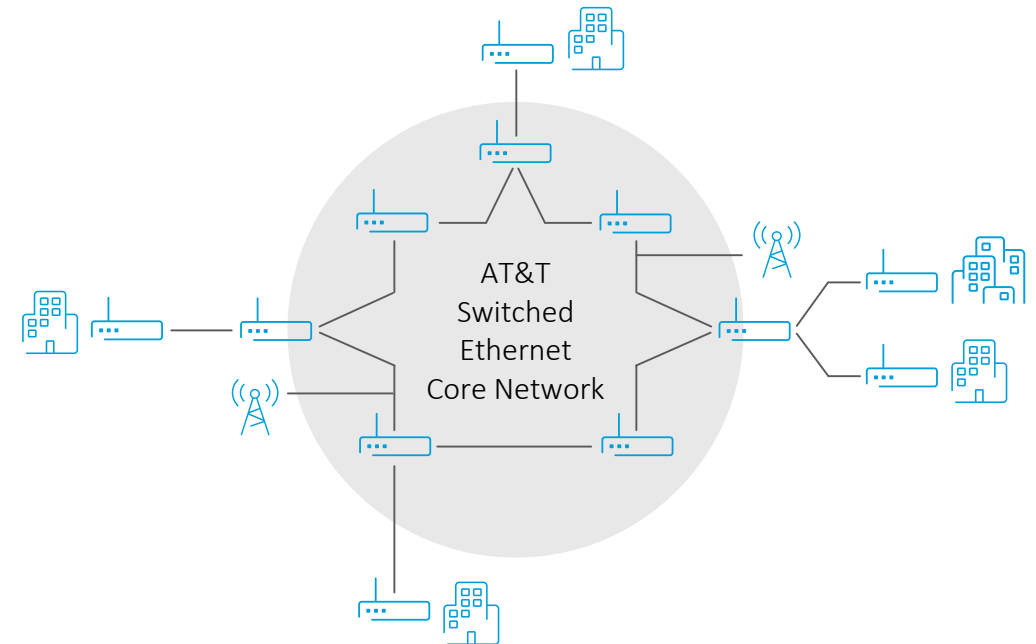
What is it?

AT&T Switched Ethernet Service offers Ethernet connectivity for customers with multiple locations with a variety of configurations to meet your needs with flexibility to grow and adapt as your needs change:

- Ports offered in 2 sizes: 100 Mbps, 1 Gbps
- Six classes of service offering the right performance / SLA for your applications
- Optional Class of Service prioritization for integrated voice and data networks
- Ethernet Private Line (EPL/EVPL) for connections between two locations
- Virtual Private LAN Service (VPLS) for connections between 3 or more locations

How does it work?

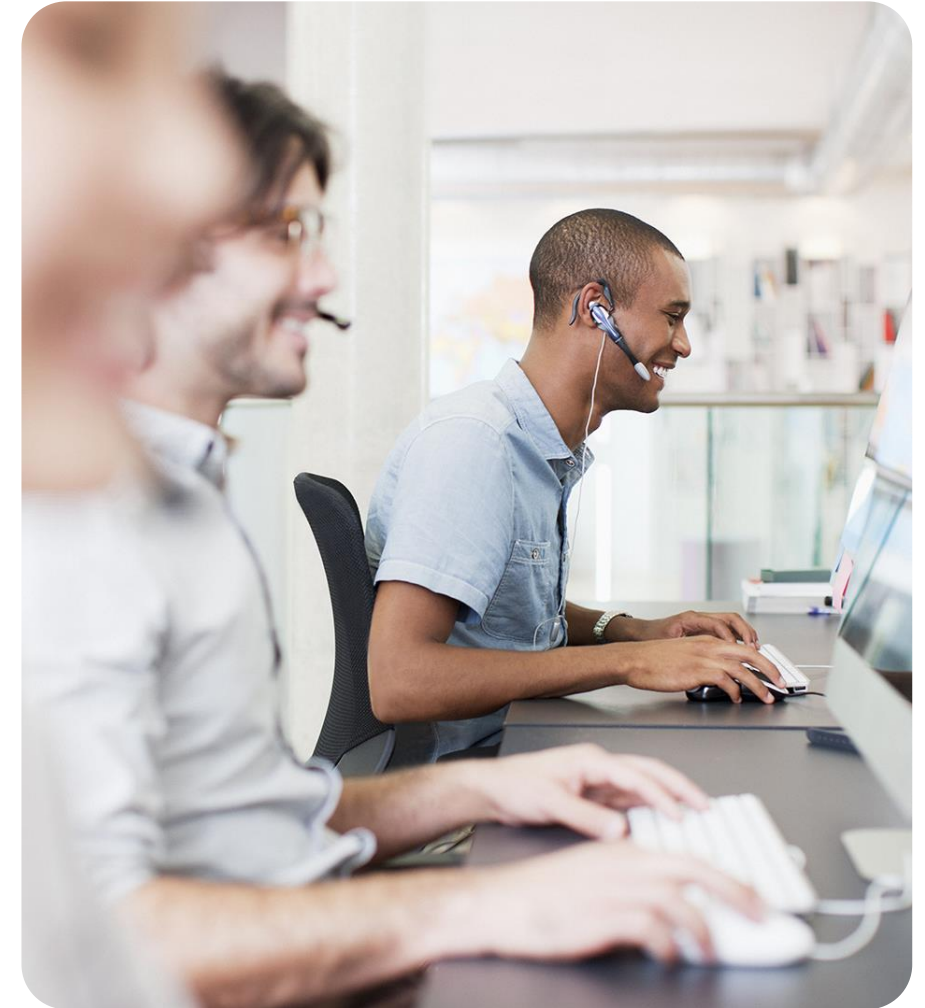
- Each customer location is served by an Ethernet port
- Ports are connected via the MPLS-based core network using highly secure Ethernet Virtual Connections (EVCs) to enable Virtual Private Networks (VPNs)



AT&T Switched Ethernet ServiceSM

Easy Connections and Service Management

- Local access loop to customer is provisioned over fiber (all speeds)
 - Ethernet over Copper (EoCu) may be used when the CIR is 2 to 10 Mbps
- Handoffs to customer are electrical (100 or 1000BaseT) or optical (1G LX/LH and SX; 10G Base-SR/SW and 10G Base-LR/LW)
 - Demarcation point is patch panel (RJ45 or fiber SC)
 - Network Terminal Equipment (NTE) enables AT&T visibility to edge of network for SLA and maintenance
- 24x7 Ethernet Network Operations Center (ENOC)
 - Responsible for provisioning and maintenance activity
 - Customer Provisioning Center
 - Service Assurance Center
 - Multiple tiers of technical expertise

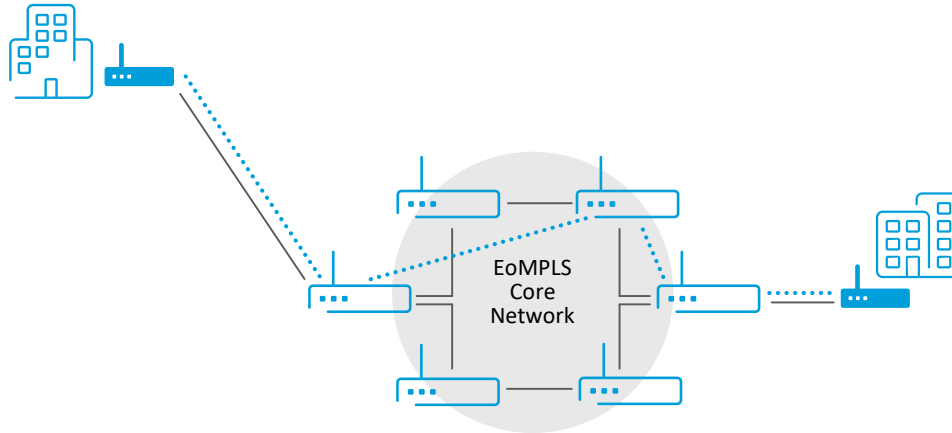


Who uses AT&T Switched Ethernet ServiceSM?

- Customers use AT&T Switched Ethernet Service to connect multiple locations in a single Ethernet-based network
 - Government, Education, Medical, Manufacturing, Financial, Entertainment, Service Providers, and System Integrators are some of the key customer market segments
- As the networking world evolves to IP/Ethernet-centric applications, every business (within the AT&T Switched Ethernet Service area) that needs multi-site connectivity is a potential candidate for AT&T Switched Ethernet Service
- Customers seeking the best combination of price and value choose AT&T Switched Ethernet Service over competitors:
 - Better availability & reliability via new carrier grade network
 - Competitive pricing with many service and configuration choices
 - Part of broad portfolio of reliable solutions from AT&T companies

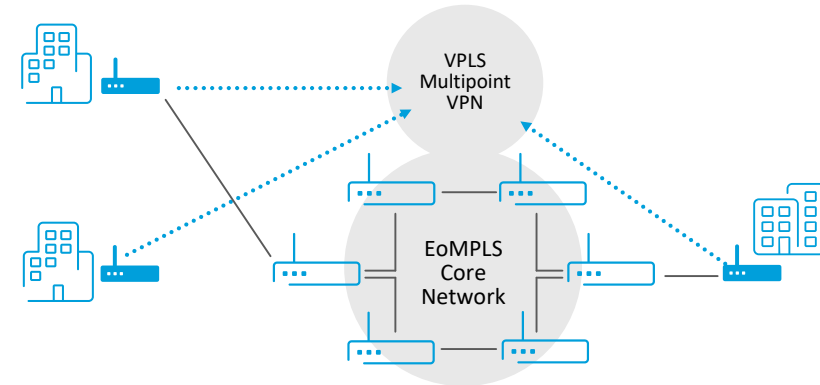


Network Applications



Ethernet Private Line

- Expand your business to a 2nd location with LAN-like performance
- Connect your primary data center to a back-up data center
- Connect to an Internet Service Provider or another WAN service at Ethernet speeds
- Use “virtual” EPL to support private line connections to multiple remote locations from a single hub port

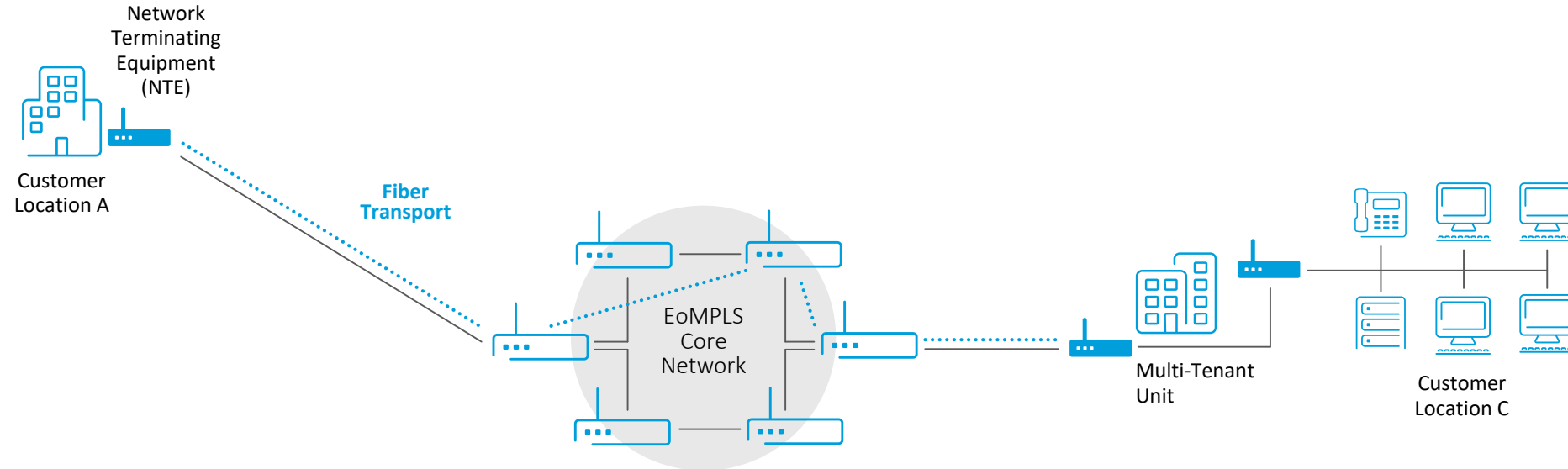


Virtual Private LAN Service

- Bring all locations together in a single network with “any to any” LAN-like connectivity
- Use “Virtual LAN” (VLANs) to segregate your network as needed by department, application, or location
- Support a variety of applications by applying different priorities to your Ethernet frames (Real Time vs. Non-Critical) for performance and efficiency



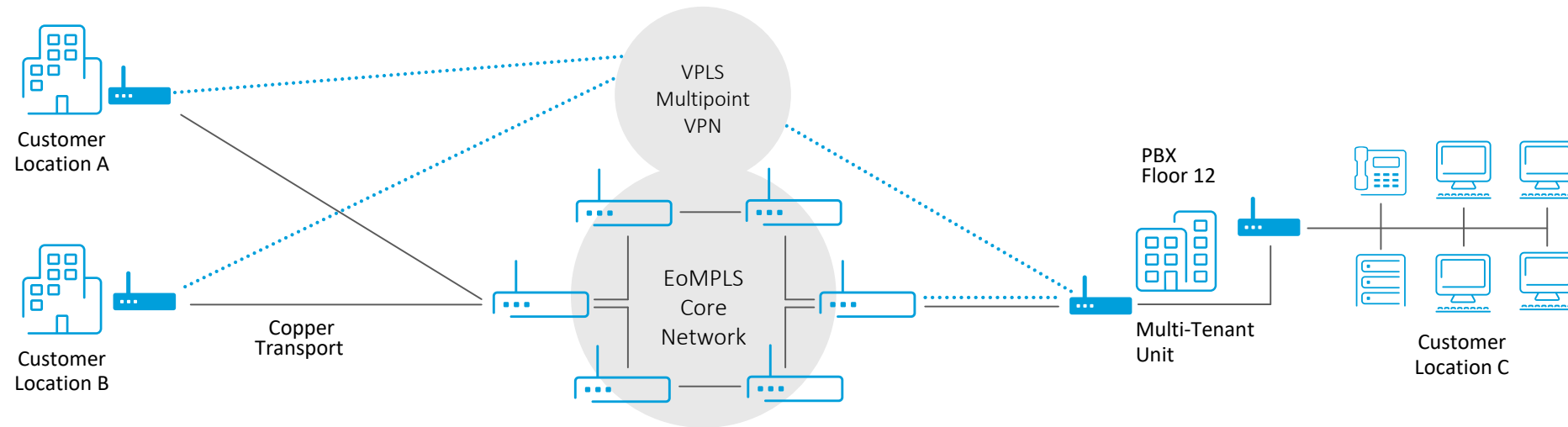
Ethernet Private Line Service (E-Line)



- Creates a point-to-point “Virtual Private Wire Service” as if dedicated facility between two locations
- Symmetric bandwidth at each location to avoid flow mismatches
- Unlimited MAC addresses and unlimited BUM (Broadcast, Unidentified Unicast and Multicast) frames
- Can be used for extranet communications or connections to partner networks
- Offers six Classes of Service with variety of performance objectives (SLAs)



Virtual Private LAN Service (E-LAN)



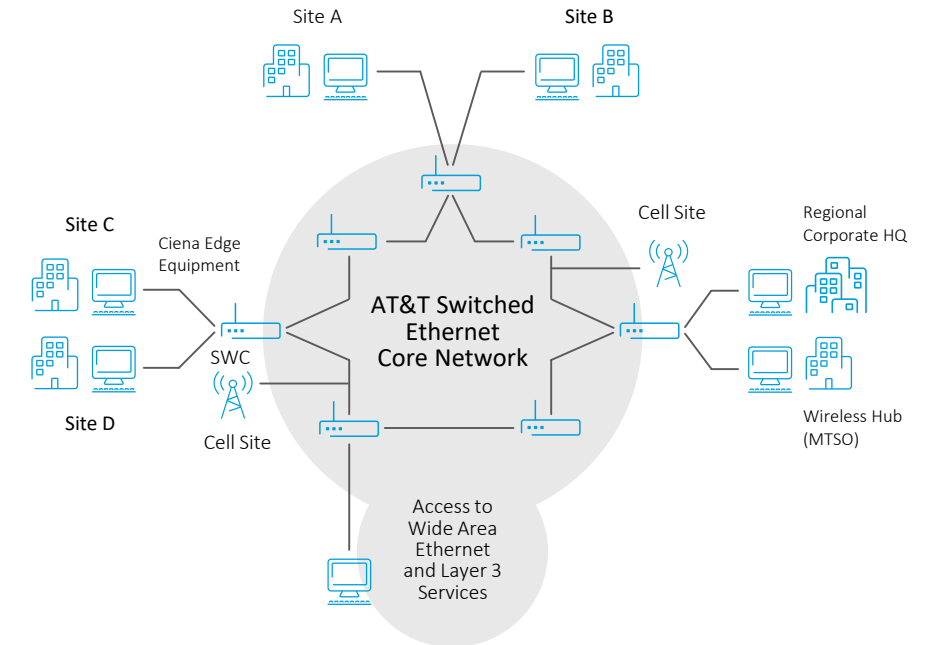
- Creates a Layer 2 Virtual Private LAN Service (VPLS) over an MPLS core allowing multiple LANs to appear as a single MAN/WAN
- Design metro hubs for concentrated resources: primary or back-up data centers, access to backbone or cloud networks
- Recommended option for Class of Service prioritization maximizes efficiency of integrated voice and data networks



AT&T Switched Ethernet ServiceSM

Six Classes of Service

- Scalable and highly Secure MPLS core featuring Juniper carrier-grade routers
- High Density deployment over ROADM and fiber for maximum footprint
- Protected 10G Core links to help ensure performance
- Point-to-point, point-to-multipoint, full multipoint
- 100Mb / 1G
- 5Mb to 10G speeds
- End to End SLAs



Real Time

Service Level Agreements:

- Latency*: 5 ms
- Jitter*: 3 ms
- Packet Delivery Rate*: 99.995%
- Network Availability: 99.99%

Service Level Objective:

- MTTR: 4 hours

Business Critical Medium

Service Level Agreements:

- Latency*: 30 ms
- Jitter*: not offered
- Packet Delivery Rate*: 99.9%
- Network Availability: 99.99%

Service Level Objective:

- MTTR: 4 hours

Non Critical High

Service Level Agreements:

- Latency*: 50 ms
- Jitter*: not offered
- Packet Delivery Rate*: 99.5%
- Network Availability: 99.99%

Service Level Objective:

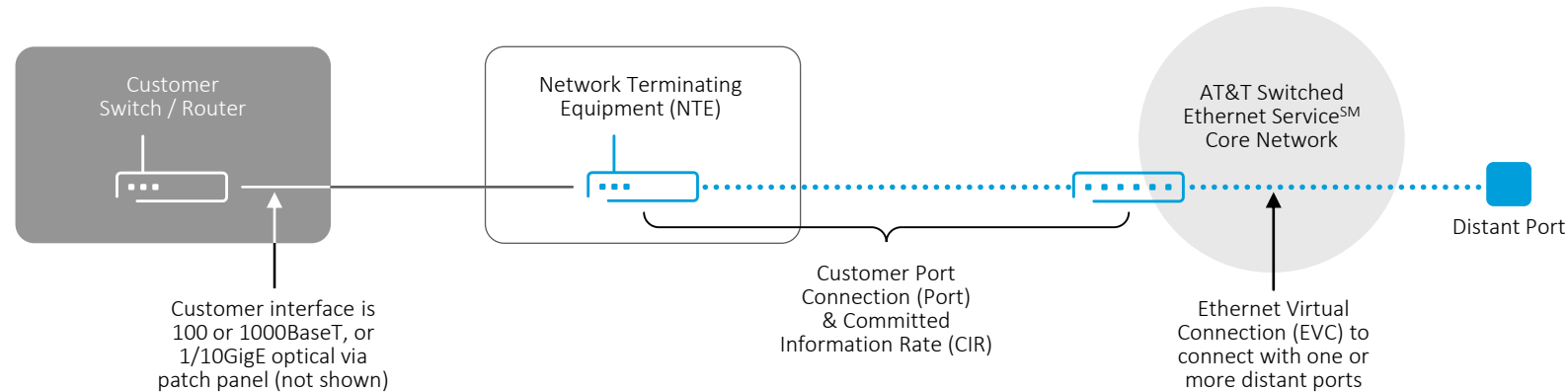
- MTTR: 4 hours

* SLAs refer to Ethernet Virtual Connections between ports in the same LATA and are one-way objectives.
Not Shown: Non-Critical (High and Low) Classes of Service; Non-Critical Low is only offered with Per Packet Class of Service



Anatomy of AT&T Switched Ethernet Port

Many choices in configuration and feature options, but the service always has the components



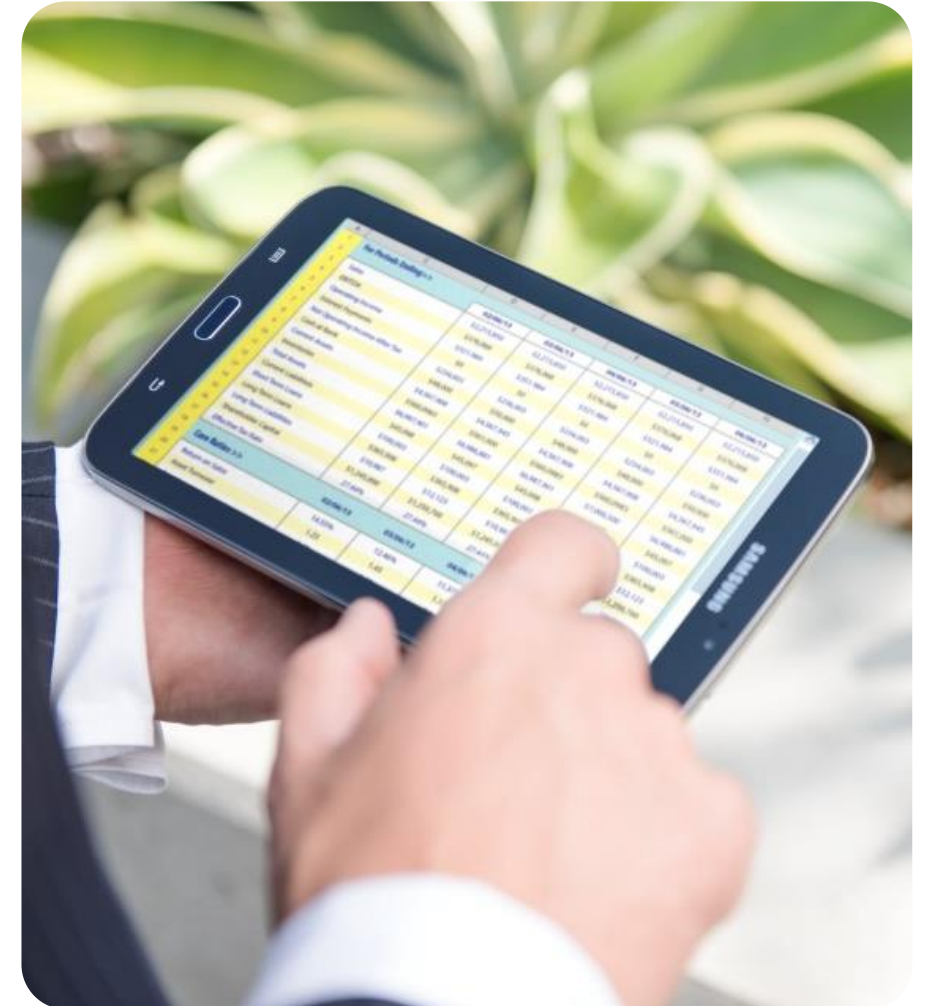
- **Customer port connection (Port):** provides the physical connection and associated speed between the customer and the AT&T Switched Ethernet ServiceSM core network
 - 2 choices: 100 Mbps, 1,000 Mbps (1 GigE)
- **Committed Information Rate (CIR):** specifies the amount of bandwidth or “logical channel” that can be transmitted over the port / network
 - Offered in 21 increments from 2 Mbps to 10 Gbps and may be increased or decreased within the port speed without truck roll in most cases
- **Ethernet Virtual Connection (EVC):** creates a virtual connection or L2 virtual private network between 2 or more ports; there is no charge for standard EVCs
 - EVC also has a CIR that is \leq than the port CIR; the sum of EVC CIRs cannot exceed the port CIR
 - Point to point EVC CIRs are symmetrical; multipoint EVC CIRs may vary at each port



How is Service Priced?

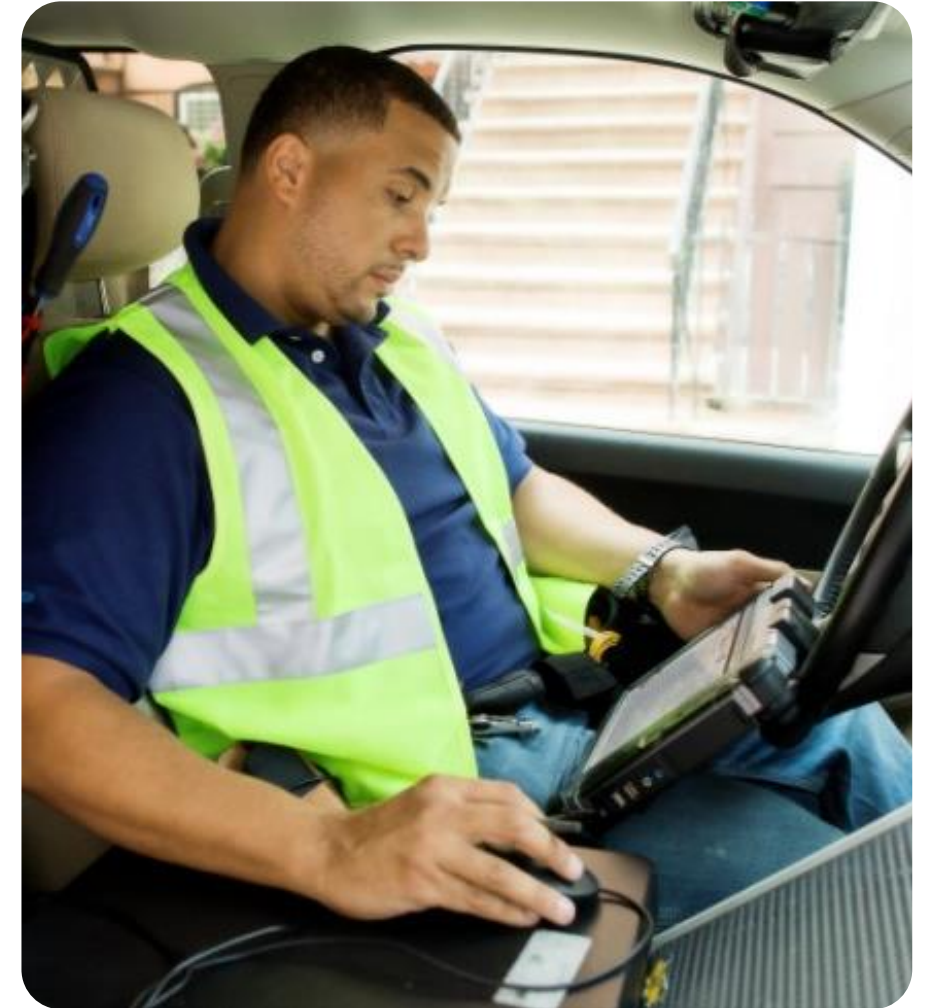
Easy Connections and Service Management

- AT&T Switched Ethernet ServiceSM is offered under terms and conditions specified in the applicable Service Publications (e.g., tariffs, guidebooks or service guides)
- Each port is priced according to service requirements with at least 2 rate elements:
 - Customer Port Connection (Port): Basic or PPCoS Port(s); 100M/1G
 - CIR speed for the port(s); the CIR price will vary by CoS choice
 - Optional features (if any): e.g. Diverse, Additional MAC, etc.
 - Length of term plan: 1 year minimum on new ports; rates offered for 1, 2, 3, 4 or 5 year terms and month-to-month on expired terms only
 - There are no mileage charges but “regenerator” charge may apply for ports located far from the nearest core switch, as determined by AT&T engineers

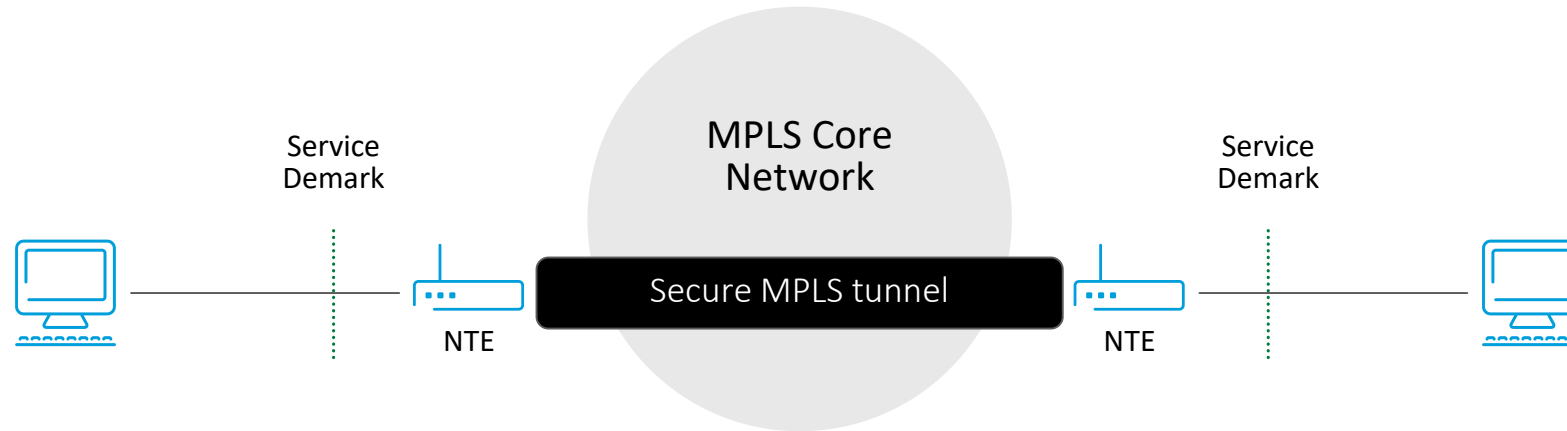


Business Continuity Options for Redundancy

- Customers rely on Ethernet networks for mission critical applications
- AT&T Switched Ethernet ServiceSM offers a variety of service configuration options designed to enable Business Continuity
 - Each customer may have a different design and recovery plan
- Within the basic service offer, customers may make the following choices to support their continuity plans
 - EVCs that connect to both primary and secondary data centers
 - Request DC powered NTE and serve from customer DC power including back-up generator
 - Request “dual power supply” NTE and provide power from 2 sources and/or from a customer owned Uninterruptible Power Supply (UPS) system
- Customers may also order more than one port and/or optional features on a port to create more robust networks, including:
 - Alternate Serving Switch, Diverse Access or Advanced Access Failover



Core Network is Ethernet over MPLS (EoMPLS)



- Greater service flexibility and reliability via highly resilient core network
- Provides highly reliable connections while minimizing latency and jitter, key requirements of advanced IP-based services (such as VoIP and Video over IP)
- Enables large numbers of customer connections while meeting stringent SLA requirements
- More security from dedicated secure MPLS tunnel
- AT&T Switched Ethernet ServiceSM is not an “MPLS service”; it is an Ethernet transport service built on an MPLS core network



AT&T Switched Ethernet ServiceSM

AT&T Switched Ethernet ServiceSM is offered widely within the 21 states where AT&T is the franchised local exchange carrier:

- AL, AR, CA, FL, GA, IL, IN, KS, KY, LA, MI, MO, MS, NC, NV, OK, OH, SC, TX, TN, WI
- Ports in these states can be interconnected via Ethernet Virtual Connections

AT&T Switched Ethernet ServiceSM is offered in limited areas outside of those 21 state franchise areas as follows:

- “Out of Franchise” - Locations within the above 21 states that are outside of the AT&T Franchise Territory
- “Out of Region” – Locations in other US metro areas where AT&T’s CLEC units provide fiber-based local access services, including:
 - Boston, New Jersey, New York, Philadelphia, and Seattle
 - Ports within the same metro area can be interconnected via Ethernet Virtual Connection

Contact your AT&T representative to determine availability.



