APRICOT 2001

Fiber to the Building Solutions
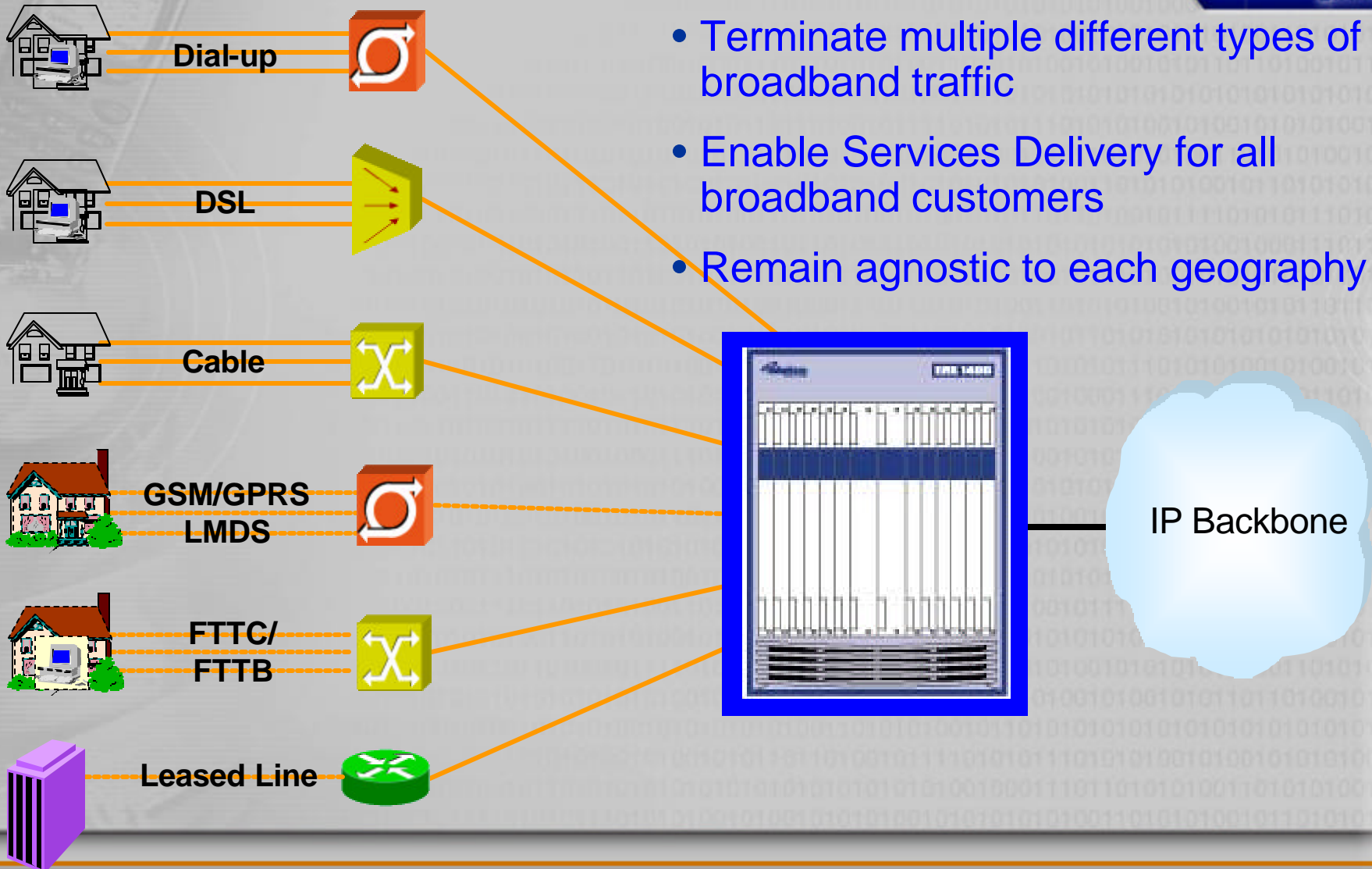
Scott Stevens
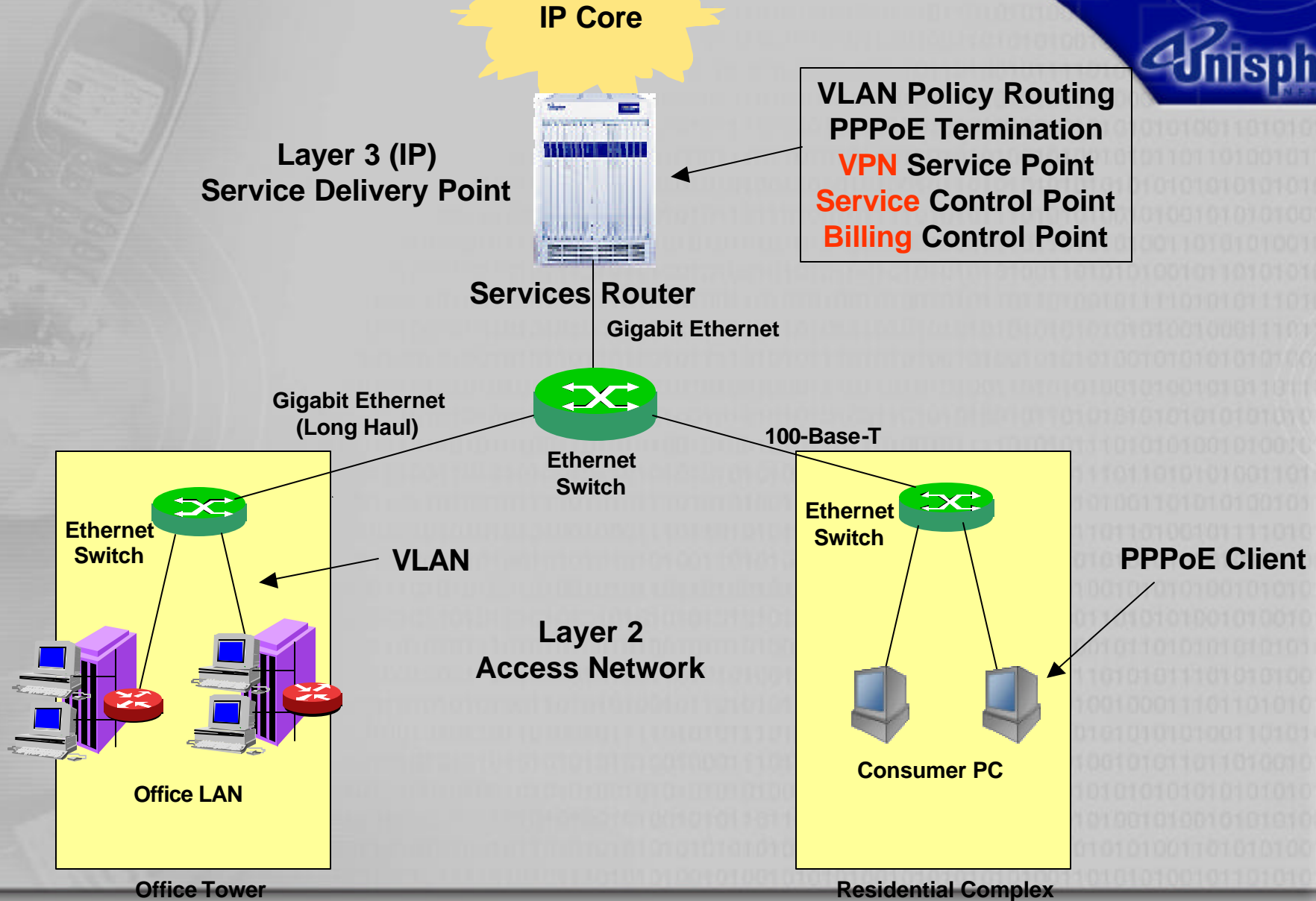**Director, Systems Engineering – Americas**

Unisphere NETWORKS™

Agnostic Edge Aggregation

In one device:

- Terminate multiple different types of broadband traffic

- Enable Services Delivery for all broadband customers

- Remain agnostic to each geography

Dial-up

DSL

Cable

GSM/GPRS
LMDS

FTTC/
FTTB

Leased Line

IP Backbone

Fibre-to-the-building model

IP Core

Layer 3 (IP)
Service Delivery Point

VLAN Policy Routing
PPPoE Termination
VPN Service Point
Service Control Point
Billing Control Point

Services Router

Gigabit Ethernet

Gigabit Ethernet
(Long Haul)

Ethernet
Switch

100-Base-T

Ethernet
Switch

Ethernet
Switch

VLAN

PPPoE Client

Layer 2
Access Network

Office LAN

Consumer PC

Office Tower

Residential Complex

Subscriber Management = Customer Identity

- Create a customer Identity
  - Map an initial Configuration to that Identity
  - Simplify and Speed Network Deployment for each Subscriber
- Map additional Services to that Identity
- ⇨ All requirements for Provisioning and Service Activation

- Maintain State with each Customer
  - Map profiles to active customers
  - Required for accurate Billing of services
  - Simplifies Statistics gathering and customer profiling
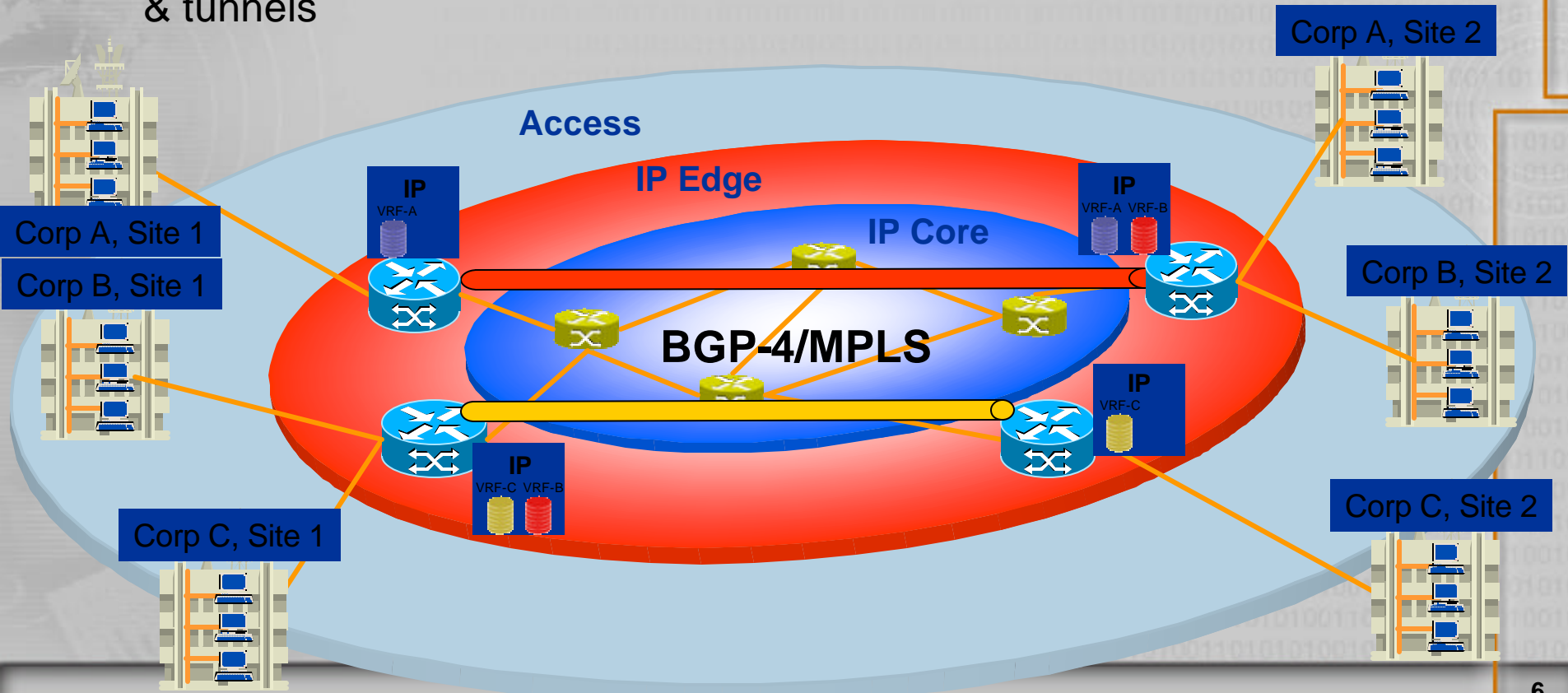
Fitting It All Together
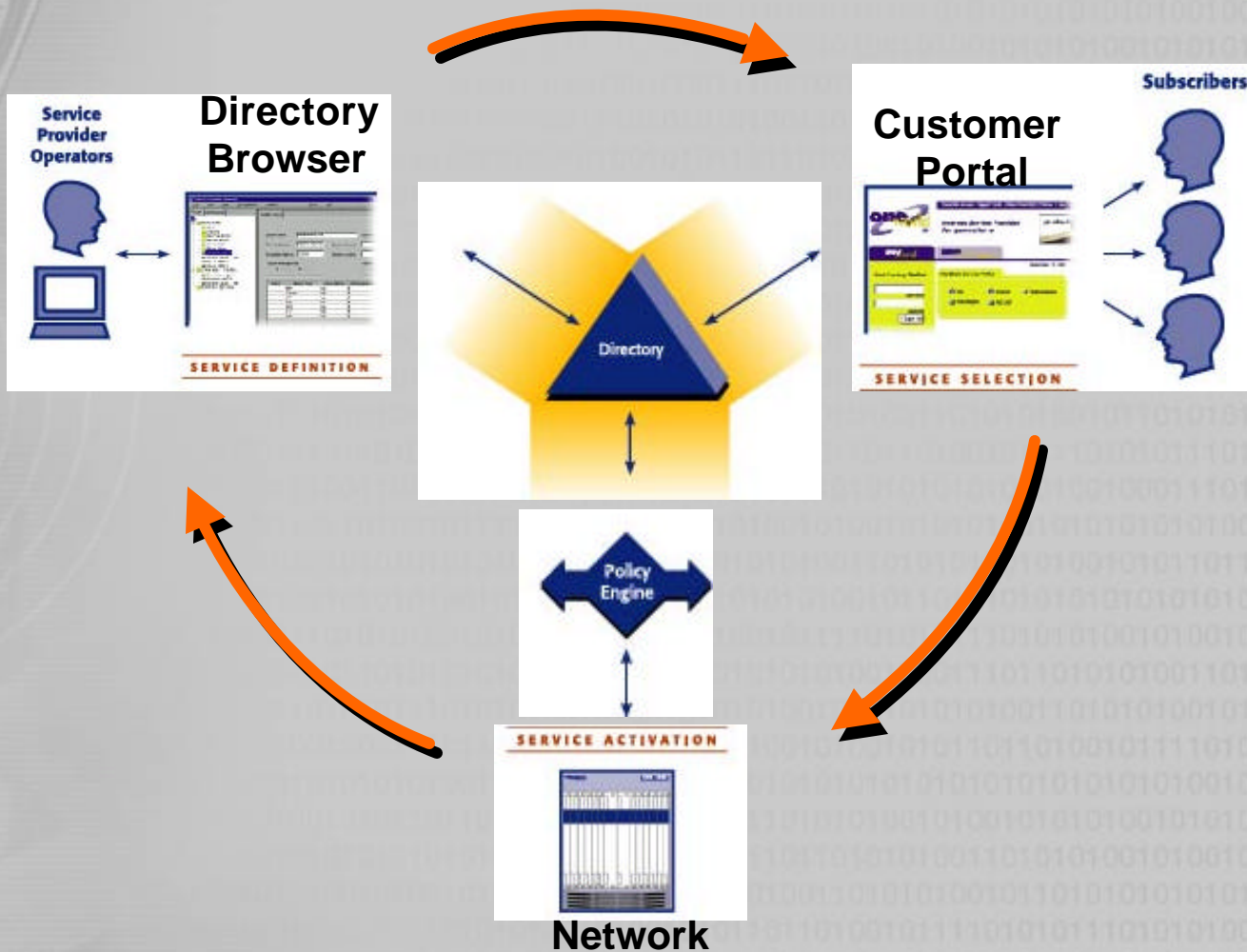
Virtual Routers

- Virtual router with dedicated forwarding table per VPN
  - Wholesaling, VPNs
- Enables overlapping address space
- Provides independent scaling

Edge Router
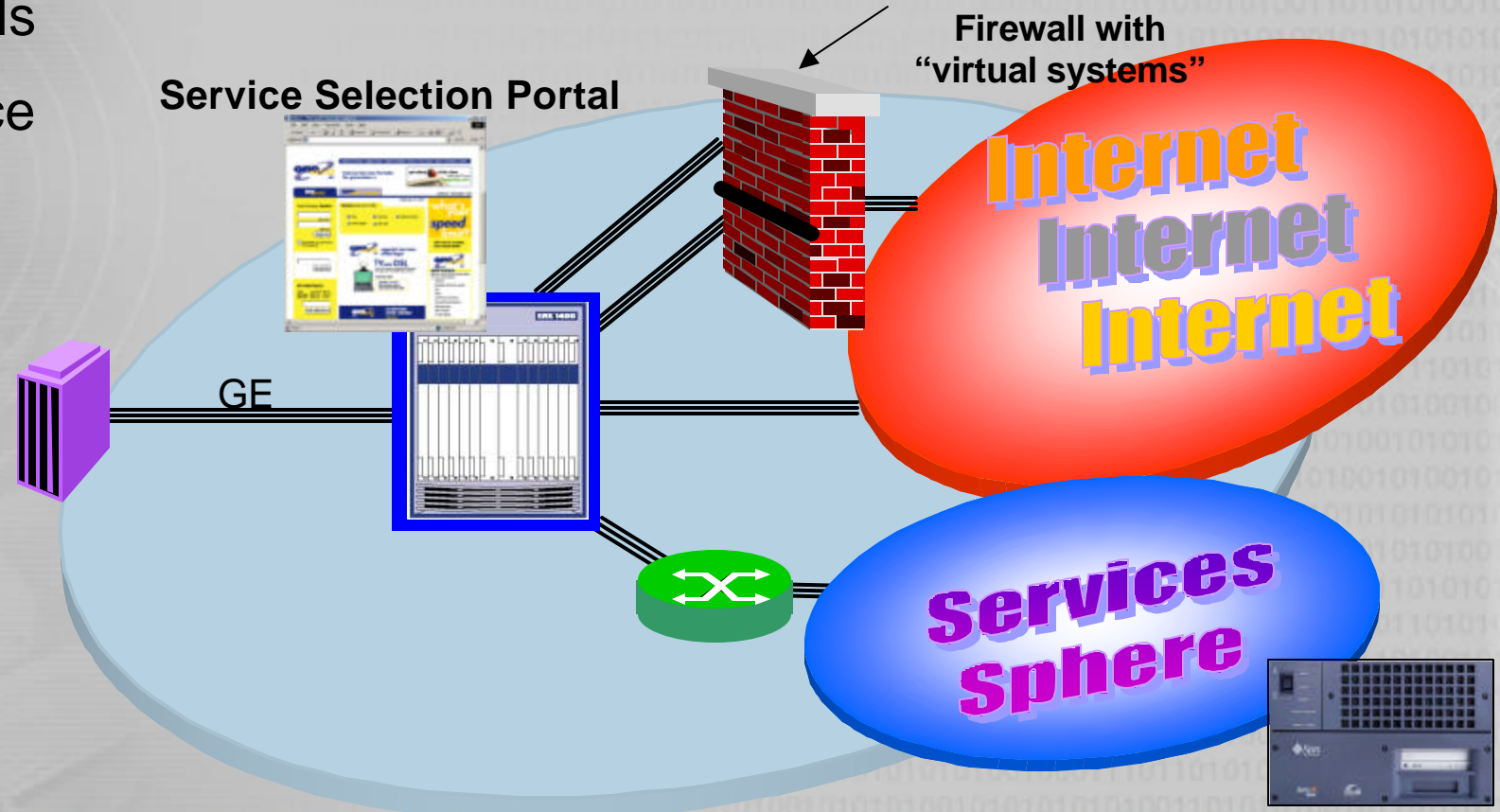
ISP A
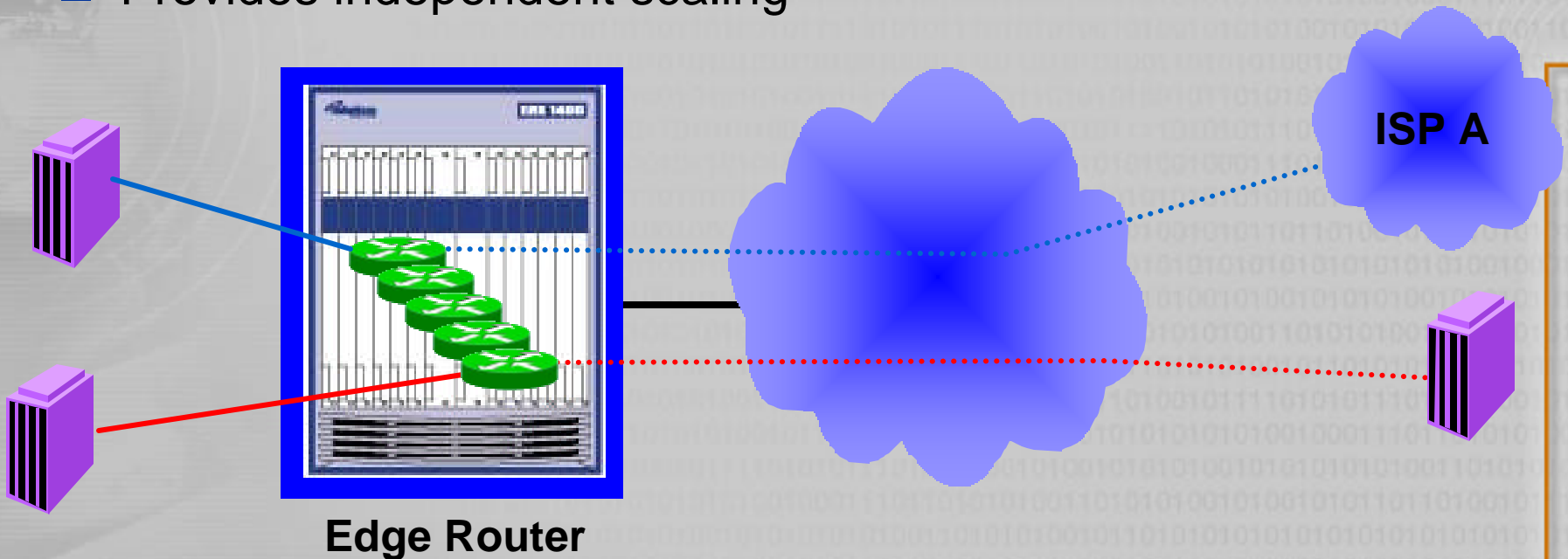
Site-to-Site IP VPNs

- Fully distributed throughout IP network

- IP services are applied at the ingress edge

- Sites 1 & 2 connect via MPLS & tunnels

- BGP extensions used to distributed VPN membership dynamically

- Subscriber service is "VPN"

Access

IP Edge

IP Core

BGP-4/MPLS

IP
VRF-A

IP
VRF-A VRF-B

IP
VRF-C VRF-B

IP
VRF-C

Corp A, Site 1
Corp B, Site 1
Corp C, Site 1

Corp A, Site 2
Corp B, Site 2
Corp C, Site 2

Tiered Internet Services (more)

Differentiate with (policy) routing through value-added switches

- Storage Area Networks
- VPNs
- Voice

- Firewalling (security)
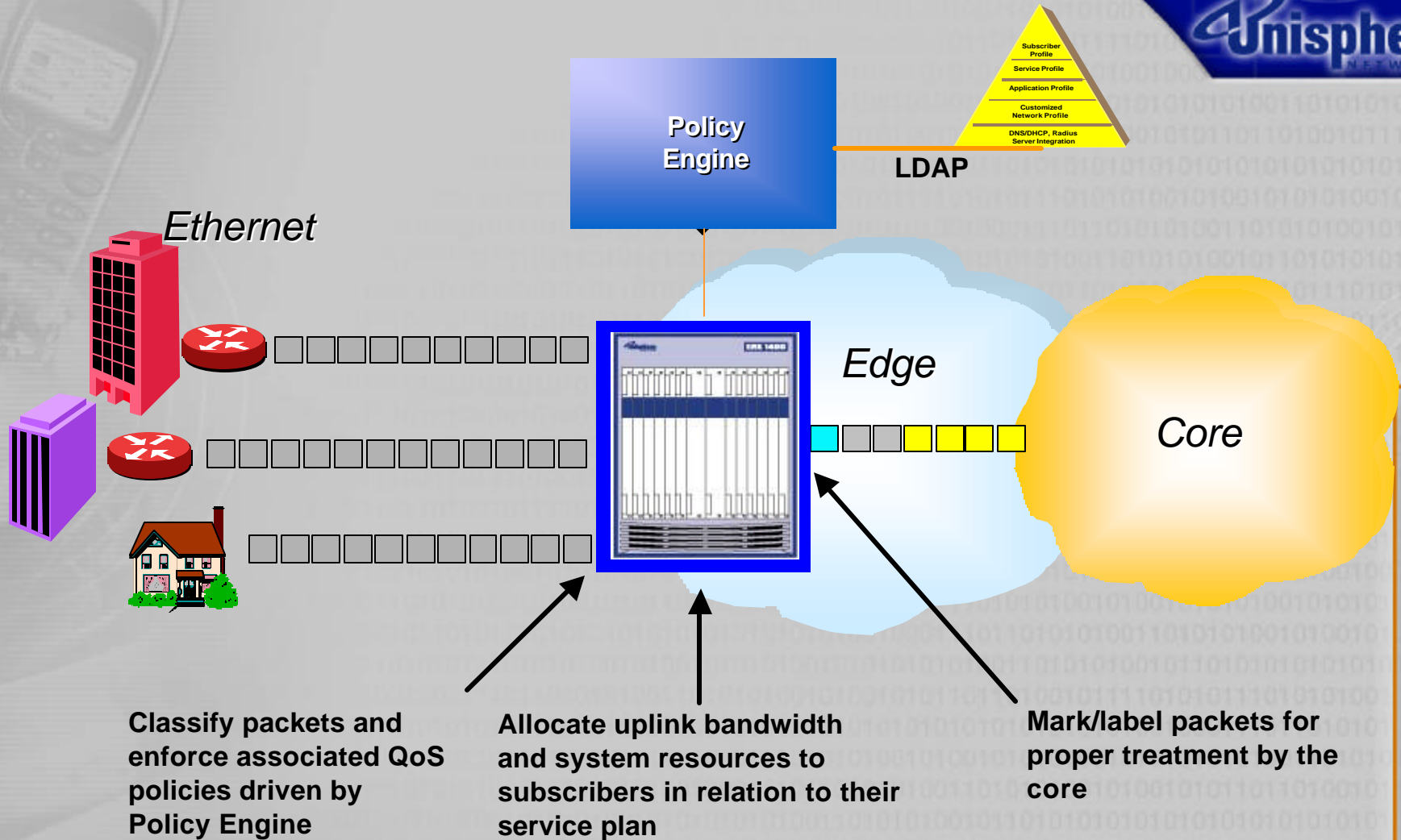- Web caching (better quality)

Service Selection Portal

Firewall with "virtual systems"

GE

Internet Internet Internet

Services Sphere

QoS Delivery – Customer Driven

The carrier edge aggregates and mediates QoS between thousands of subscribers at the entrance to the public network

Ethernet

Edge

Core

Classify packets and enforce associated QoS policies

Allocate uplink bandwidth and system resources to subscribers in relation to their service plan

Mark/label packets for proper treatment by the core
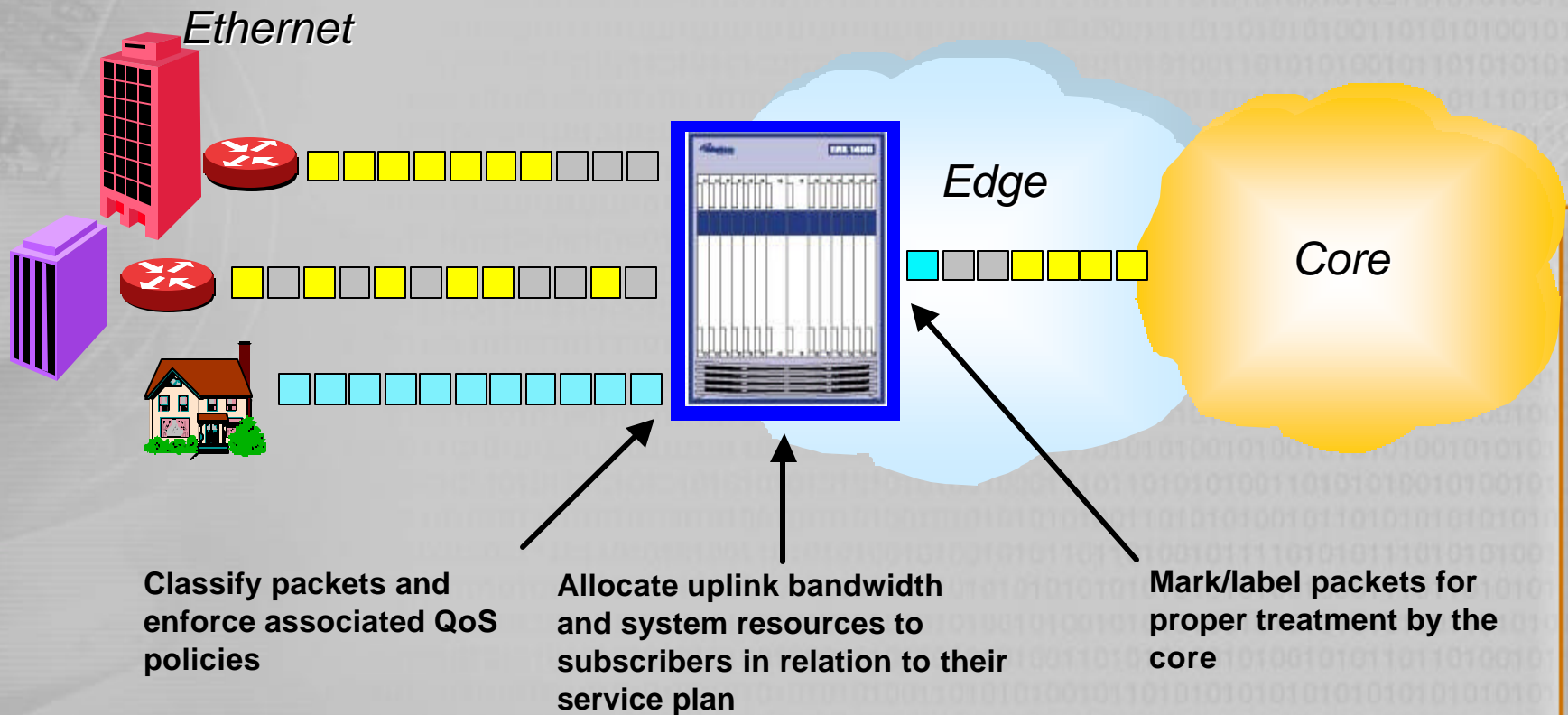
QoS Delivery – Directory Driven

Policy Engine

Subscriber Profile
Service Profile
Application Profile
Customized Network Profile
DNS/DHCP, Radius Server Integration

LDAP

Ethernet

Edge

Core

Classify packets and enforce associated QoS policies driven by Policy Engine

Allocate uplink bandwidth and system resources to subscribers in relation to their service plan

Mark/label packets for proper treatment by the core

Services Delivery Architecture for Broadband Networks

- Powerful Routing at the Edge of the provider network

- Network and Packet intelligence

- Granular Classification of Customer Traffic

    "A Smart, Fast, Big-Iron Router"
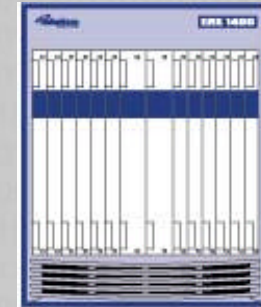
- Intelligence of the Back Office

- Dynamic ability to modify the behavior of the network

    "A Flexible, Scalable, Dynamic Policy Server"

Policy Engine

Subscriber Profile

Service Profile

Application Profile

Customized Network Profile

DNS/DHCP, Radius Server Integration