Bell Canada RPR Requirements

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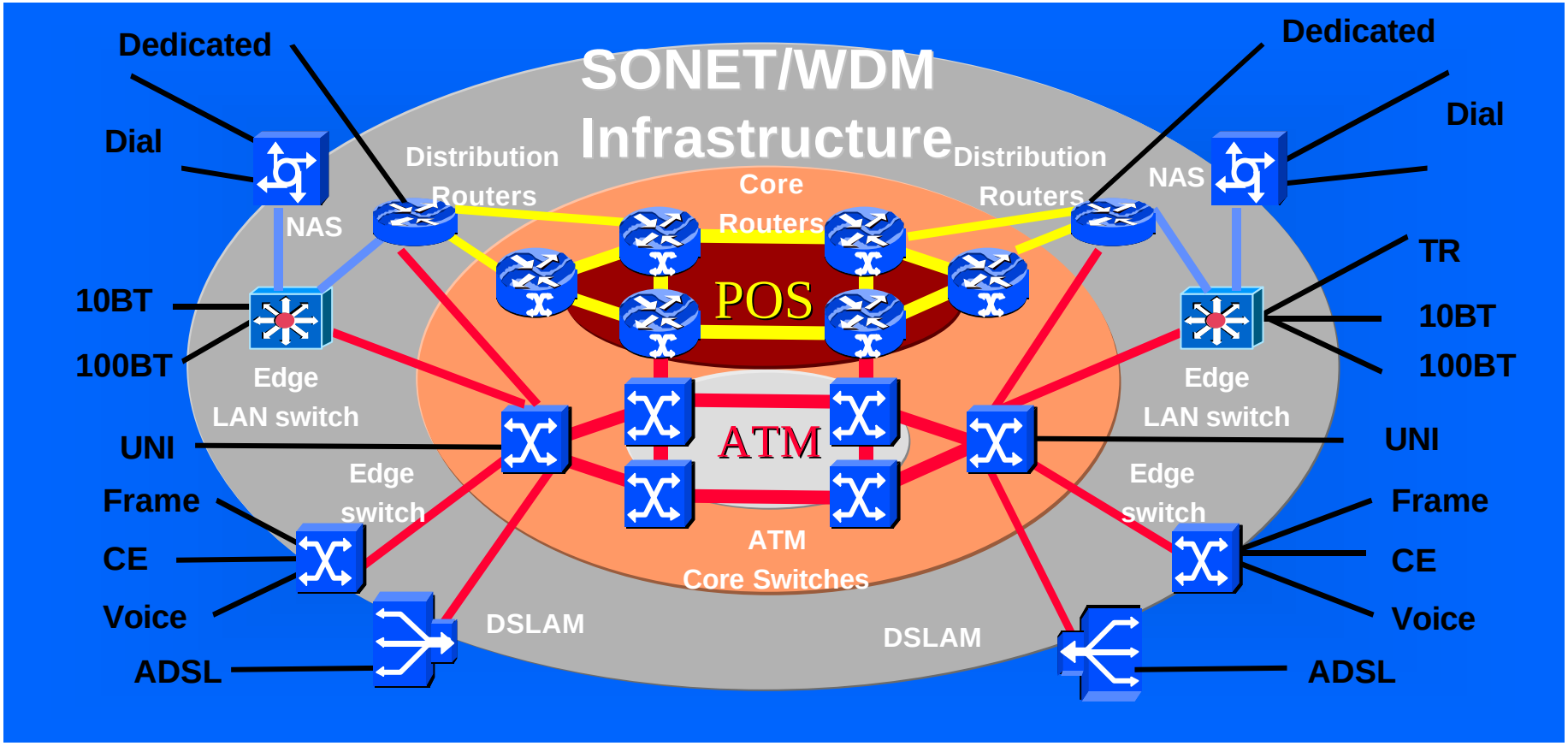
Outline

- Background
  - Bell Canada Transparent LAN Service
  - Evolution Requirements
- Network Architecture with RPR
- RPR Requirements
- Summary

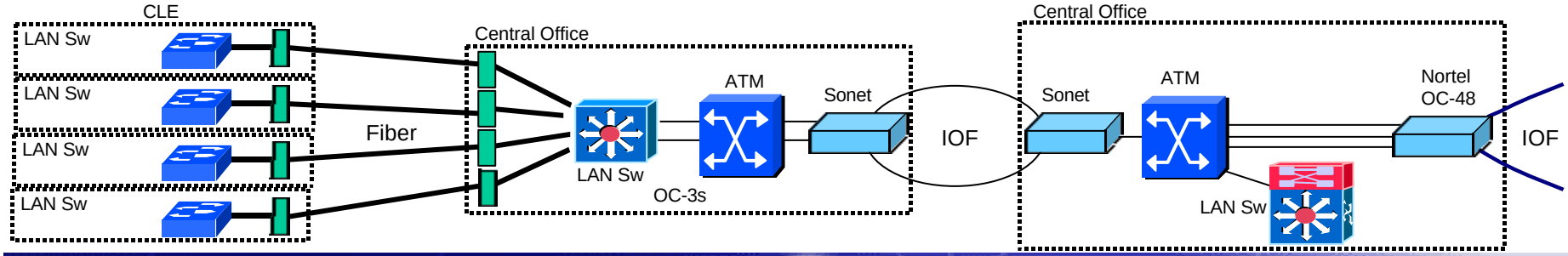
Network Today for Broadband & IP Services



Emerging services: Gigabit Ethernet, IP-VPN

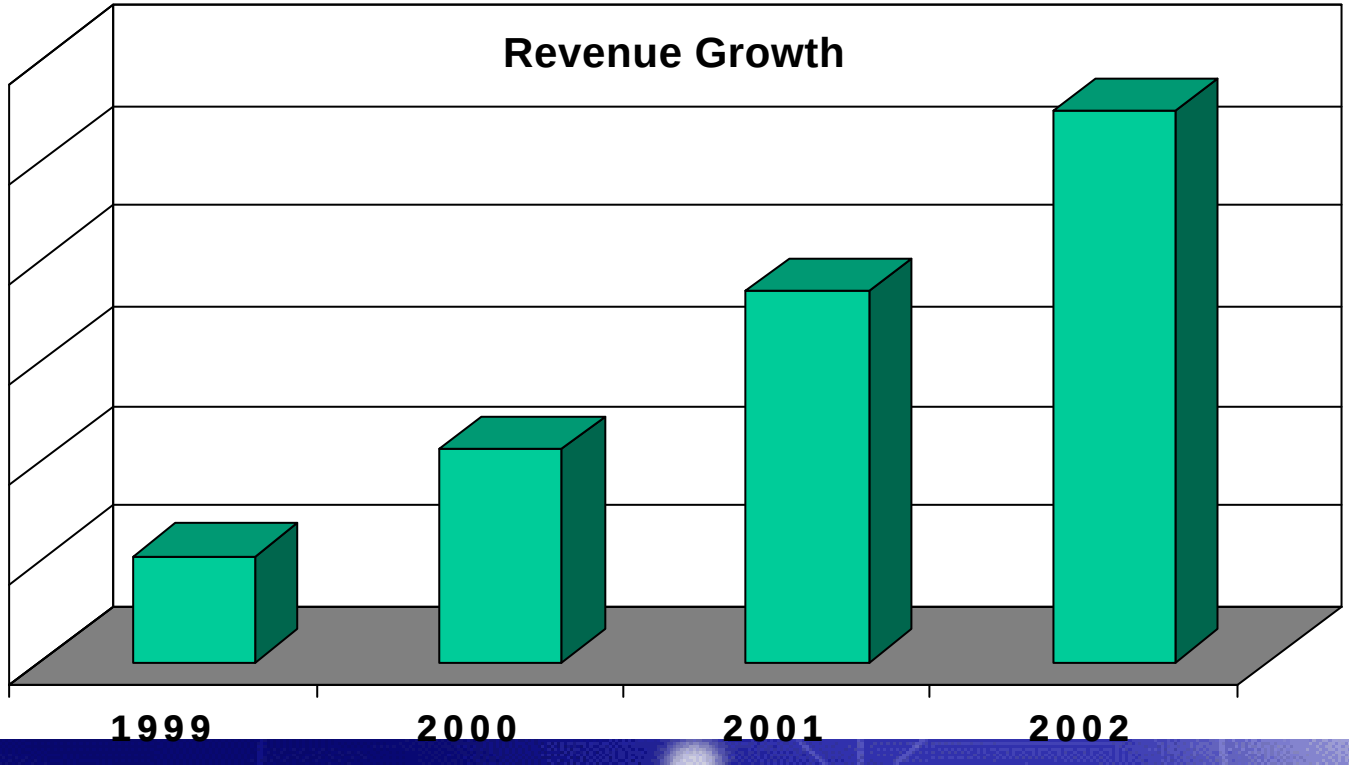
TLS - Today's Service Attributes

- 10/100 Mbps customer access to Bell Nexxia's network
  - Fiber extensions for 10/100 Mbps
  - T1 and DSL for 10 Mbps
- Point to point (or Multipoint) Ethernet interconnection between customer sites
- Security/Customer Separation
  - True VLAN 802.1q service between customer sites
  - Interworking with customer's VLAN and/or IP address space
- Quality of Service
  - UBR+ : Native LAN - Best effort with MIR
  - VBR : Shaped LAN - Peak & Sustained Cell Rates

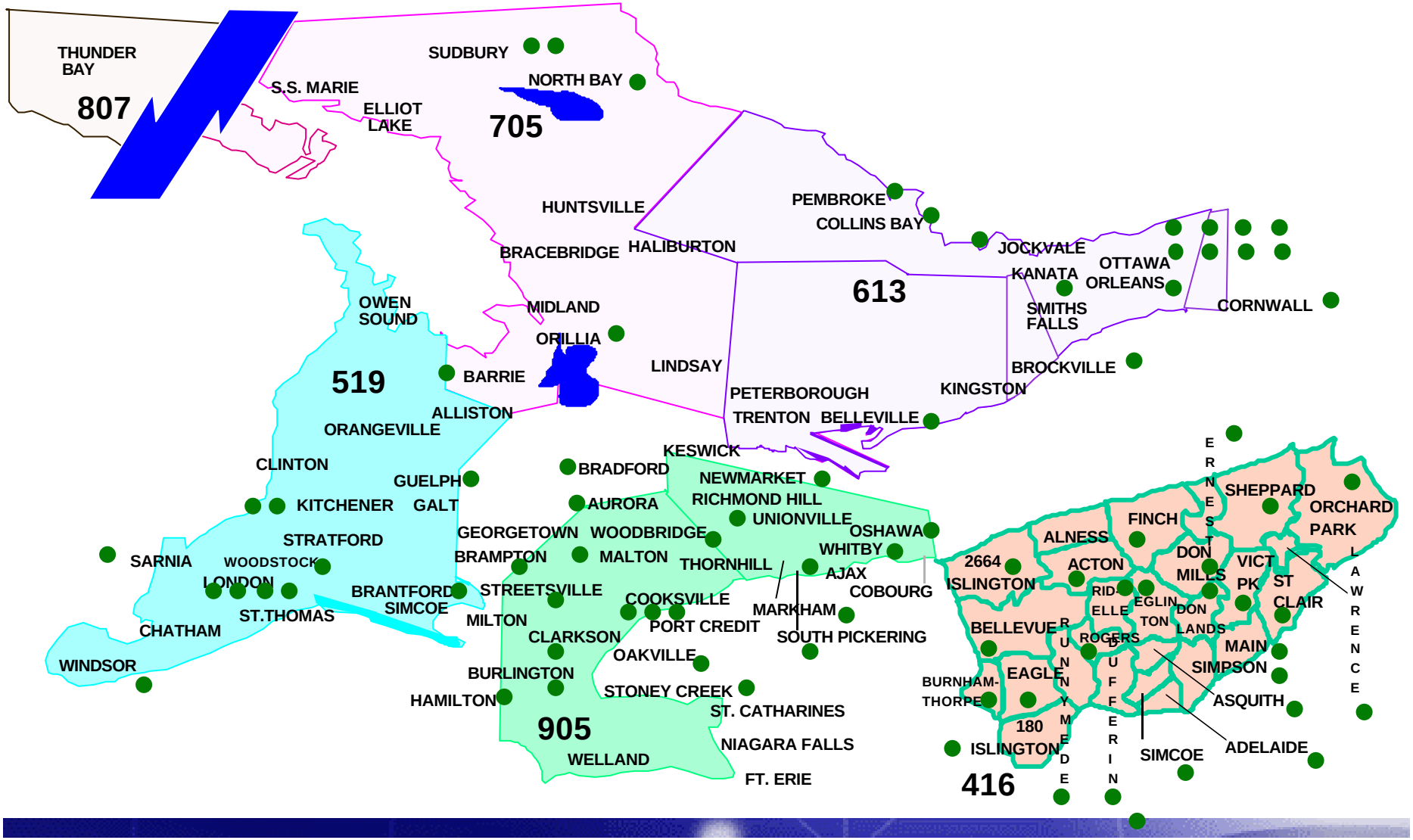


A Successful Service

- More than 200 customers, from large enterprises to schools, many with multiple sites
- More than 3500 fiber accesses for 10/100 Mbps service
- 300 LAN switches deployed in Central Offices throughout Canada



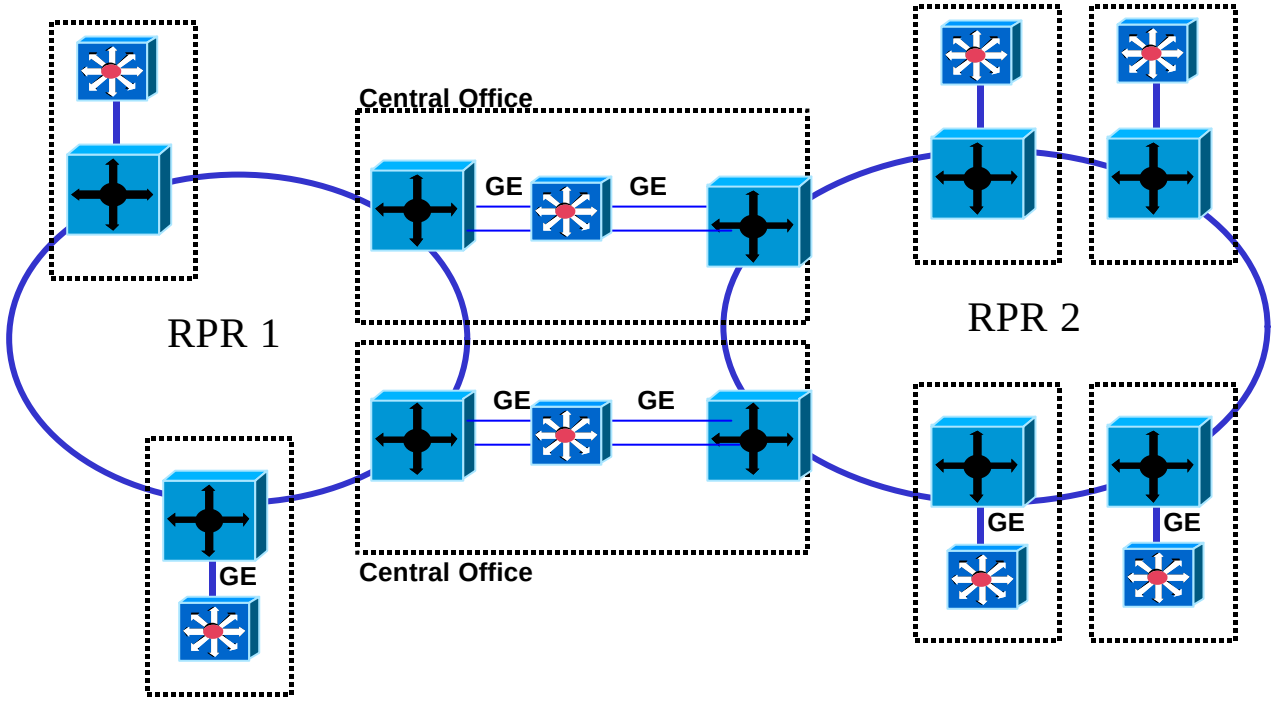
Extent of Coverage Example - LAN Switch Locations in Ontario



Drivers & Requirements for a Gigabit Ethernet MAN

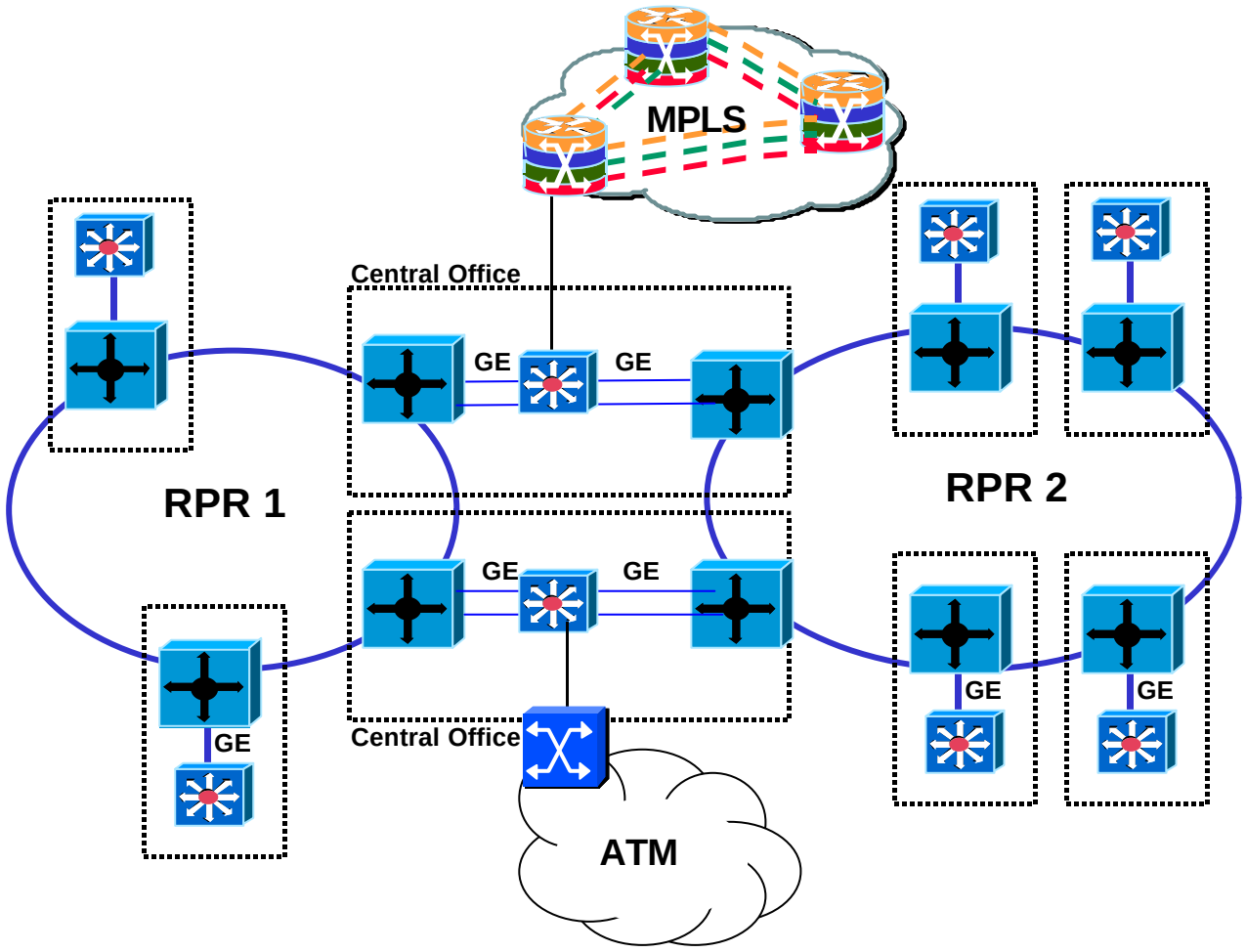
- Drivers
  - Increased demand for LAN services in metro areas
    - Expecting Gigabit Ethernet to several customer sites
    - Need to introduce a new hierarchy for higher-level aggregation
    - Insufficient capacity of ATM network & technologies
  - Ethernet frames becoming the standard carriage vehicle for IP: GE MAN used as access & metro to IP Core
- Requirements
  - Maintain transparency to layer 3 protocols
  - Installed base of LAN switches is easily integrated
  - Standards-based: 802.3z/x, 802.1d/p/q
  - Ability to provide Gigabit Ethernet in the access
  - Scale the Metro & Core to gigabit speeds
  - More robust access & metro networks for TLS and IP services
  - Develop interfaces to MPLS

Gigabit Ethernet MAN Using RPR



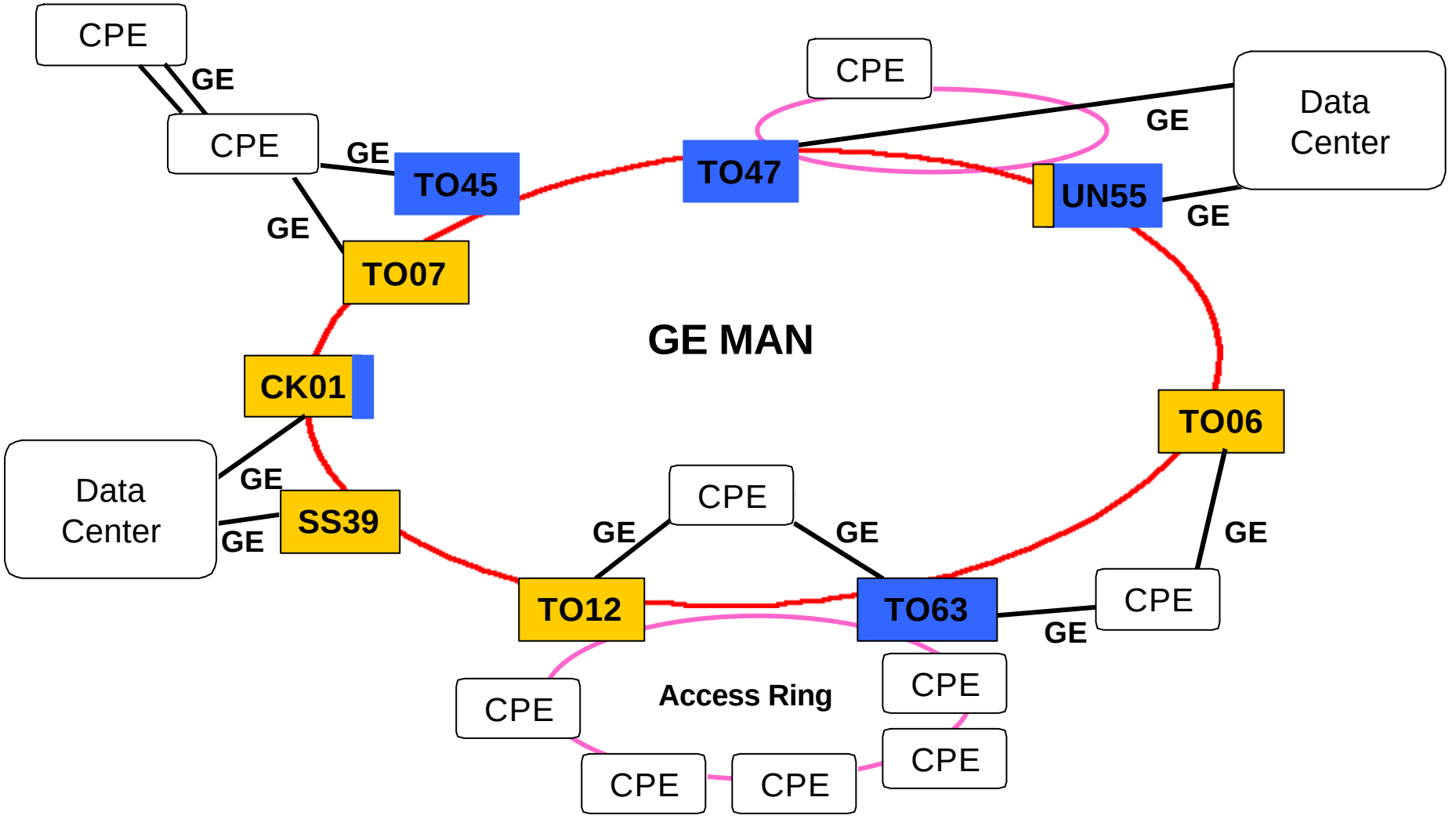
- **Gigabit Ethernet service has been launched in Bell Canada based on this architecture**
- **Multiple rings can be expected in a large metro area**

Linkages to Other Networks



Other services will use this infrastructure: IP-VPN, Internet access, Wholesale GE, etc.

First Deployment - CIBC in Toronto



RPR Requirements

- Support for different service types & their attributes
  - L2 - TLS
  - L3 - IP-VPN, Access to internet
- DWDM optics for multiple systems on the same fiber pair
- Scalable to multi-gigabit rates
- Support multiple customers
  - Maintain customer separation
  - Scale VPNs beyond VLAN limits
- Support SLAs
  - QoS/CoS in tune with edge device capabilities (switches, routers) using different QoS/CoS schemes to support different services, such as TLS, IP-VPN
  - Control over jitter & latency: must be well controlled since a customer may have sites over multiple rings

RPR Requirements (Cont'd)

- Multicast-friendly
- Lossless once traffic gets on the ring (unless there is a fiber cut)
- Fairness
  - Within a ring
  - Across multiple rings
  - Mechanisms scalable from MAN to WAN applications
- OAM
  - Statistics on a per customer (VPN) granularity is required for troubleshooting and reporting perspective
  - Carrier-grade: in-service software upgrades, reliability
  - Simplified provisioning, auto-discovery

Summary

- Carrier Class Gigabit Ethernet networks can be built using RPR
- Bell Canada has a network operational and just launched a Gigabit Ethernet service
- Interworking with other networks is key for an attractive solutions for customers
- Several requirements have been identified

Thank You!