N+I

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The Power of Networking to Transform the Future of Business

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President -- Global Networking Technology Services

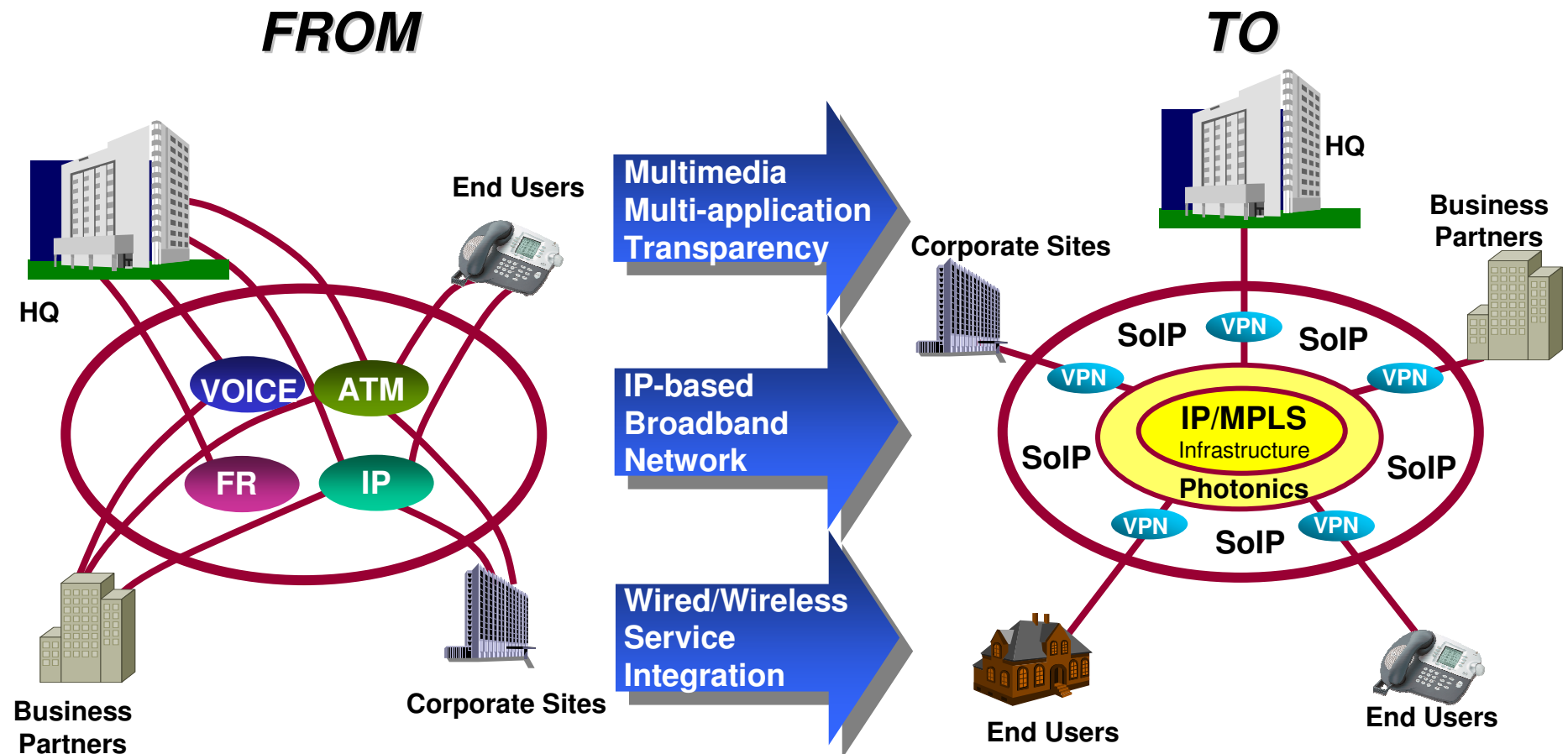*President -- AT&T Labs*

AT&T CTO & CIO

AT&T Fellow

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The world's networking company SM

1. **IP Will Eat Everything!**

2. **Security Is Critical**

3. **Convergence of Communications & Applications Will Be A Reality – Network Will Be The Computer**

4. **Wireless Internet Will Be Big – Driving Mobility**

5. **Sensor Networks Will Be Everywhere**

6. **e-Collaboration Will Dominate The Workplace – next generation speech recognition**

7. **Broadband Will Be Common – Death of Locality**

8. **Wireless & Wired Lines Will Converge – Accelerating Virtualization**

9. **Knowledge Mining Will Transform the Way We Do Business**

10. **Home LANs Will Proliferate**

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Power of Convergence

FROM

TO

HQ

End Users

VOICE ATM

FR IP

Business Partners

Corporate Sites

Multimedia Multi-application Transparency

IP-based Broadband Network

Wired/Wireless Service Integration

Corporate Sites

HQ

Business Partners

SoIP VPN SoIP

VPN VPN

SoIP **IP/MPLS** Infrastructure SoIP

VPN Photonics VPN

VPN SoIP VPN

End Users

End Users

IP Network Convergence: Delivers The Flexibility & Integration To Serve Users Better
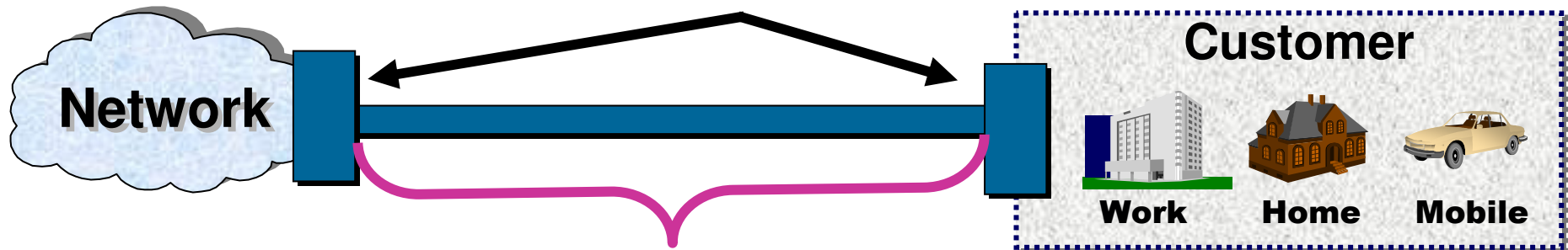
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Access Challenge

CUSTOMERS WANT →

- Choices – other than the ILEC.
- Cost effective access diversity for mission critical applications.
- More bandwidth.
- Shorter access installation intervals
- More reliable and secure access

The Key To Networking Is Distribution

Pipe & Point

Network ←→ **Customer**

Work   **Home**   **Mobile**

- **Most of the Cost**
- **Least Competition**
- **Least Bandwidth**
- **Best Ability to Differentiate Yourself from Competitors**

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WiMax: A Next Generation Access Technology

WiMax is:

• Worldwide Interoperability of Radio Access

• An air interface standard (IEEE 802.16)

• Wireless Metropolitan Area Network (MAN)

• Ethernet "over the air"

• An alternative to ~T1/DSL/cable wireline access
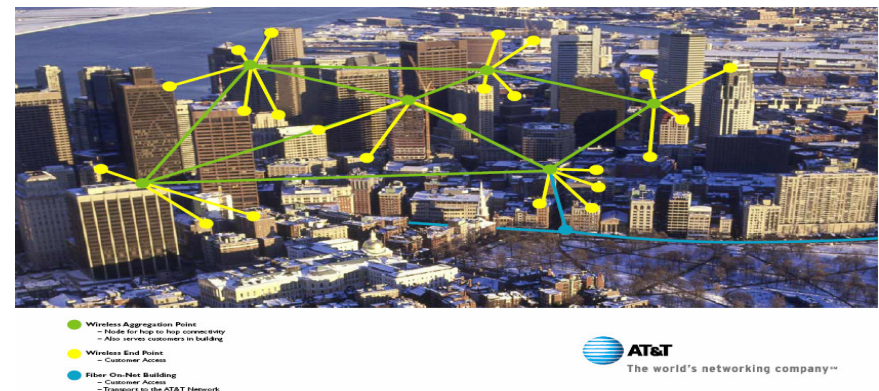
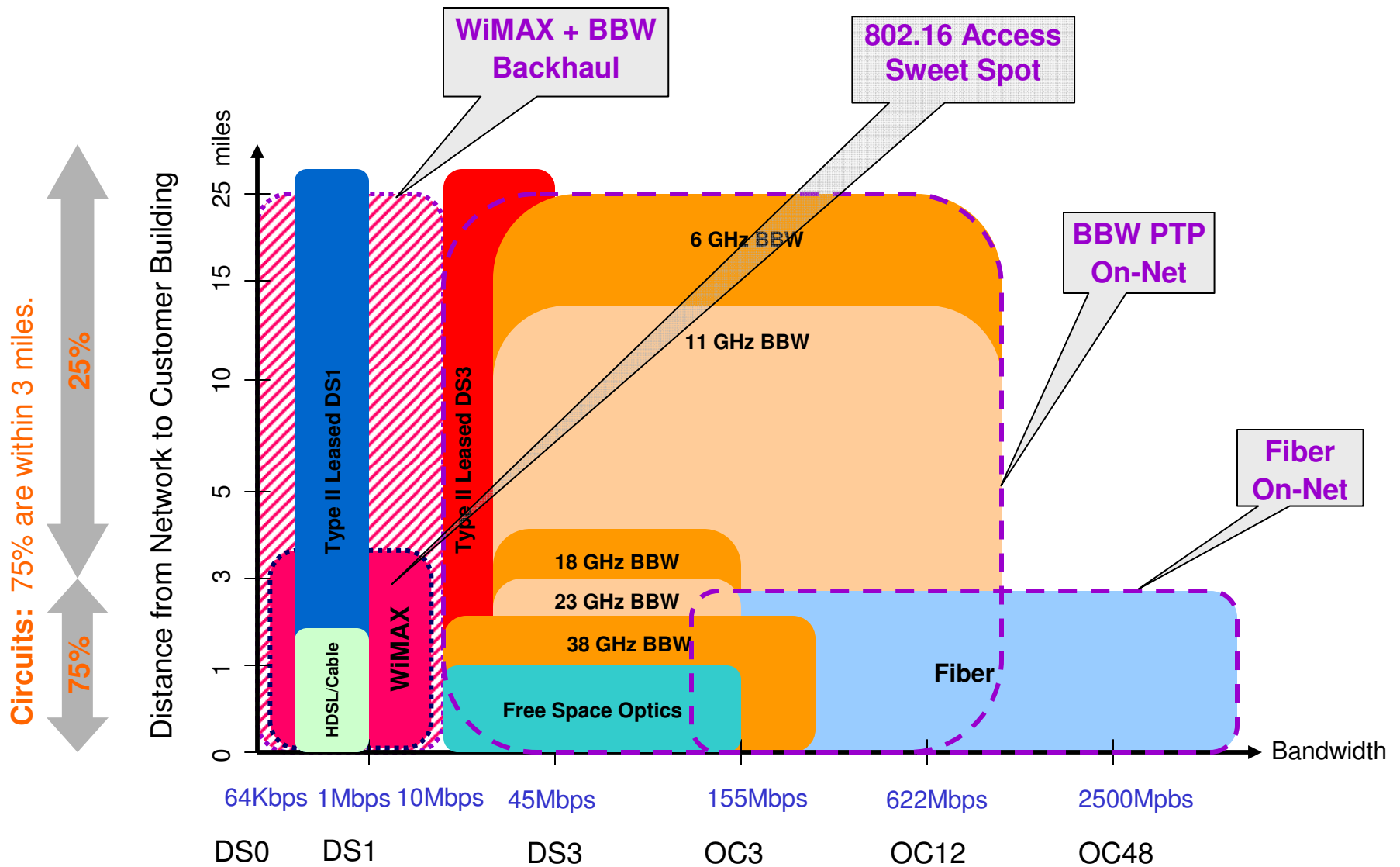• A global standard
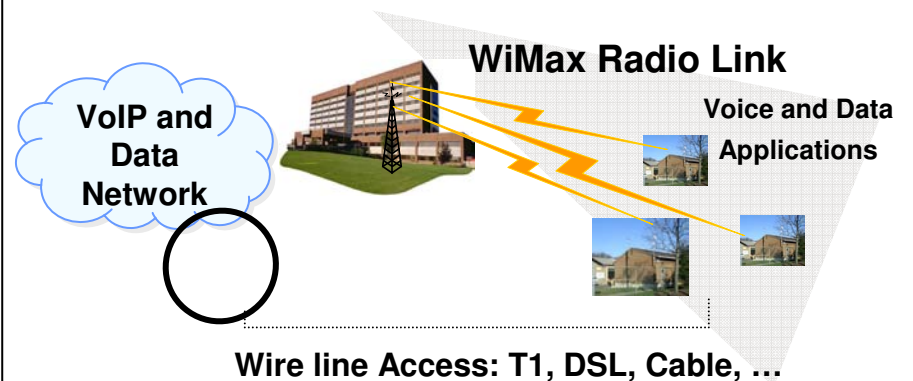
Expected Advantages of WiMax access:

• **Cost effective**

• **Fast Provisioning**

• Customer preferred interface – **Ethernet**

• Higher **reliability** than T1 access circuits

• Provides **resilient, portable & mobile services**

WiMax Technology is:

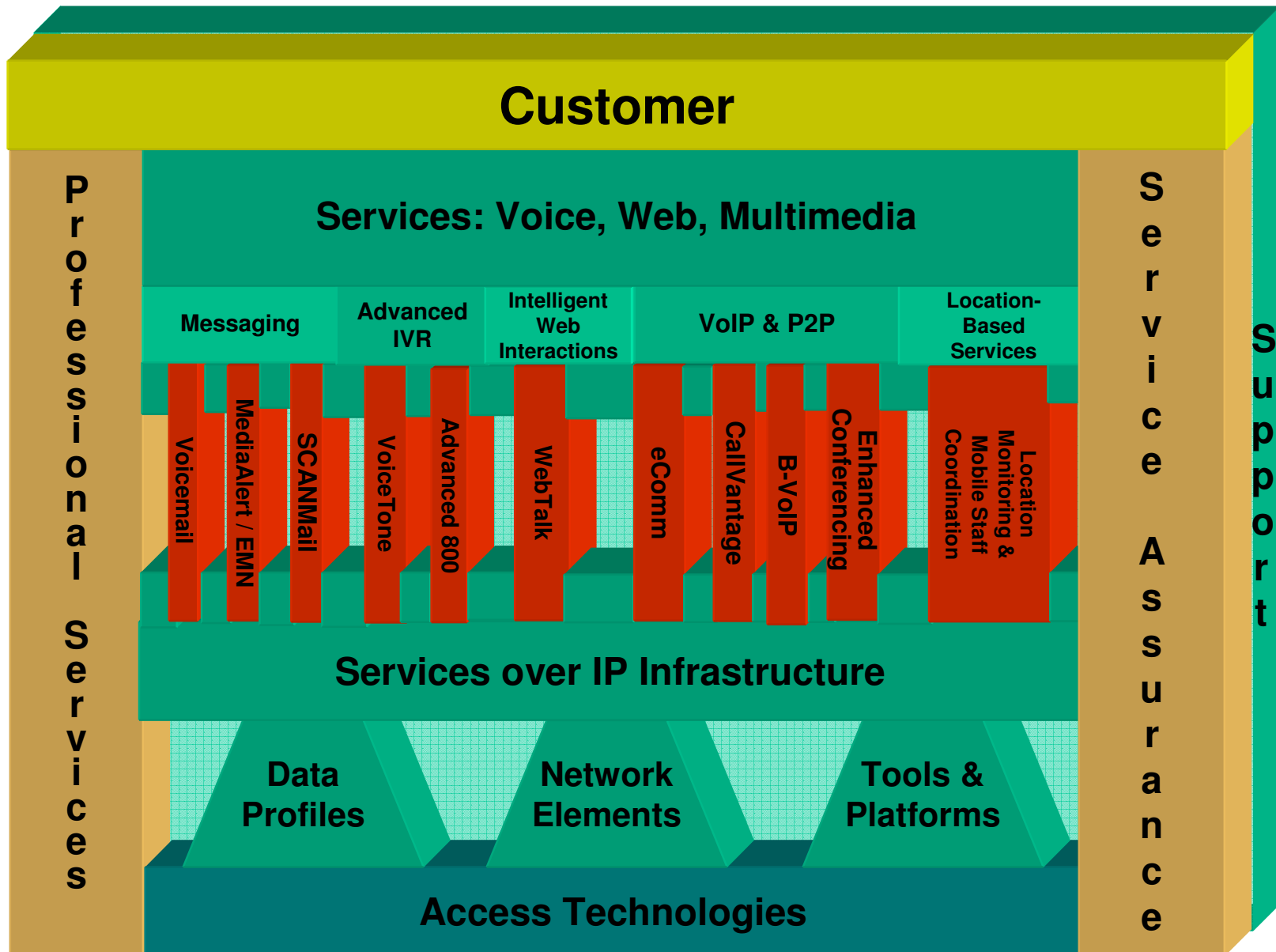

WiMax Radio Link

VoIP and Data Network

Voice and Data Applications

Wire line Access: T1, DSL, Cable, …

Visualizing a WiMax Network
WiMax Links are shown in yellow, typically 1-5 Miles

Wireless Aggregation Point
  – Node for hop to hop connectivity
  – Also serves customers in building
Wireless End Point
  – Customer Access
Fiber On-Net Building
  – Customer Access
  – Transport to the AT&T Network

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Access Field Of Use

WiMAX + BBW Backhaul

802.16 Access Sweet Spot

BBW PTP On-Net

Fiber On-Net

Circuits: 75% are within 3 miles.

25%

75%

Distance from Network to Customer Building

25 miles

25

15

10

5

3

1

0

6 GHz BBW

11 GHz BBW

18 GHz BBW

23 GHz BBW

38 GHz BBW

Type II Leased DS1

Type II Leased DS3

WiMAX

HDSL/Cable

Free Space Optics

Fiber

Bandwidth

64Kbps 1Mbps 10Mbps   45Mbps   155Mbps   622Mbps   2500Mpbs

DS0   DS1   DS3   OC3   OC12   OC48

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Services Over IP Framework

Customer

Professional Services

Service Assurance Support

Services: Voice, Web, Multimedia

Messaging	Advanced IVR	Intelligent Web Interactions	VoIP & P2P	Location-Based Services

- Voicemail
- MediaAlert / EMN
- SCANMail
- VoiceTone
- Advanced 800
- WebTalk
- eComm
- CallVantage
- B-VoIP
- Enhanced Conferencing
- Location Monitoring & Mobile Staff Coordination

Services over IP Infrastructure

Data Profiles	Network Elements	Tools & Platforms

Access Technologies

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AT&T Services Over IP Vision – *Layered Architecture*

Integrated Feature Execution Environment

Collaboration **Voice** **Conferencing** **Messaging** **Video** **AT&T CallVantage** **IP Centrex**

AT&T Services over IP Infrastructure Provides Advanced Services in a Uniform Environment

Common Services over IP Network Infrastructure

E911

CALEA

Peering

Global IP/MPLS

Network Functions

Border Elements & Gateways

All Access Technologies

Any End Device

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AT&T Services Over IP

Network-Based IP Telephony for the Enterprise
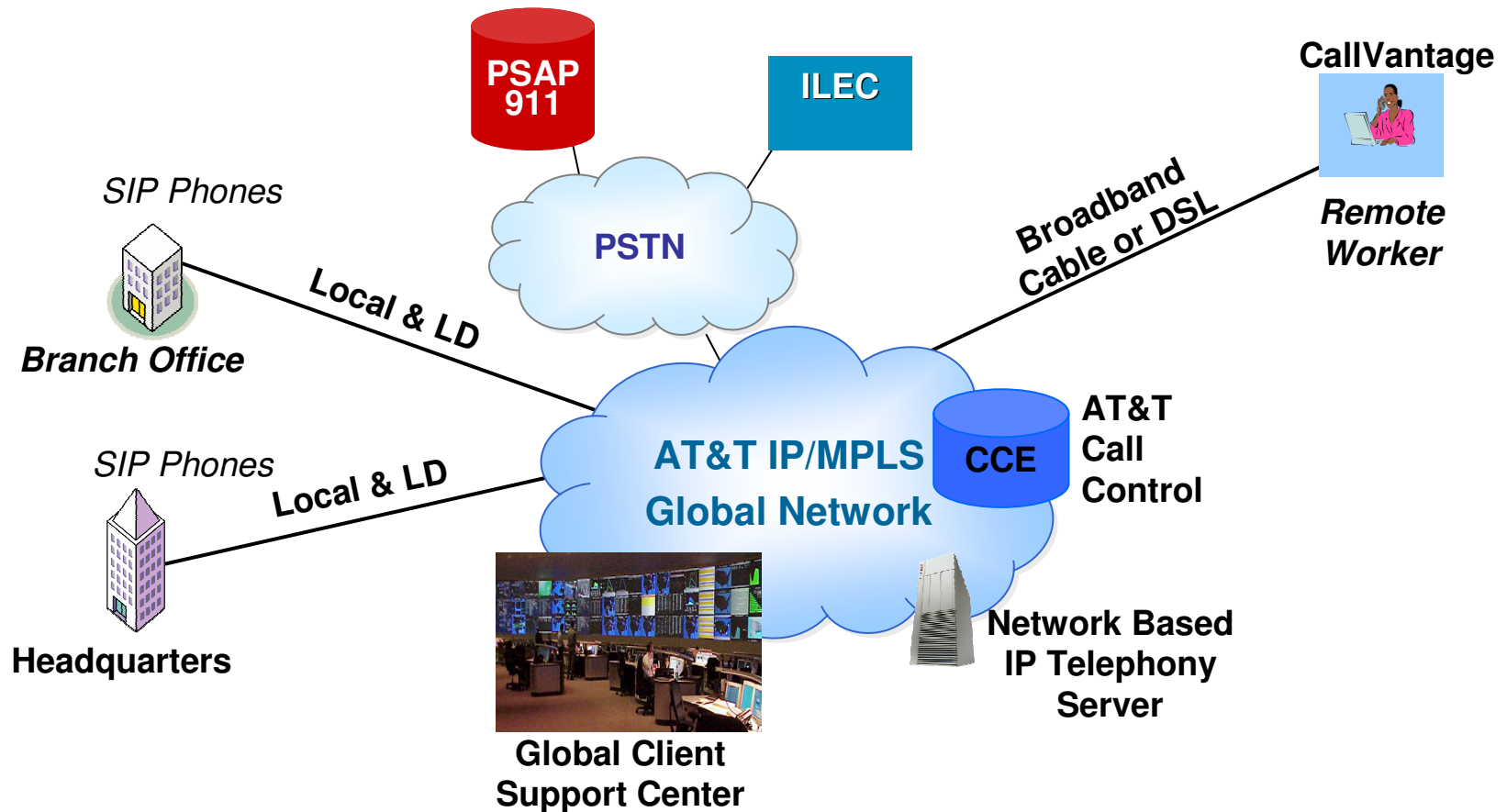
Improved Productivity – Reduced Complexity & Cost Savings

Multimedia Information Indexing

Image Processing | Video Processing | User Interfaces
Text Processing | MIRACLE | Web Technology
Speech Processing | Audio Processing | Network Technology
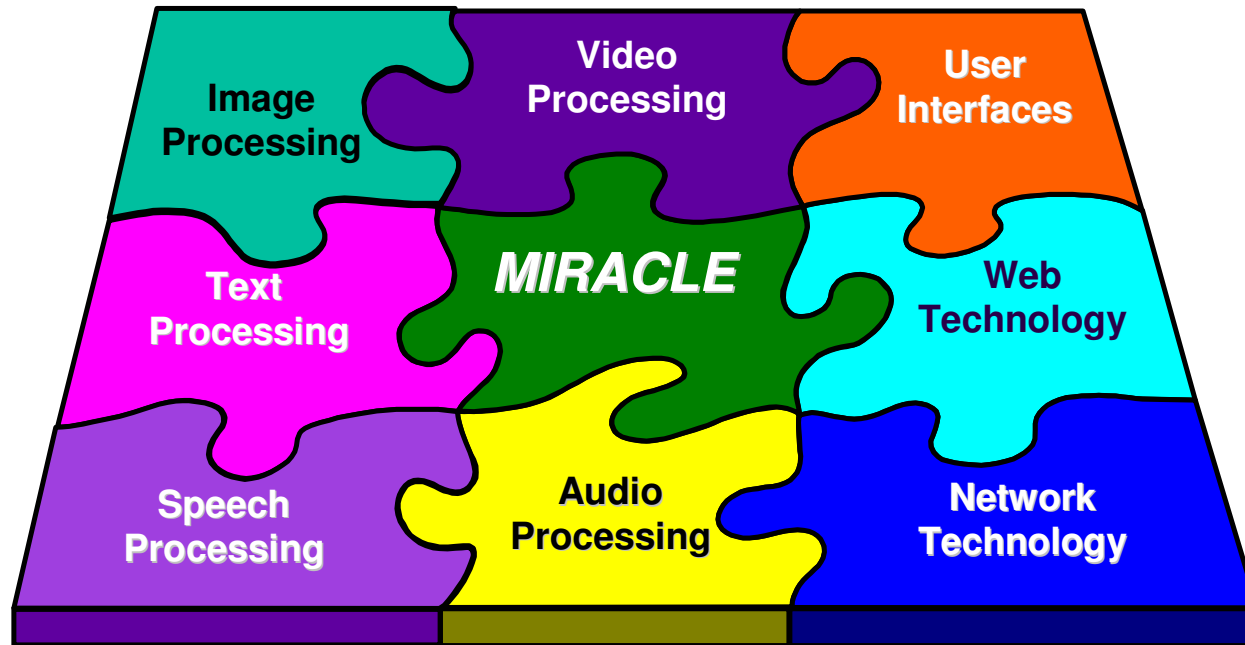
MIRACLE – A platform aimed at creating the technologies for automated and content-based indexing of multimedia information for intelligent, selective, and efficient retrieval and browsing using IP technology

MIRACLE: **M**ultimedia **I**nformation **R**etrieval by **C**ontent
- Bringing all the technologies together

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Technologies: Real-Time Automatic Speech Recognition

- Enables automatic indexing of spoken communications

- Features:

    - Large Vocabulary (210,000 words)

    - Real-Time Response

    - Low Latency

    - High Word Accuracy

Enhanced Conferencing

- **_VOIP conferencing_** is AT&T's new enabler for powerful new conferencing features
  - Meeting recording
  - Multi-meeting support
  - SpeechLogger keyword search
  - Email/IM notification
  - Meeting Security

SpeechLogger™ is used to manage conference recording and searching

WebTalk

Natural Language Interface To The Web

ASR/TTS

Data Mining

Dialog Management

Information Retrieval

WebTalk

Language Generation

Natural Language Understanding

Machine Learning

Website Analysis

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local voice service

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Automatic spoken dialog system building based on a set of Web pages

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Multimedia / Multimodal Contact Centers

Natural Language Understanding Provides A Cost Effective Alternative for Contact Center While At The Same Time Preserving the Customer Experience

Customer

Consumer

Internal

Business

Function

Sales

Customer Care

Support

Interaction/Access Method

Phone

Wireless

Web

Other

Automated Contact Enablers

- Speech Recognition
- Natural Language Understanding
- Dialog Management
- Text to Speech
- Speaker Recognition
- Web Collaboration
- Automated Chat/Email
- Virtual Assistants & Avatars

Automation

VoiceTone

Live Assistance

Agent

Consistently personalized and natural customer experience, regardless of the interaction channel chosen by the customer.

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Network Based Security

Current State of Industry
"Distributed Enterprise Edge Security"

3rd Party Network

Primary Provider IP Network

Edge

Edge

Client Enterprise

Client Enterprise
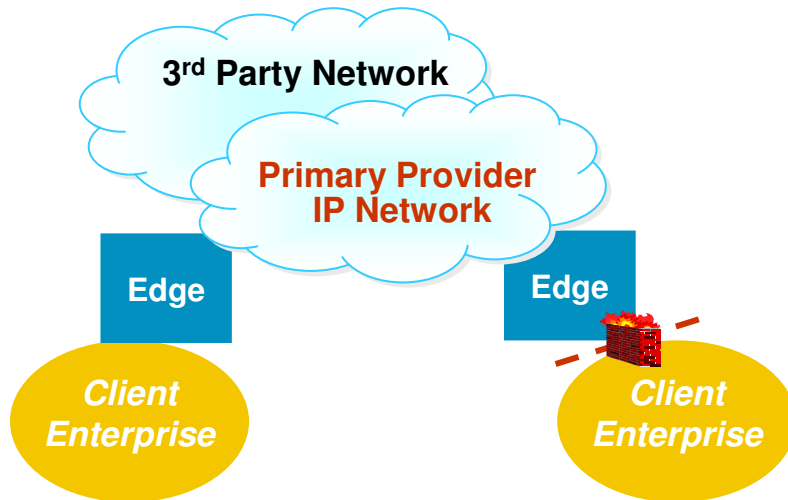
- **Client Security Investment at Edge**
- **IDS, Firewalls, Anti-Virus, Anti-SPAM Deployed by Customer**
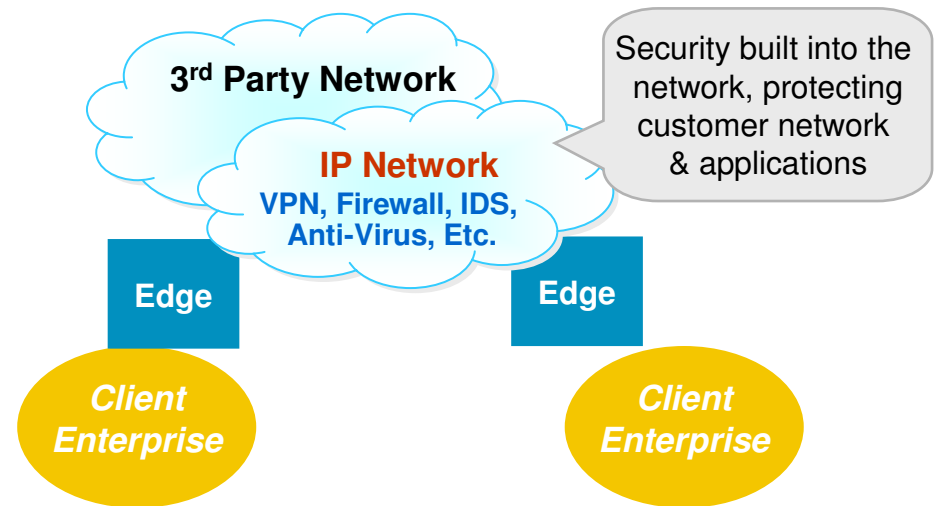- **Inefficient, Expensive, Non-Holistic**
- **Repetitive Across Client Base**

Network "Intelligence and Security"

3rd Party Network

IP Network
VPN, Firewall, IDS, Anti-Virus, Etc.

Security built into the network, protecting customer network & applications

Edge

Edge

Client Enterprise

Client Enterprise

- **Network-Based Solutions**
- **Efficient, Inexpensive, Holistic**
- **Non-Repetitive Across Client Base**
- **Total Cost of Ownership (TCO) Improvement**

CHALLENGE: Industry-wide Convergence Toward Network-based Solutions

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Continuum of Managed Security Services

Broad-Based Threat (vertical axis)

Localized Threat (vertical axis)

Network Cloaking
- AT&T Labs Research-Based Tools
- AT&T IP Backbone Protection
- "Invisibility" of Assets from Attack

Internet Protect
- 24/7 Real-Time Indications
- Worm and Virus Alerting
- Threat Management System

Denial of Service Defense
- Backbone Filtering
- DDOS Attack Protection
- Advanced Algorithms

Network-Based Security
- Network-Based Firewall / URL
- Network-Based IDS
- Network-Based Antivirus/Spam

Premise-Based Security
- Managed Firewall
- Managed IDS
- Managed Authentication (Token, PKI)

Protection at Edge ⟶ **Protection in Network**

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Converged Services Over IP

Anywhere, Anytime, Any Device Communications

IP - 8 Services

Unified Remote Control

IP Phone

Home Phone

Cell Phone

Soft Phone

Video Phone

PBX Phone

Voice & Video Conferencing

Integrated Directory and Address Book

Real Time Document Colboration

Click-to-dial From Any Web Page or E-mail

Instant Messaging

Endpoint Computing Power

Enabling Flexible, Seamless Services For Customers

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