

SYSTIMAX®
SOLUTIONS



GigaSPEED® ***X10D Solution***
Visionary 10G UTP

Philippe Thiébaud
Director Belgium & Luxembourg

SYSTIMAX SCS Formula

Building Blocks of Success



SYSTIMAX Heritage



1889



1900



1921



1939



1964



1969

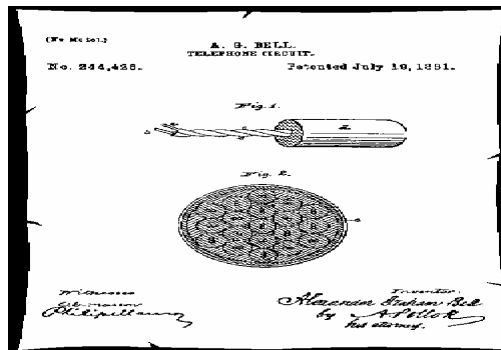


Lucent Technologies
Bell Labs Innovations



a CommScope company

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Bell's Twisted
Pair Design



Claude
Shannon

The Heritage Continues ...

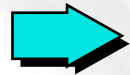
Our Track Record

First there was...

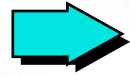
SYSTIMAX® PDS (1985)



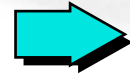
High-5™ (1993)



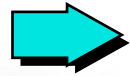
PowerSUM (1996)



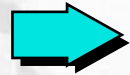
GigaSPEED® (1997)



High Res DMD (1998)



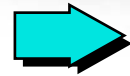
LazrSPEED™ (1999)



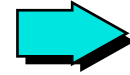
App. Perf. Spec (2000)



GigaSPEED XL (2002)



GigaSPEED 10G (2004)



Then came ...

Category 3 (1991)

Category 5 (1995)

Category 5e (1999)

Category 6 (2002)

DMD Standard (2001)

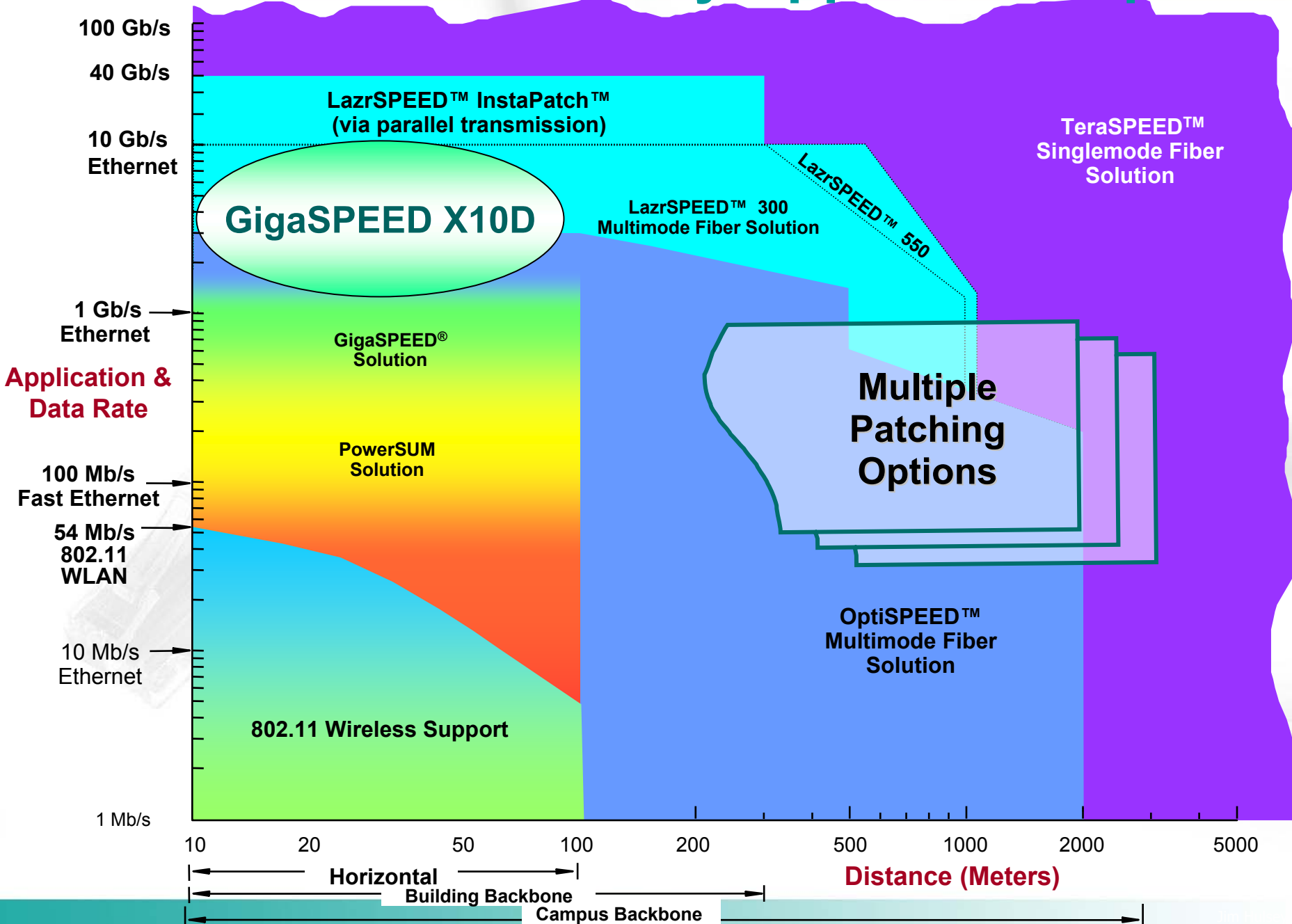
LOMM/OM3 (2002)

10G Ethernet (2002)

???

Category 6a (2006) ??

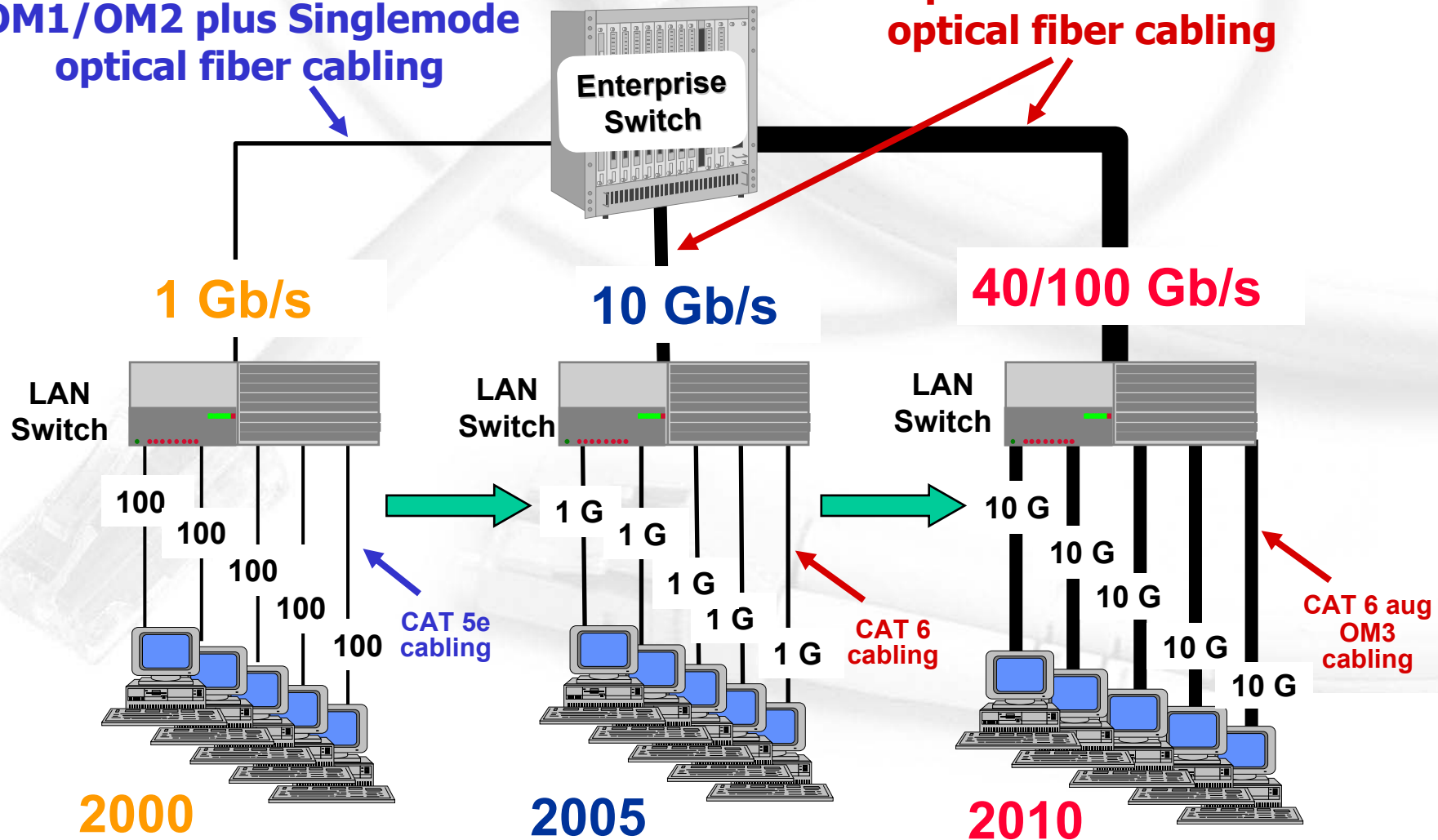
SYSTEMAX Portfolio by Application Space



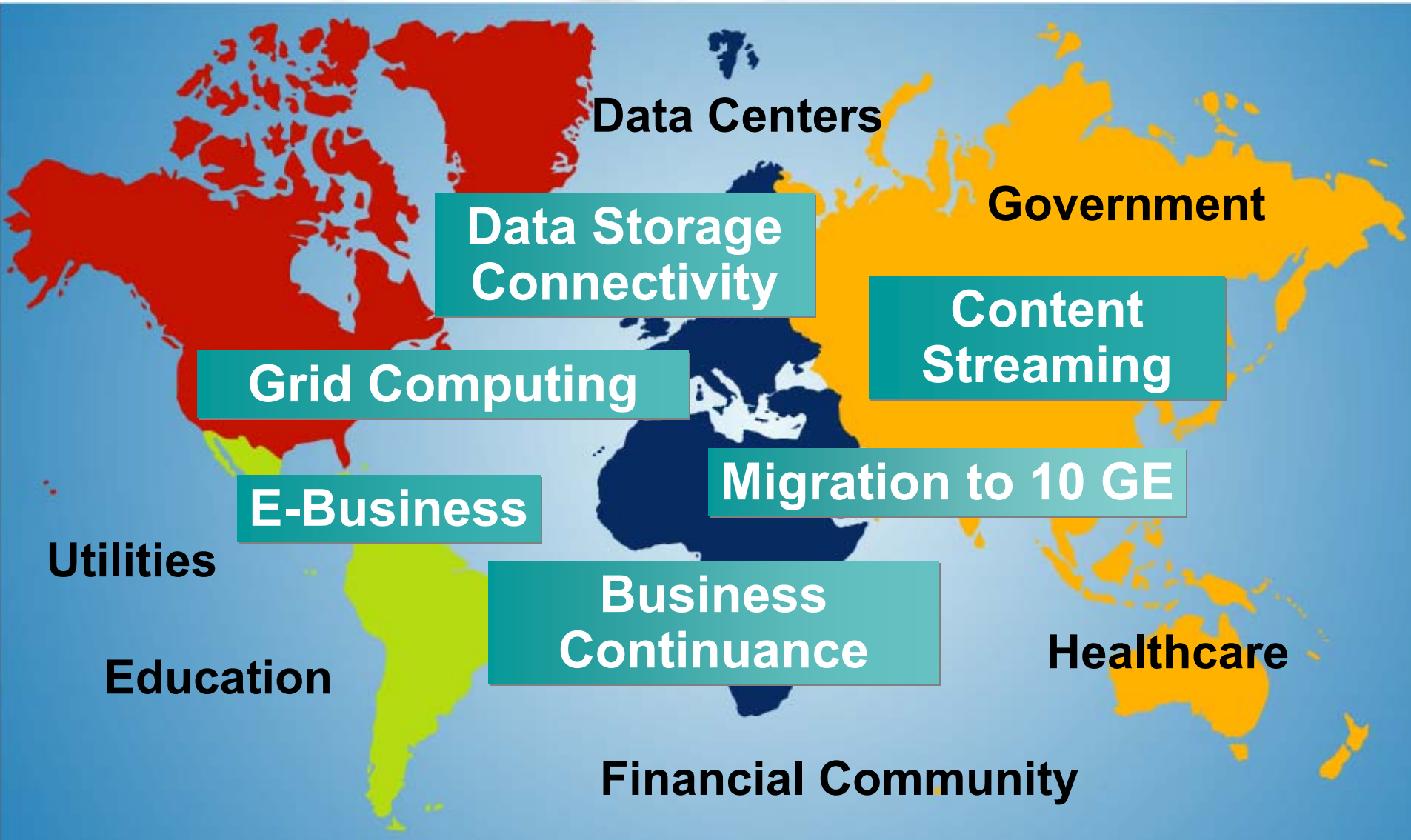
Future Migration Plan

OM1/OM2 plus Singlemode optical fiber cabling

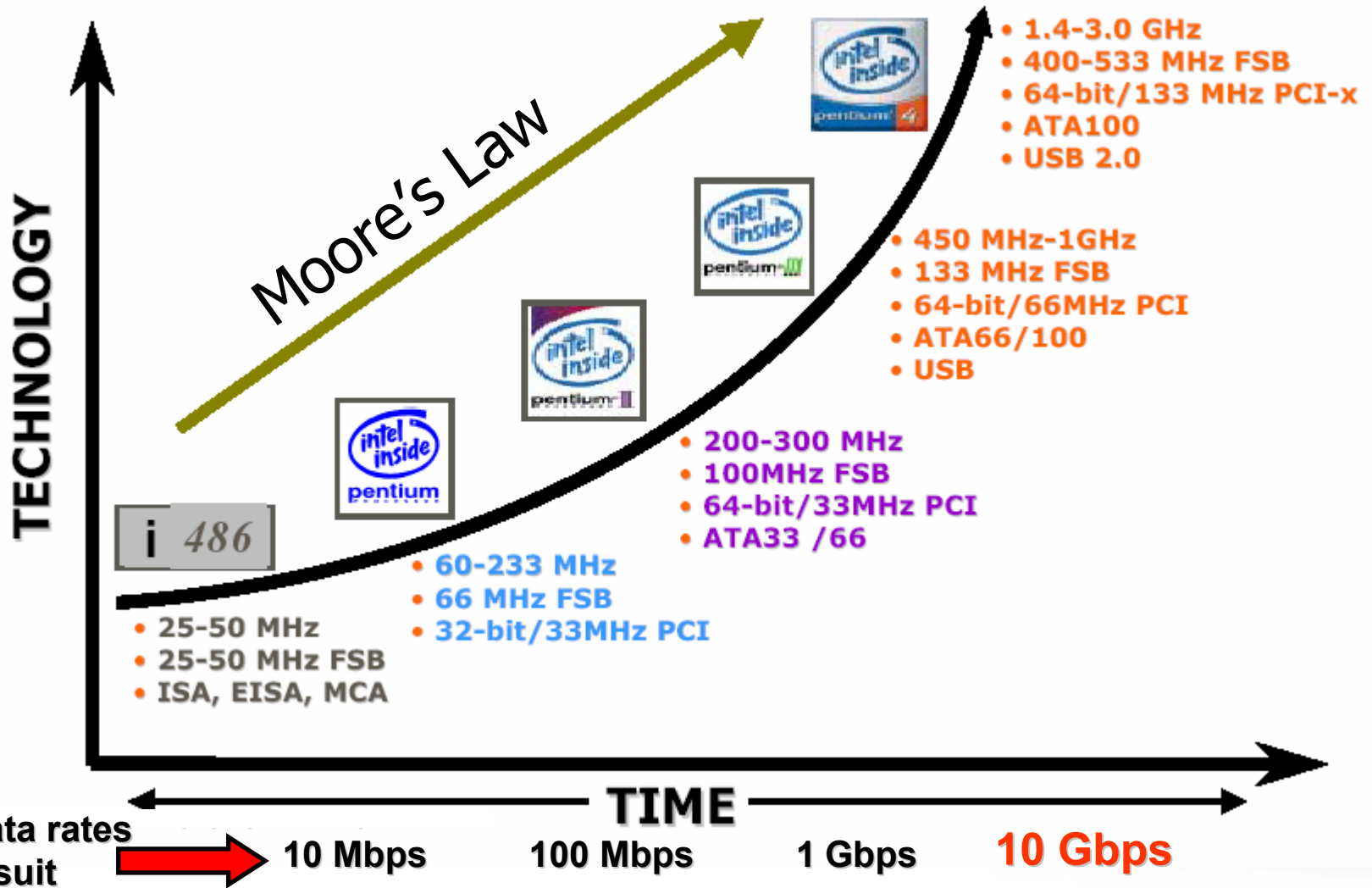
OM3 plus TeraSPEED-ZWP optical fiber cabling



Evolving and Extending your Network



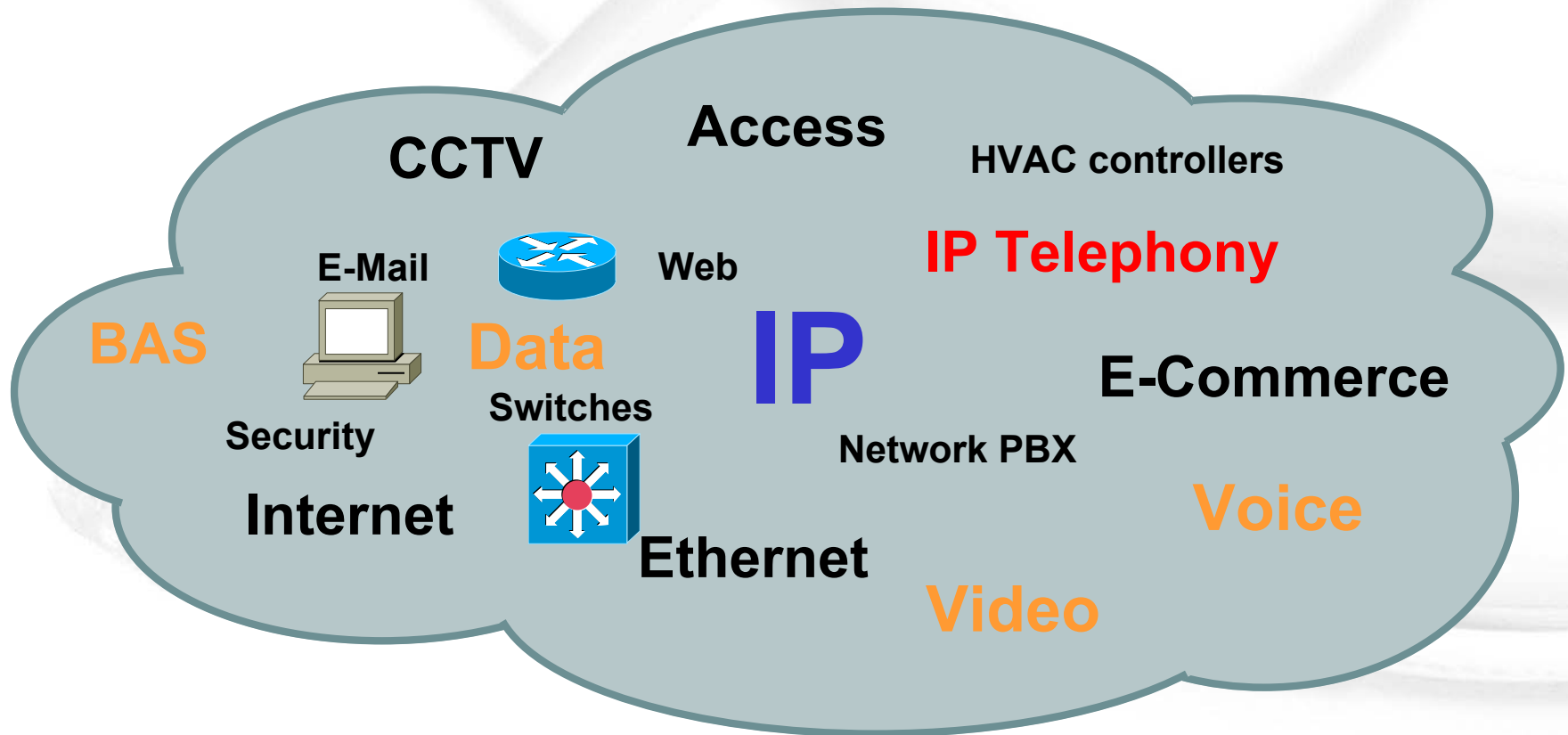
Computer Performance



Gigahertz Processors need Gigabit Pipes

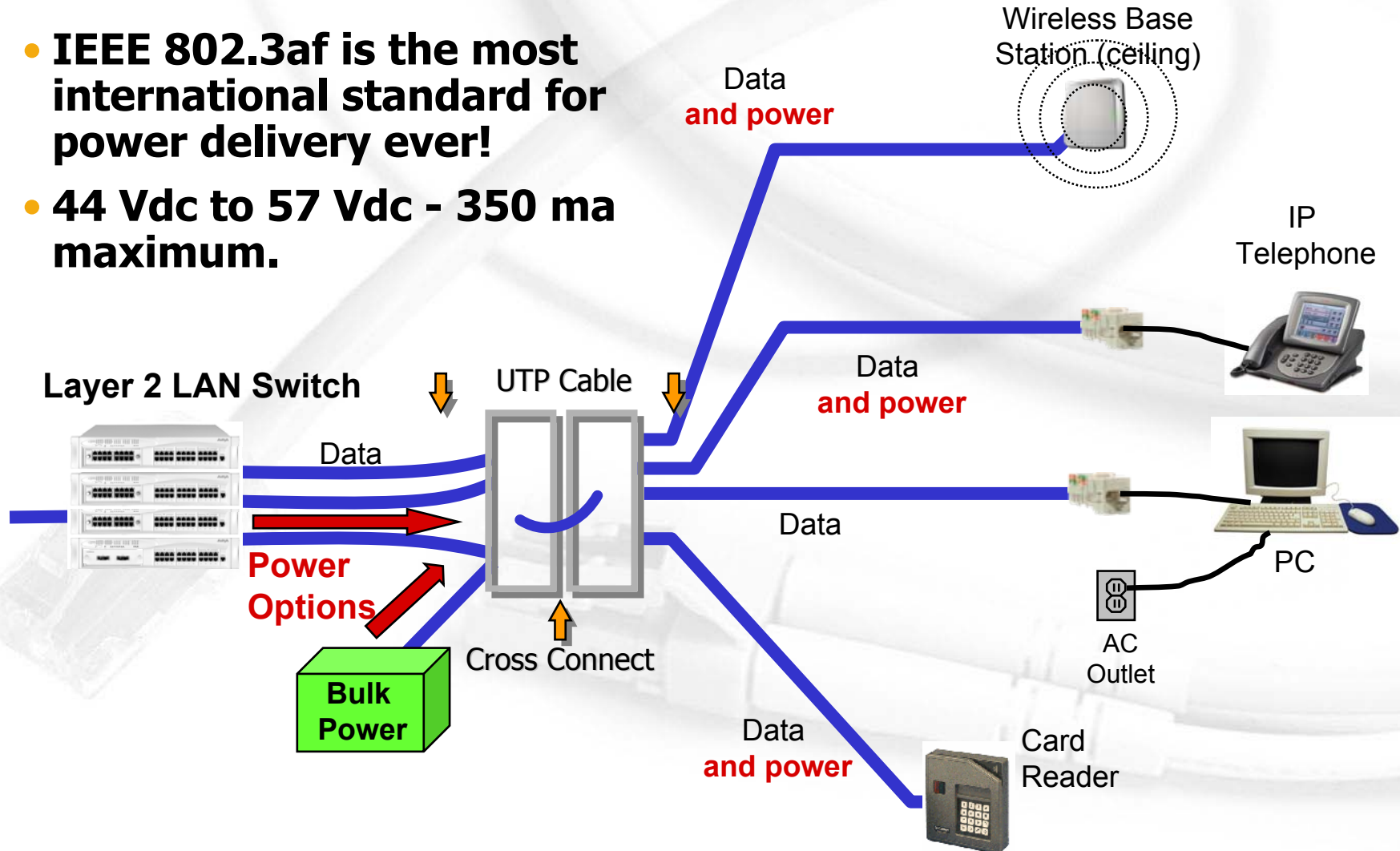
BAS and Ethernet/IP

- Ethernet & IP is replacing proprietary BAS interfaces and protocols



Ethernet/IP Remote Power

- **IEEE 802.3af is the most international standard for power delivery ever!**
- **44 Vdc to 57 Vdc - 350 ma maximum.**



Why do you need Gbit Ethernet?

- **More bandwidth**
 - Serves more traffic
- **Eliminate “bottlenecks”**
 - Speed up applications
- **Simplified network design**
 - High speed server attachments
 - Integrated services (voice/data/video)
 - “Collapsed” back bones
- **Lower latency/delay**
 - Decreased serialization/network delays
- **Simplified management**
 - All one physical layer
- **Inter-building connectivity**
 - Can be used to flexibly support small campuses
- **Gbit Ethernet provides a simple means for simple upgrades...**

10 Gigabit Ethernet to the rescue

- **Fiber Standards Ratification Complete !**

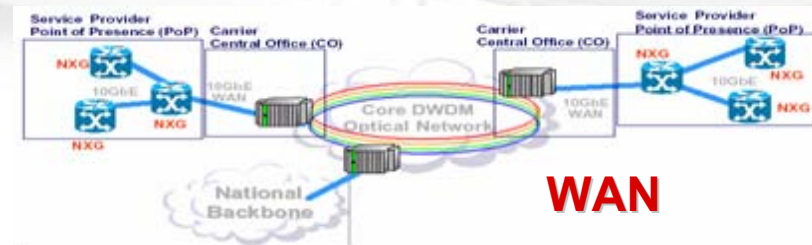
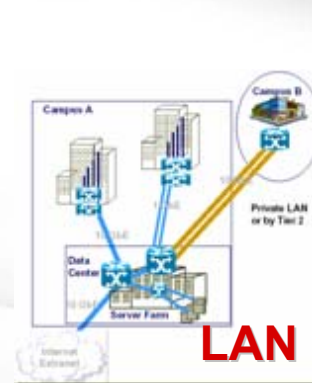
Opto Electronics- IEEE 802.3ae for 10 Gb/s
OM3/ LOMM Fiber-ISO/IEC 11801, TIA/EIA 568B.3-1

- **Copper Standards Underway**

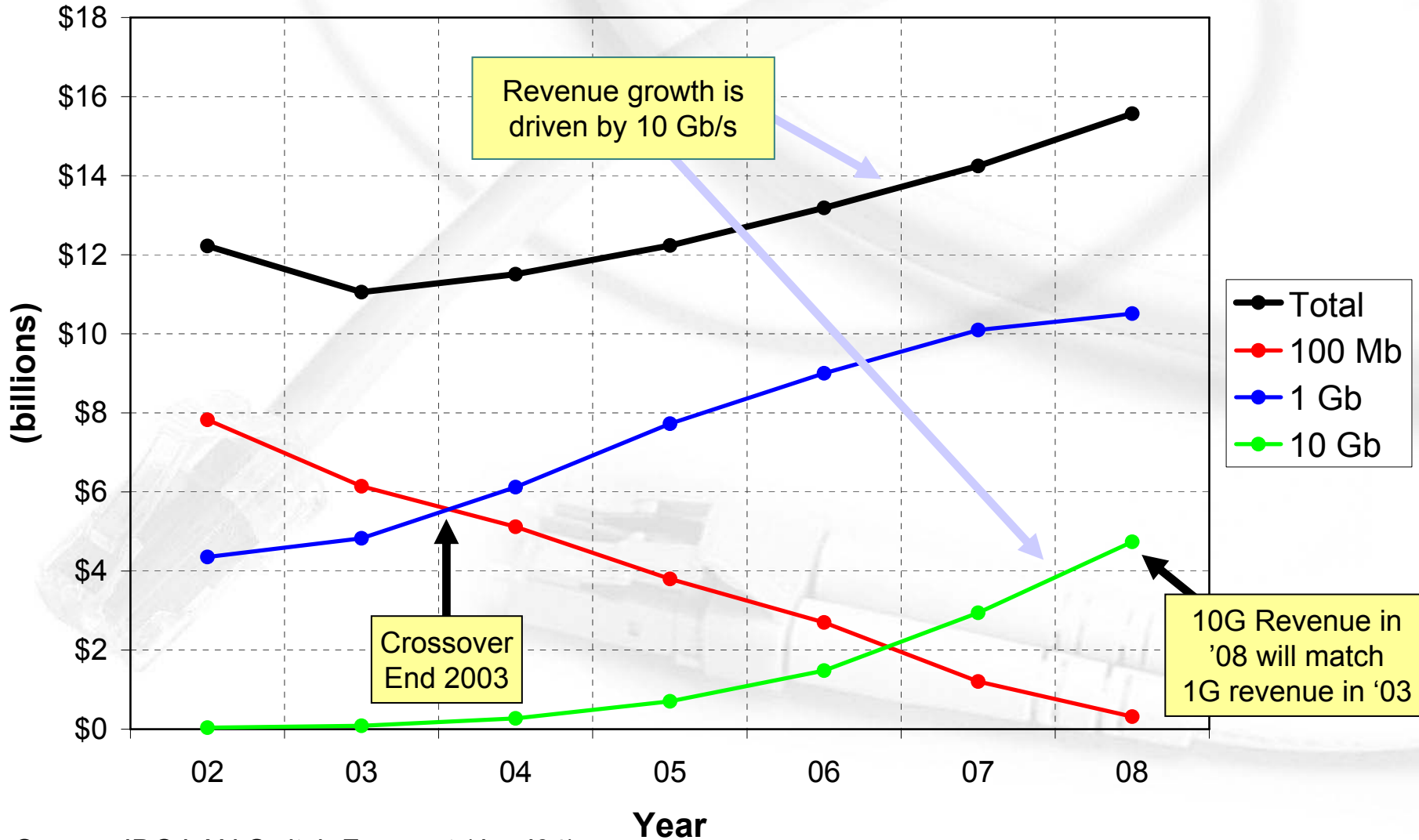
IEEE 802.3an for 10 Gb/s
Category 6 Augmentation -ISO/IEC 11801, TIA/EIA 568B

- **Connectivity Options Already exist**

**10GBASE-T is clear answer
in addressing 10Gb/s cost
effectively up to 100m**



Switch Port Revenue Excluding Low-end Fixed Unmanaged Ports



Source: IDC LAN Switch Forecast (Jan '04)

The Important Copper Transmission Considerations

- Transmission Techniques
 - Coding/Scrambling/Spectral Shaping
 - Parallel Transmission Schemes
 - Bi-directional Transmission Schemes
- Cable Parameters
 - Insertion Loss/Attenuation
 - Crosstalk (NEXT/FEXT/ANEXT)
 - Delay Skew
 - Return Loss (RL)
 - Differential and Common Modes

What makes 10G on UTP Possible?

- Extending the useable bandwidth to **500MHz**
 - All Category 6 channel performance specifications have been extended from 250 MHz out to 500MHz
- Establishing a new multi-level 10G transmission **coding scheme** – more information per signal
- Eliminating the negative effects of **Alien Crosstalk**
 - Alien Crosstalk is the **undesired coupling of energy** (signals) from **adjacent channels** (cables/connectors)
 - Cannot be cancelled by electronics

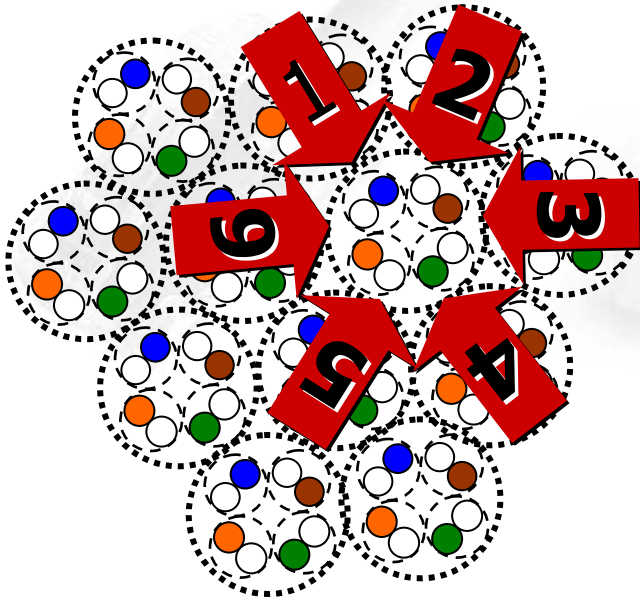


10 Gigabit: What's Coming

- **IEEE 802.3an task force is on track to complete the standard by summer 2006**
- **ISO/IEC and EIA/TIA Cabling Stds are collaborating to develop new CAT 6a “augmented” channel specs**
- **CAT 6a will have ~ 100% more bandwidth than current CAT 6**
- **Research continues to determine if embedded base CAT 6 can support 10G for 55 meters**
- **SYSTIMAX Solutions launched its 10G solution in the December of 2004**

Too Close for Comfort?

In Local Area Networks, cables are commonly **bundled** in large groups



Based on cable geometry, even in the largest cable bundles, the total number of cables that can have an Alien Crosstalk effect on a single cable is SIX (6) “**6 around 1**”

The signal strength of a cable in a **non-adjacent** position is simply too weak to induce Alien Crosstalk.

GigaSPEED X10D Cable Innovations

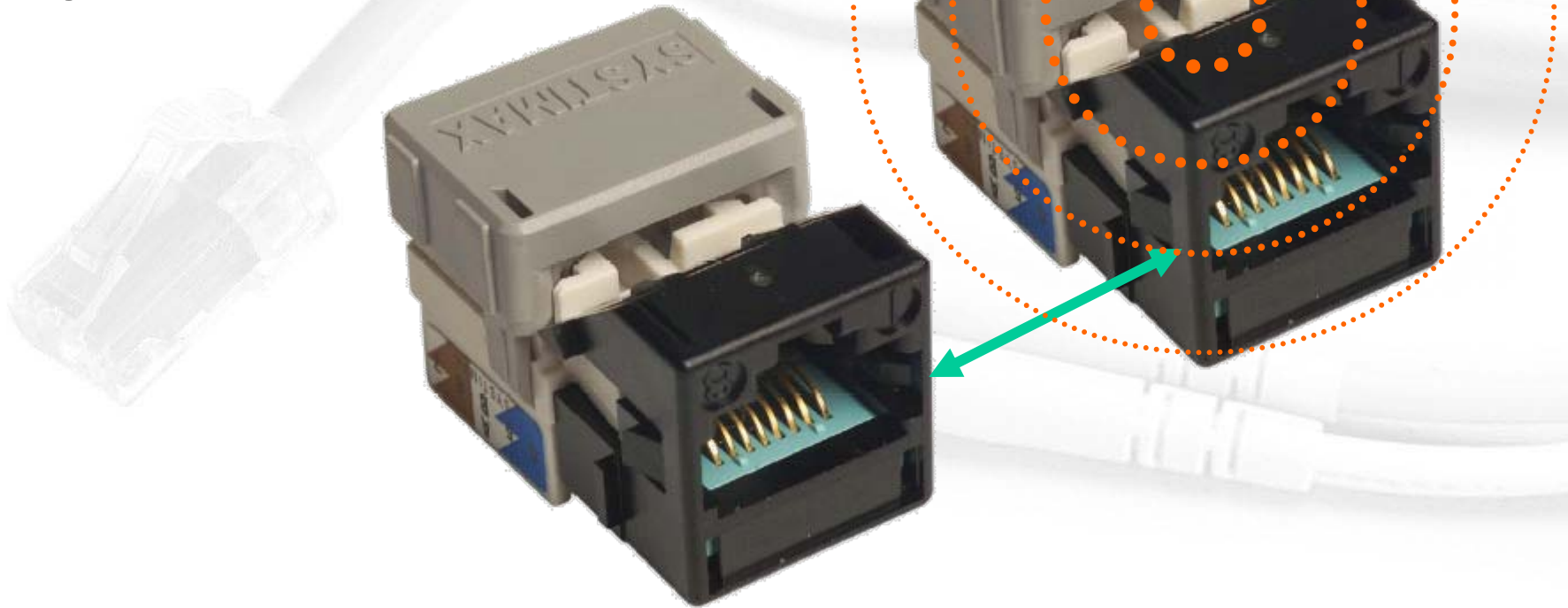
The innovative jacket design of the **'91 Series Cable** family provides the necessary **spacing** to eliminate the negative effects of Alien Crosstalk on adjacent cables

The jacket's **finned inner lining** provides flexibility, a lighter cable, and improved electrical performance at high frequencies



GigaSPEED X10D Connector Innovations

With connectors, **spacing** and **compensation** are the key elements in eliminating the negative effects of Alien Crosstalk

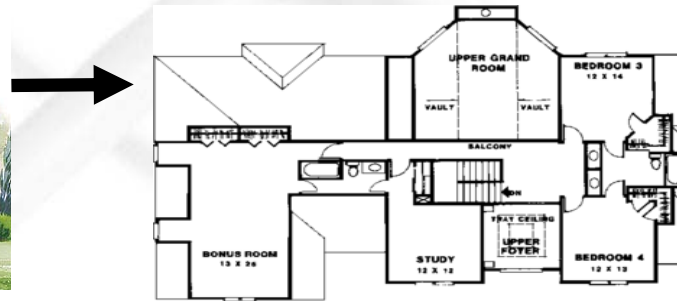


Our Unique Top-Down Systems Engineering Approach

Visualize



Design



Specify



vs the Alternative Approach

Pick Parts



Force Together

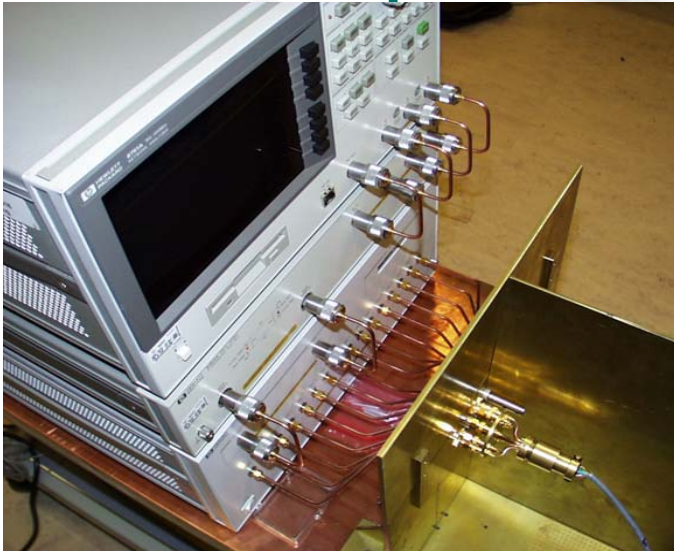


Settle

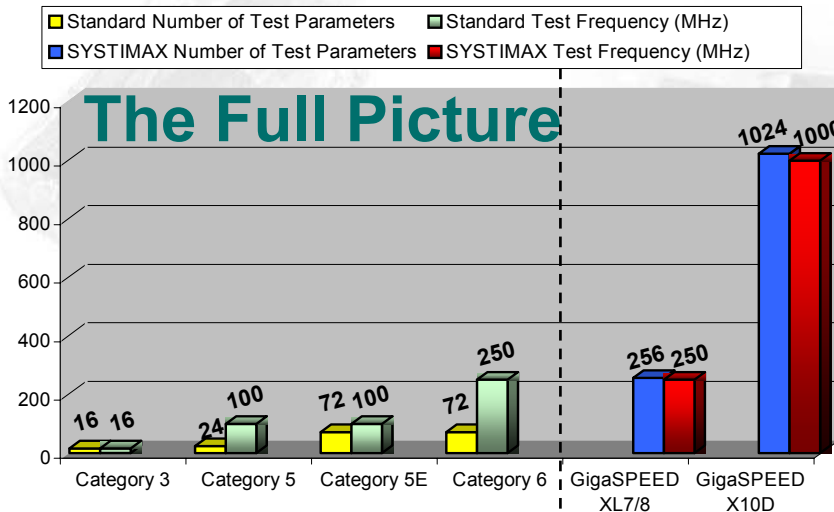


Real Science Makes the Difference

Modal Decomposition Modeling



- SYSTIMAX Labs have ‘total control of the design and manufacturing’ of the copper channel
- “SYSTIMAX® Solutions’ 16-port modal tool characterizes the unbalanced paths and eliminates ‘surprises’ when coupling components together
- Measuring Unbalanced effects goes well beyond standards based testing (4 x times the volume of tests) **Unique to SYSTIMAX Solutions™**
- Software modelling extends ‘design, test, build’ ability and allows 10,000’s of component combinations to be tested



GigaSPEED X10D Solution

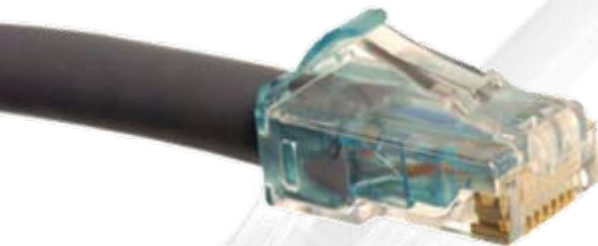
*Every component
is designed to
deliver 10G*



MGS500 I/O



**'91 Series
Cables**



GS10E Cords



UMP Patch Panel

(24 port model - outlets not included)

Solution Performance Guaranteed

Electrical Parameter	Channel Margins to <i>current</i> Category 6 / Class E Standards (1-250MHz)	Channel Margins to <i>NEW</i> Draft ISO/IEC 11801 Edition 2.1 Standard (1-500MHz)
Insertion Loss	5%	2%
NEXT	6 dB	1 dB
PSNEXT	7.5 dB	2.5 dB
ELFEXT	6 dB	6 dB
PSELFEXT	8 dB	8 dB
Return Loss	3 dB	0 dB
PSANEXT	Not Applicable	0 dB

Note:

The GigaSPEED X10D Solution **exceeds** the new draft **10G standard** and **significantly exceeds** the current **CAT6 standard** with industry leading performance similar to the GigaSPEED XL7 Solution

Guaranteed performance for channels up to 100m with 4 connectors

New Class E/Augmented Cat 6 and 10GBASE-T

- TIA working on Addendum 10 to TIA/EIA 568B and ISO/IEC NWIP Approved
- The only normative UTP specification guaranteed to support 10GBASE-T for 100m 4-conductor channels
- Compliant with IEEE Model 1 PSANEXT
 - test methods under discussion
 - 6 around 1 represents worst case condition
- Compliant with IEEE Model 1 Insertion Loss
 - Class F Insertion Loss achievable with UTP
- Compliance with internal channel requirements
 - the extrapolated limits are the safest choice



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Questions to ask about 10GBASE-T support

Questions to ask about 10GBASE-T support claims

- What are the new components in the channel?
- Are the cables and cords round and easy to install?
- What are the allowed channel/connecting hardware configurations?
- What are the bundling configurations allowed for horizontal cables and cords?
- Is the channel guaranteed to meet IEEE Model 1 PSANEXT in 6-around-1 configuration?
- Is the channel guaranteed to comply with the proposed ISO/IEC “New Class E” limits to 500 MHz?



GigaSPEED X10D Solution

Key Facts

- **10G Ethernet** support up to **100 meter** deployments with up to **4 connection points**
- Supports 10BASE-T, 100BASE-T, 1000BASE-T, and 10GBASE-T on this **single solution**
- **Exceeds IEEE** (Model #1) and **draft cabling standards** requirements for 10G
- **Performance is Guaranteed** over Swept Frequency Range to **500 MHz**
- Performance Verified in tests of **1024 Electrical Parameters** over the Swept Frequency Range to **1000MHz**
- **Unique design** supports pre-bundling of cable

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