



THE FUTURE OF LEARNING SPACE

St. Cloud School District 742

Mark S. Valenti, CTS

President

THE SEXTANT GROUP, INC.

February 28, 2017

AGENDA

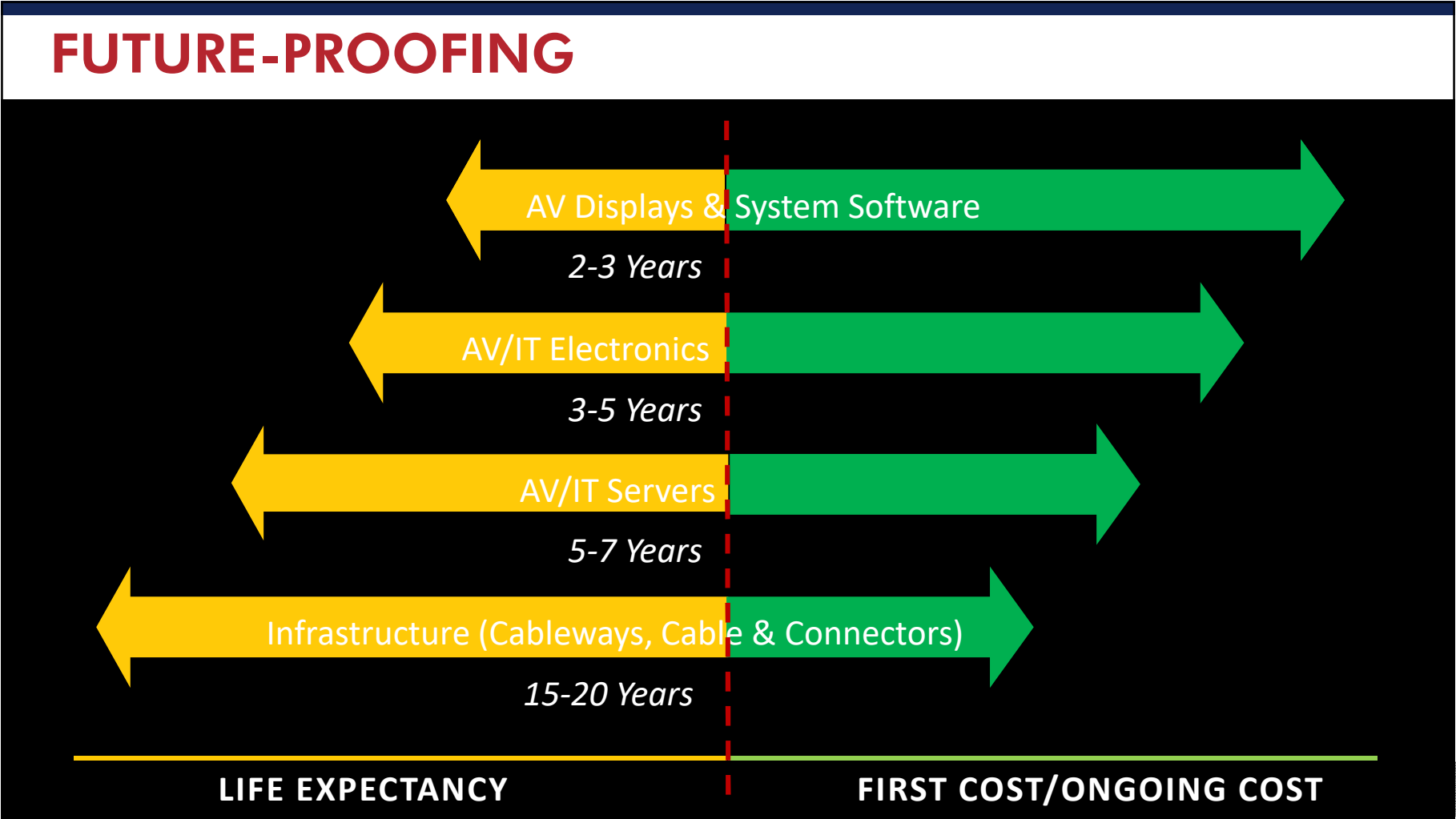
Introduction and Overview	St. Cloud / Leapaldt
Presentation: The Future of Learning Space	Valenti
Pizza!	
Discussion: Technology Trends	Full Group
<ul style="list-style-type: none">• Personal Communications• Computing• Digital Media• Networking• Other	
Discussion: Teaching and Learning Trends	Full Group
<ul style="list-style-type: none">• Collaboration• Active Learning• Blended Learning• Other	
Break	
A Future Scenario: St. Cloud 2025	Break-Out Groups
Report and Review	Valenti
Next Steps and Concluding Remarks	Leapaldt / St. Cloud

THE BIG PICTURE

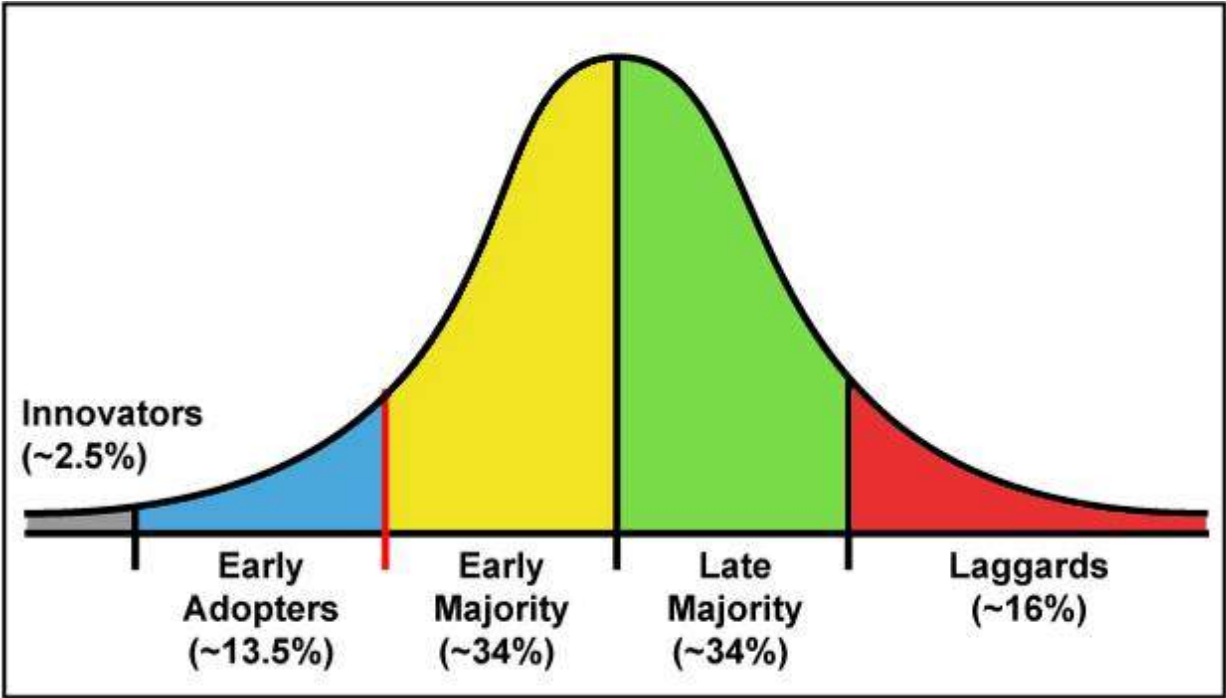


“The future, according to some scientists, will be exactly like the past, only far more expensive.”

John Sladek



CROSSING THE CHASM



BANDWIDTH, THE 4TH UTILITY

✦Copper Cable

- ✦Performance gains with copper continue to be realized
- ✦100 Mb / 1 Gb / 10 Gb / 80Gb

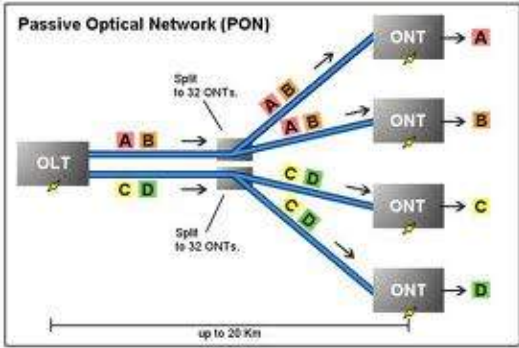


✦Optical Fiber

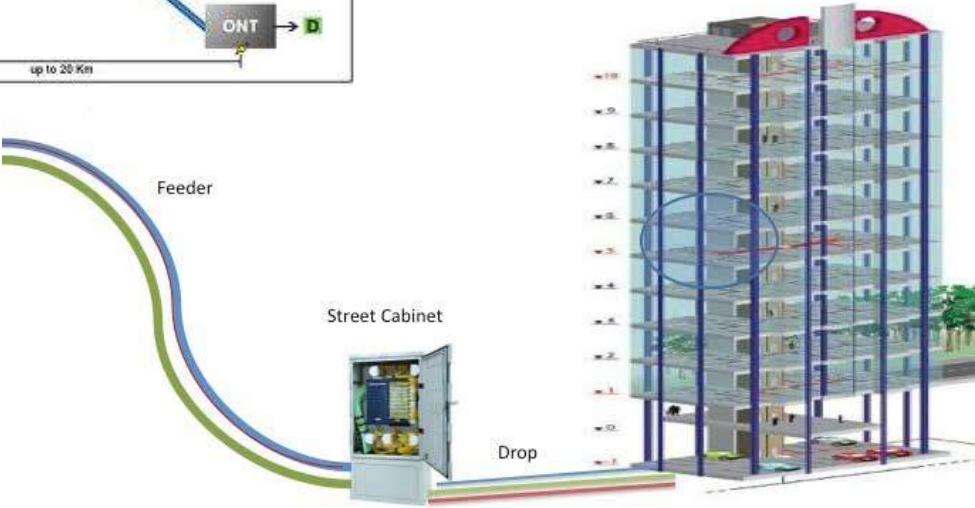
- ✦12% annual growth for Fiber through 2025
- ✦Strong demand for advanced IT and emerging multimedia services



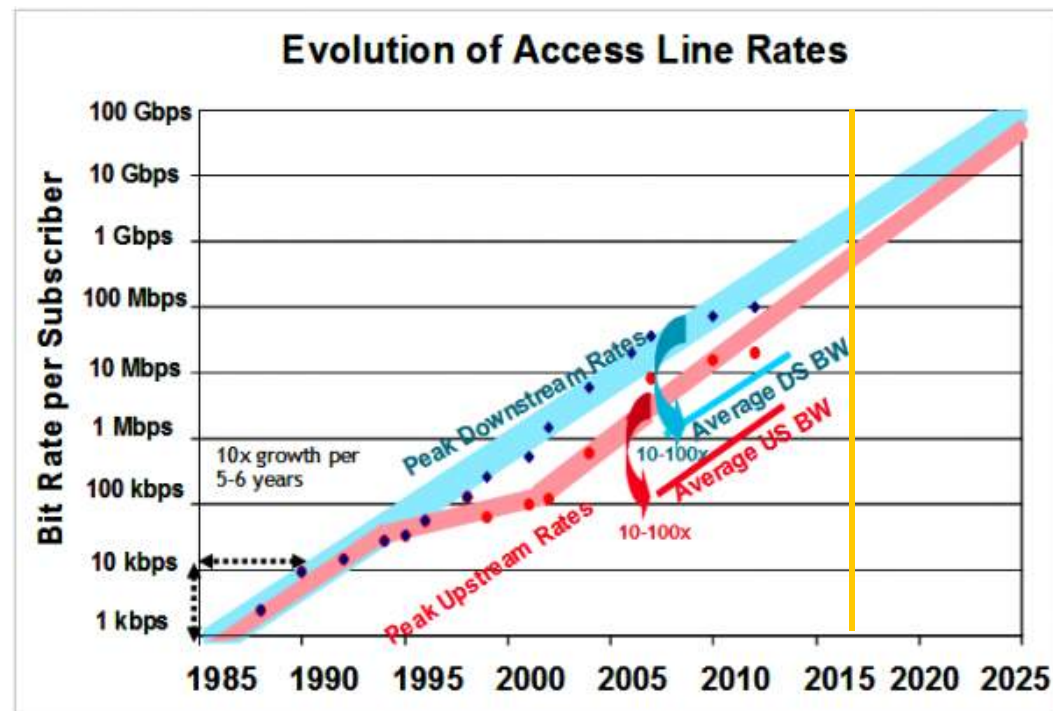
BANDWIDTH, THE 4TH UTILITY



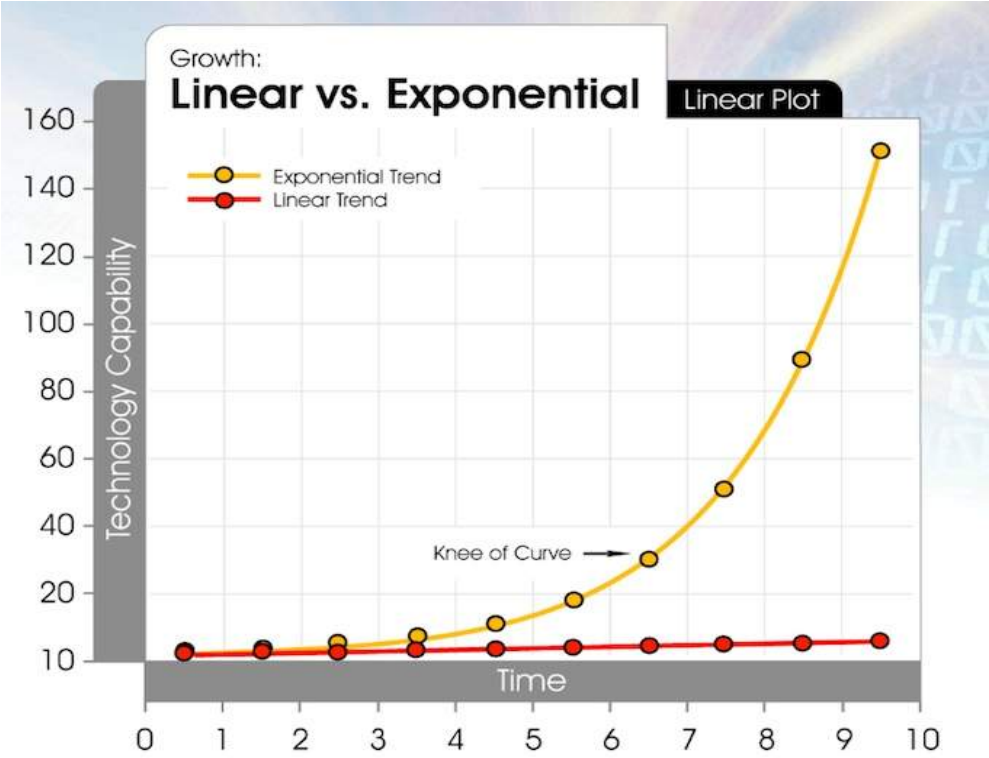
“Fiber to the Home” (FTTH)
Passive Optical Network (PON)



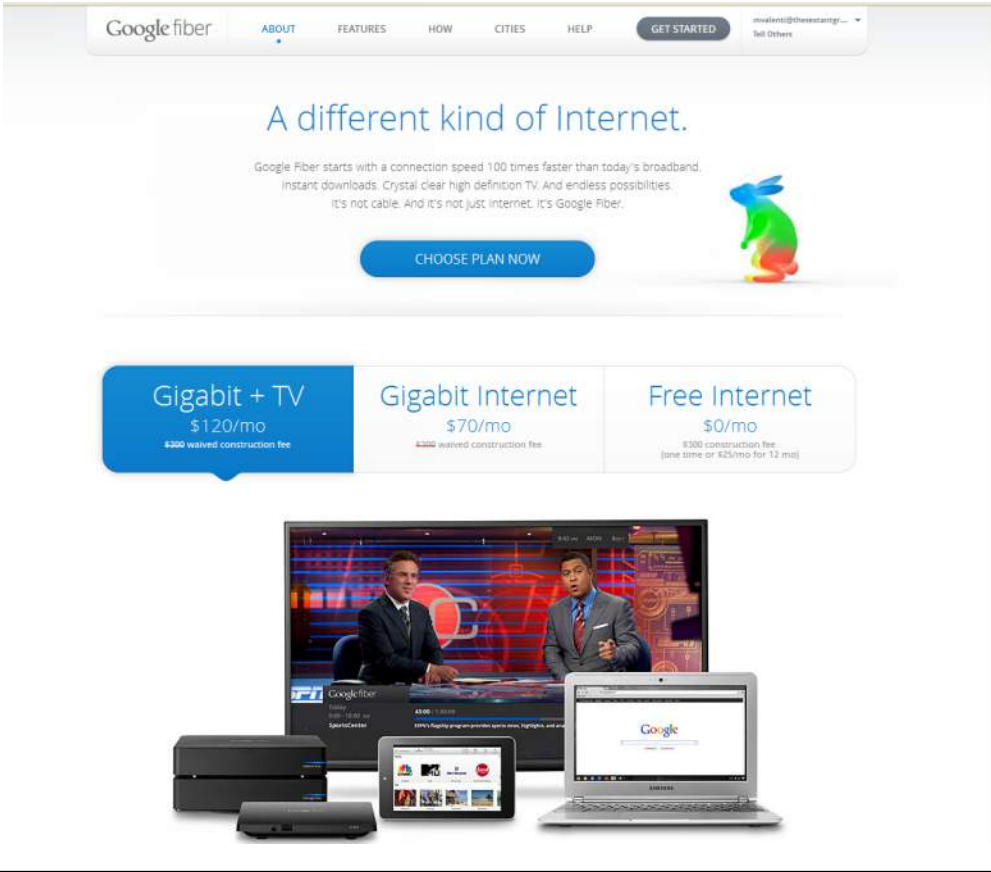
BANDWIDTH, THE 4TH UTILITY



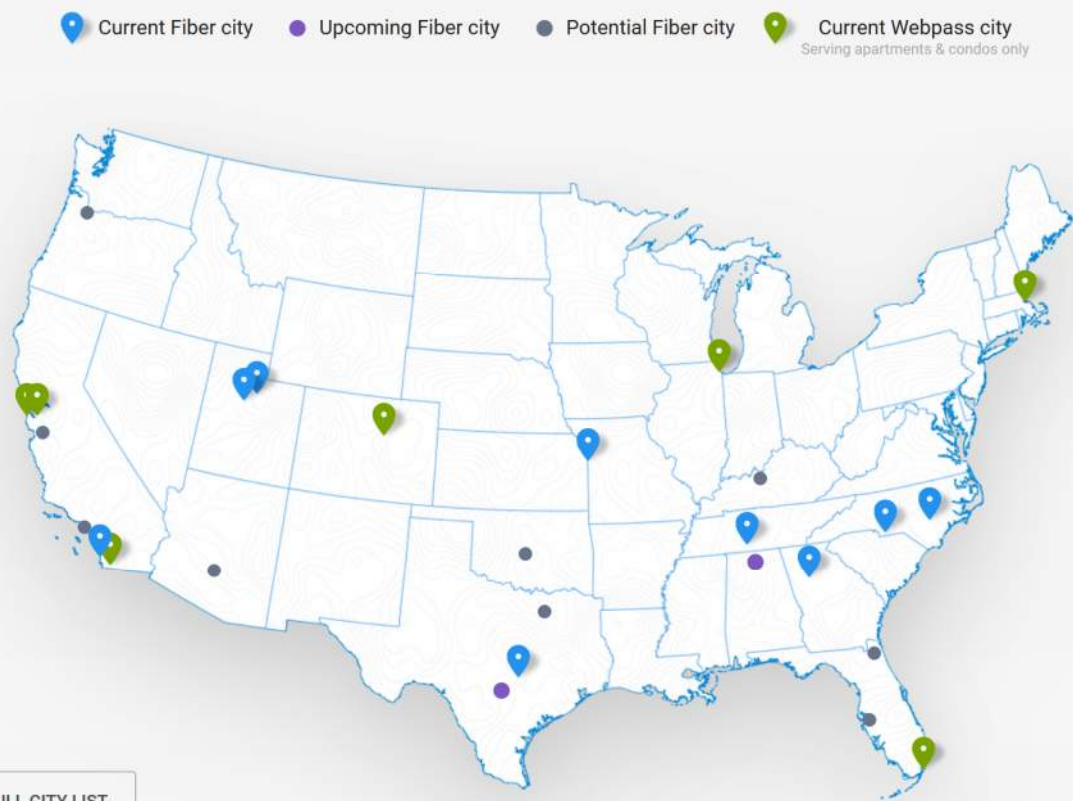
BANDWIDTH, THE 4TH UTILITY



GOOGLE FIBER

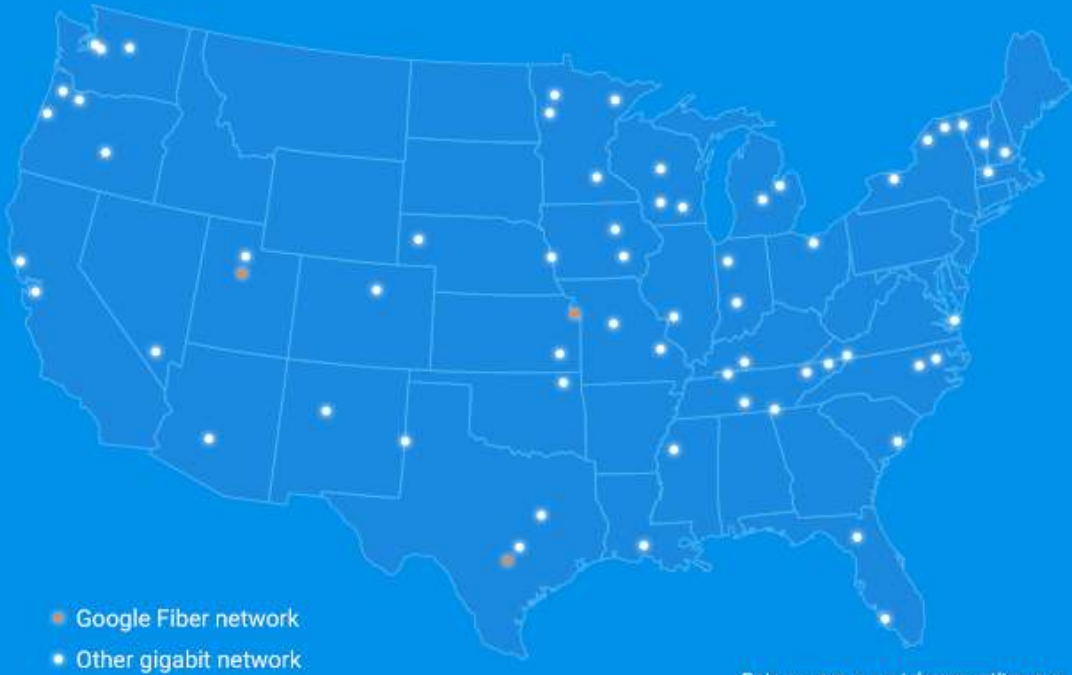


GOOGLE FIBER



IT'S NOT JUST GOOGLE

Celebrating America's gigabit cities

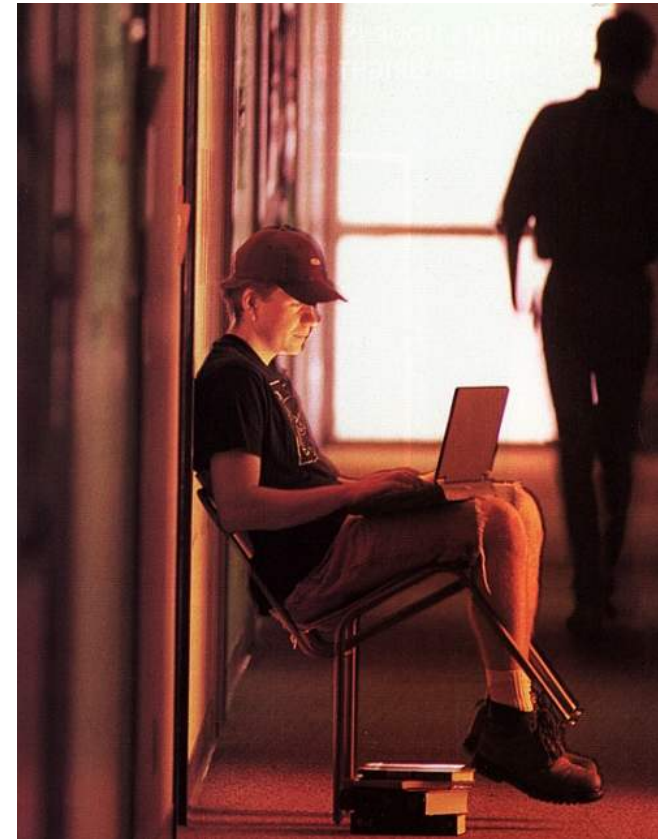


Data source: www.telecompetitor.com

BANDWIDTH, THE 4TH UTILITY



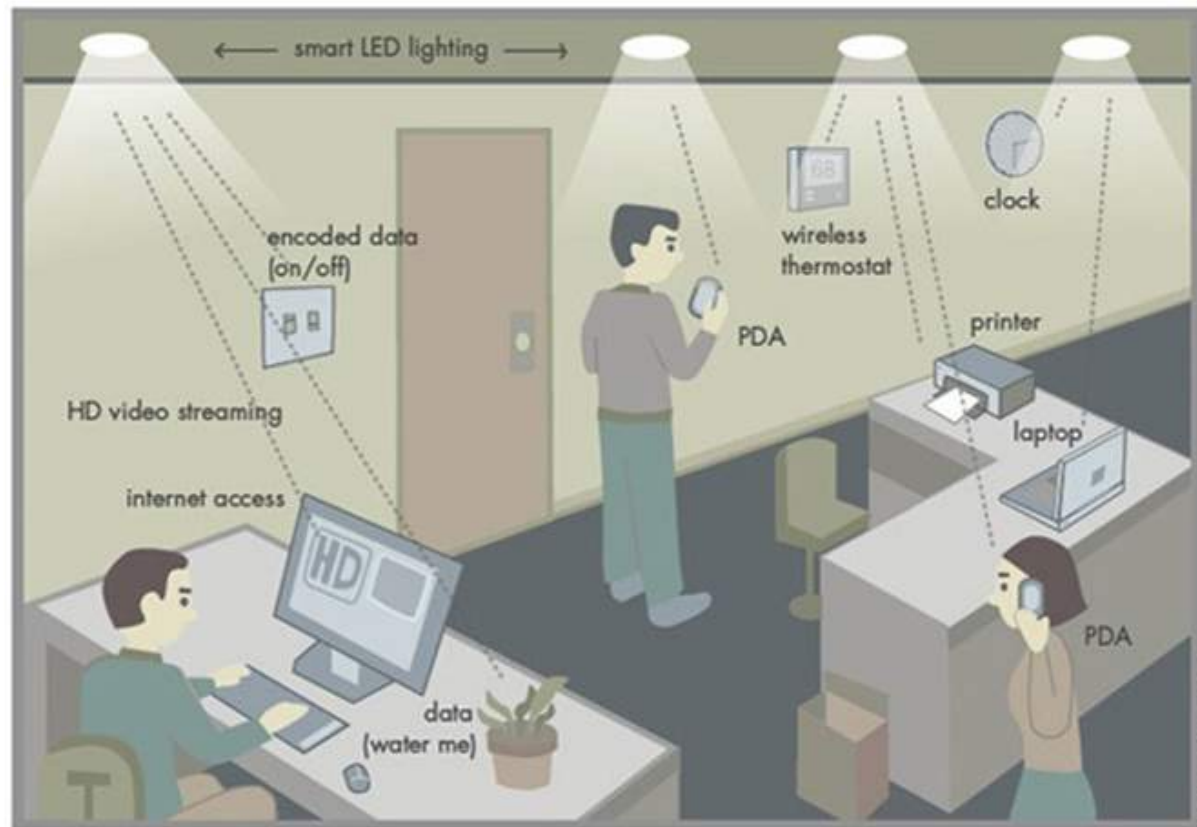
- ✦ **Wireless LAN (Wi-Fi)**
- ✦ **Bluetooth, NFC, RFID, DAS
Zigbee, Thread, Li-Fi and
more**
- ✦ **The era of “Personal
Broadband” is upon us**



YOUR PERSONAL AREA NETWORK

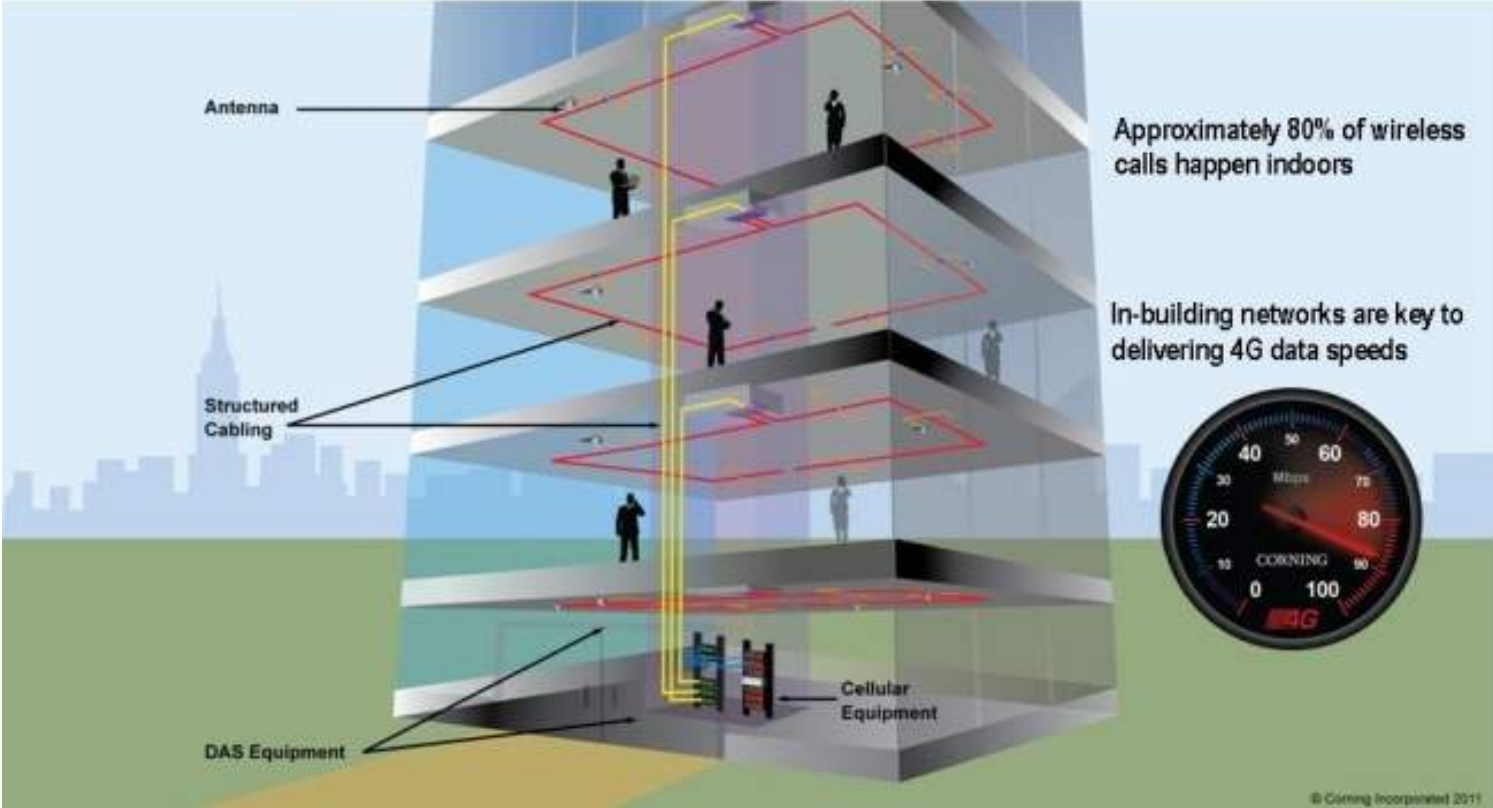


LI-FI APPLICATIONS



https://www.ted.com/talks/harald_haas_wireless_data_from_every_light_bulb?language=en

DIGITAL ANTENNA SYSTEM



CLOUD COMPUTING

amazon.com

Dear Customers,

Managing a digital music collection is a bit of a mess. It's possible to buy music from your phone, but then it might get stuck there. It's possible to buy music from your work computer, but then you have to remember to transfer it to your home computer. Most people just wait until they get home and do their purchasing from there. What's more, if you're not regularly backing up your music collection, you can lose it with a disk drive crash.

We're solving those problems today with two important new offerings: Amazon Cloud Drive and Amazon Cloud Player. [Cloud Drive](#) is your personal disk drive in the cloud. Anything you put in Cloud Drive is robustly stored in Amazon's datacenters. You can upload your music collection to Cloud Drive, as well as any other digital documents.

amazon cloud player

Play Your Music Anywhere

Launch Player


Web -- no software to install -- just a web browser. The Android version is an app that lets you do the same thing from your Android phone or tablet.

Combined, these services allow you to store your music worry-free in the cloud and enjoy it anywhere. When you buy any of the 15 million songs in the Amazon MP3 Store, you'll now see a new option to put your purchase directly into your Cloud Drive.

To start, we're giving you 5 GB of free Cloud Drive storage. Plus, new purchases from the [Amazon MP3 Store](#) are stored for free and do not count against your storage quota.

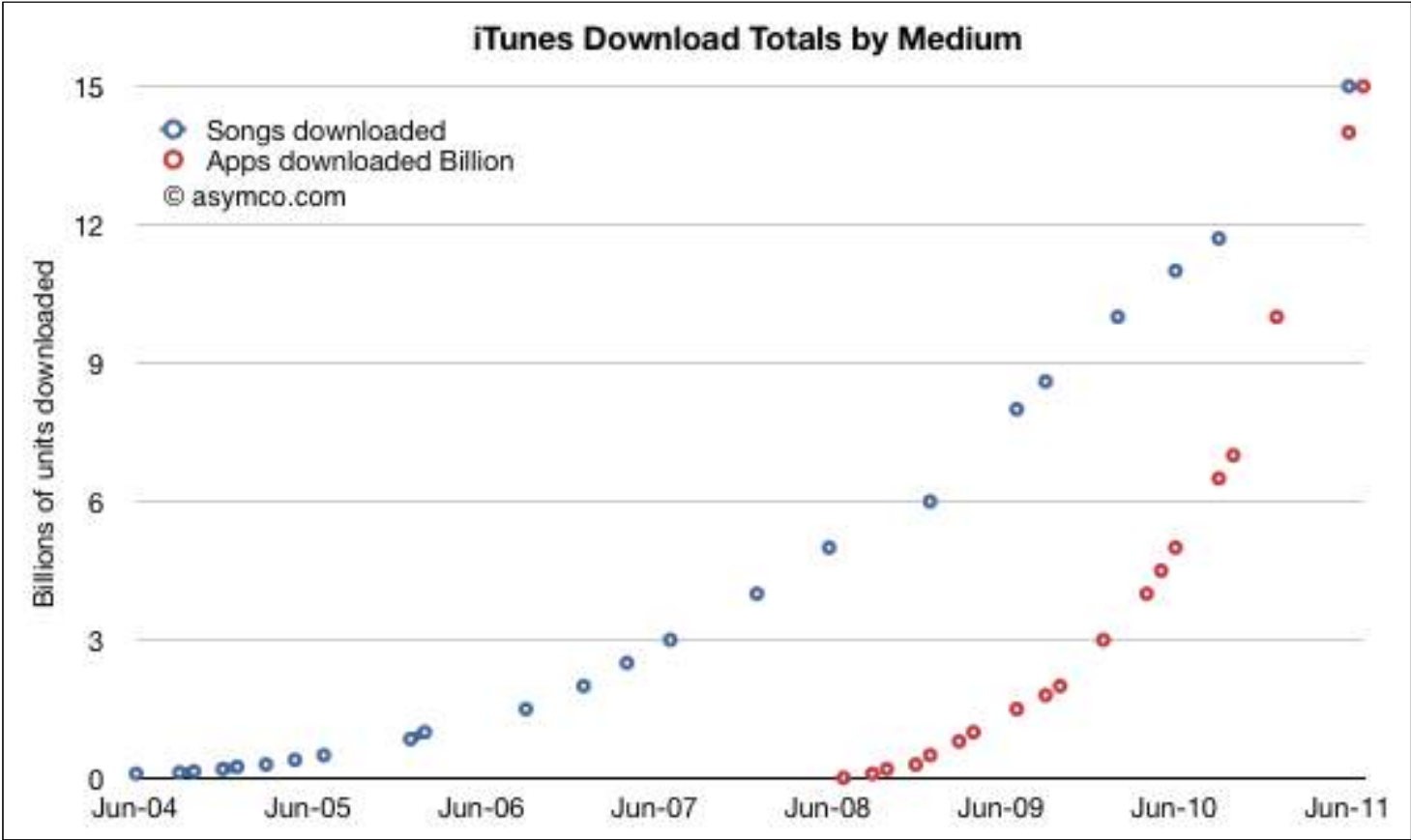
We're excited to offer you the ability to buy anywhere, play anywhere, and keep your music in one place.

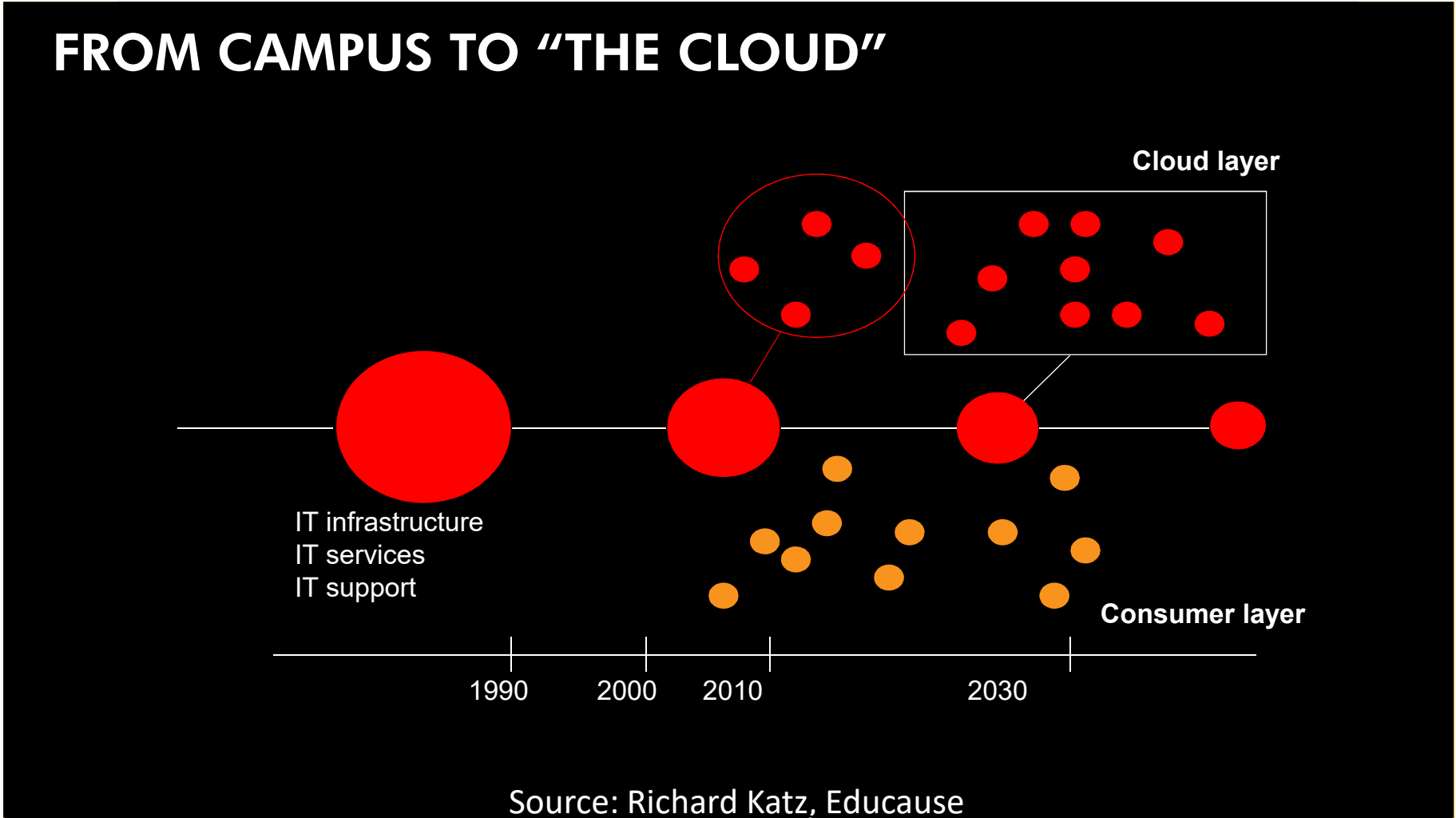
Enjoy and happy listening,



Jeff Bezos
Founder & CEO

APPS > MUSIC



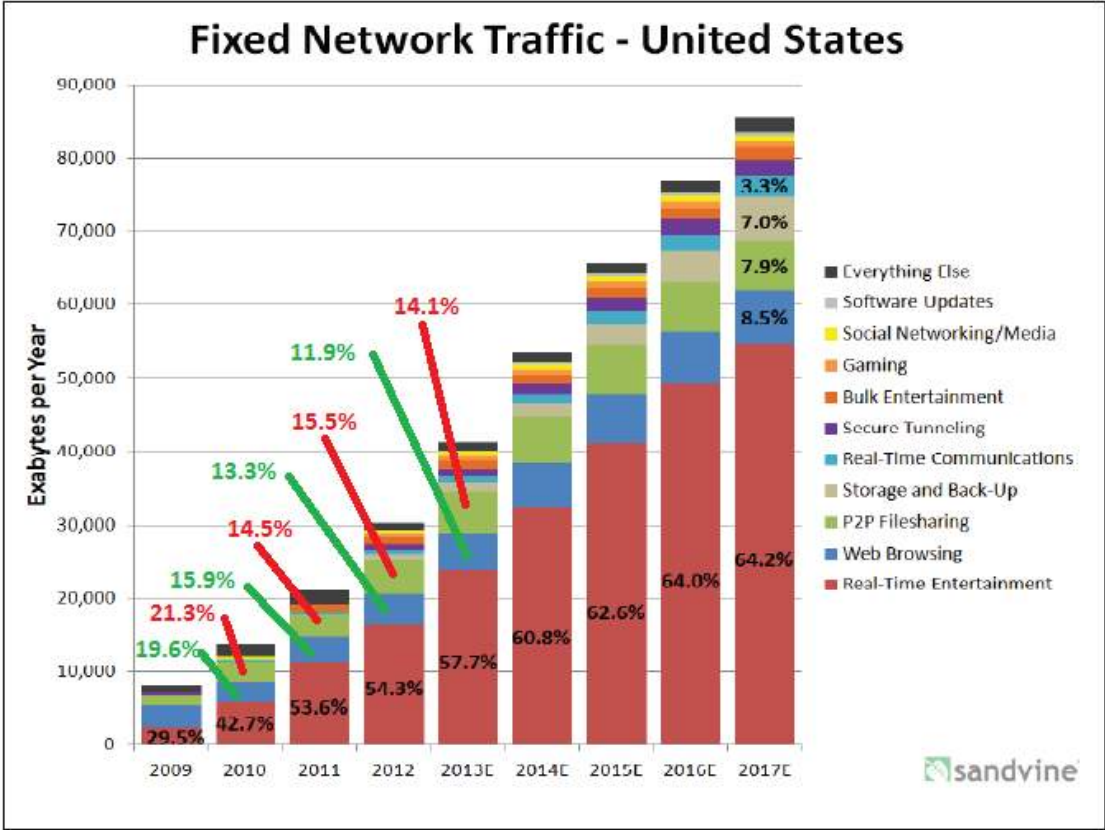


*Unlike the current World Wide Web,
the “Great Global Grid” will be
primarily a visual medium.*

*—Michael Malone
“Internet II: Re-booting America”*



THE INTERNET TODAY



THE NEW INTERNET

Netflix is often reported as generating over 30% of the evening Internet traffic. YouTube, Hulu, Amazon Fire TV, Twitch and Roku likewise place huge demands on the Internet infrastructure.



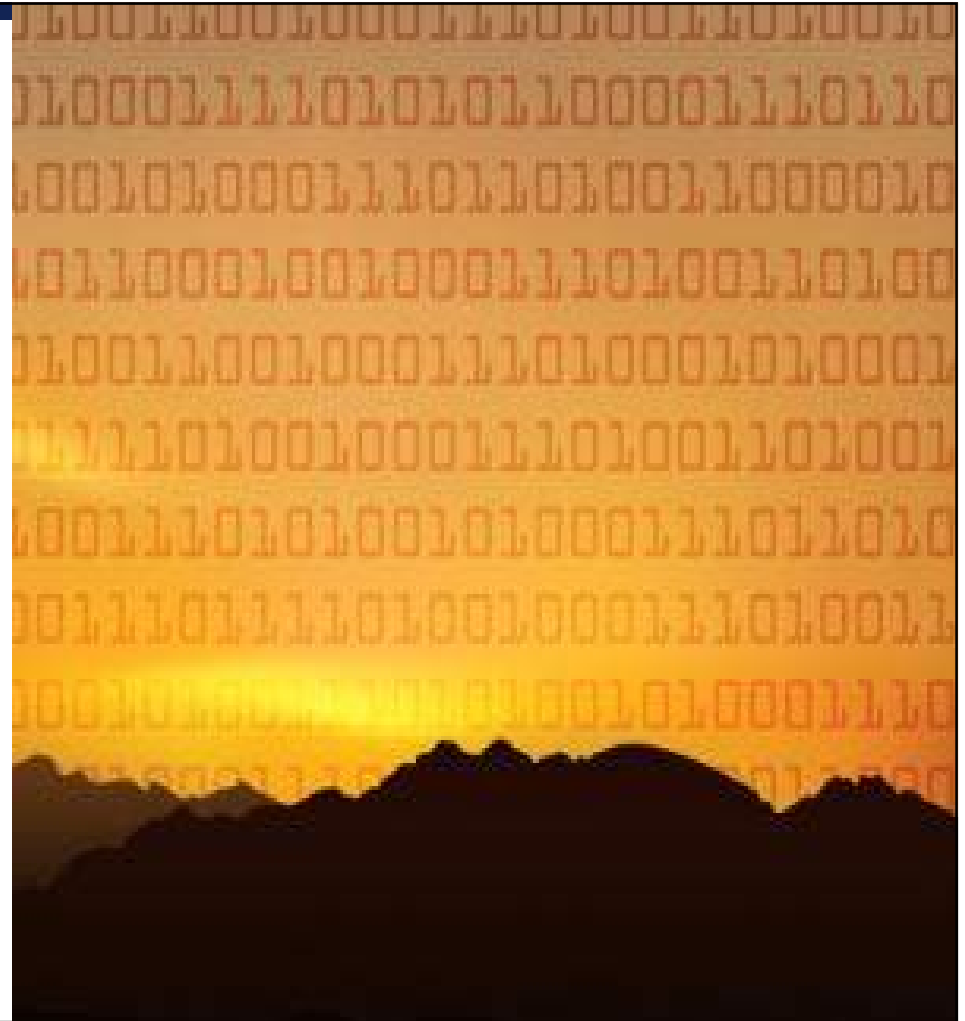
the end of AV | as we know it

ANALOG SUNSET

2.2.2.2 ANALOG SUNSET –

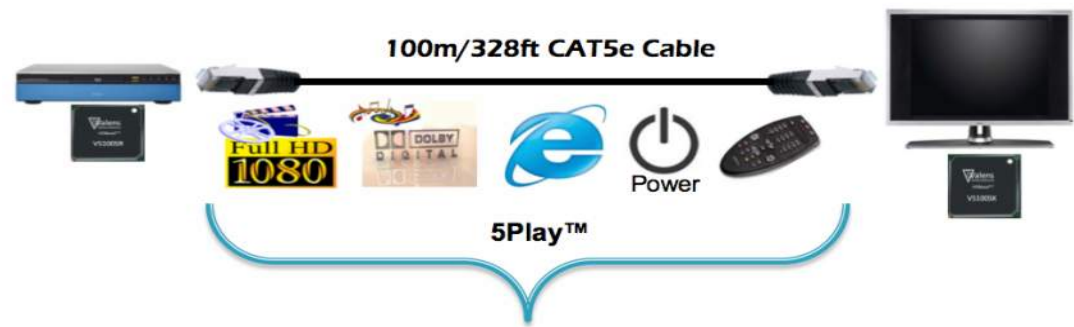
No Licensed Player that passes Decrypted AACCS Content to analog video outputs may be manufactured or sold by Adopter **after December 31, 2013.**

Source: Advanced Access Content System (AACCS) Final Adopter Agreement, available at <http://www.aacsla.com>.



AV & IT CONVERGENCE

Uncompressed HD Multimedia
Distribution



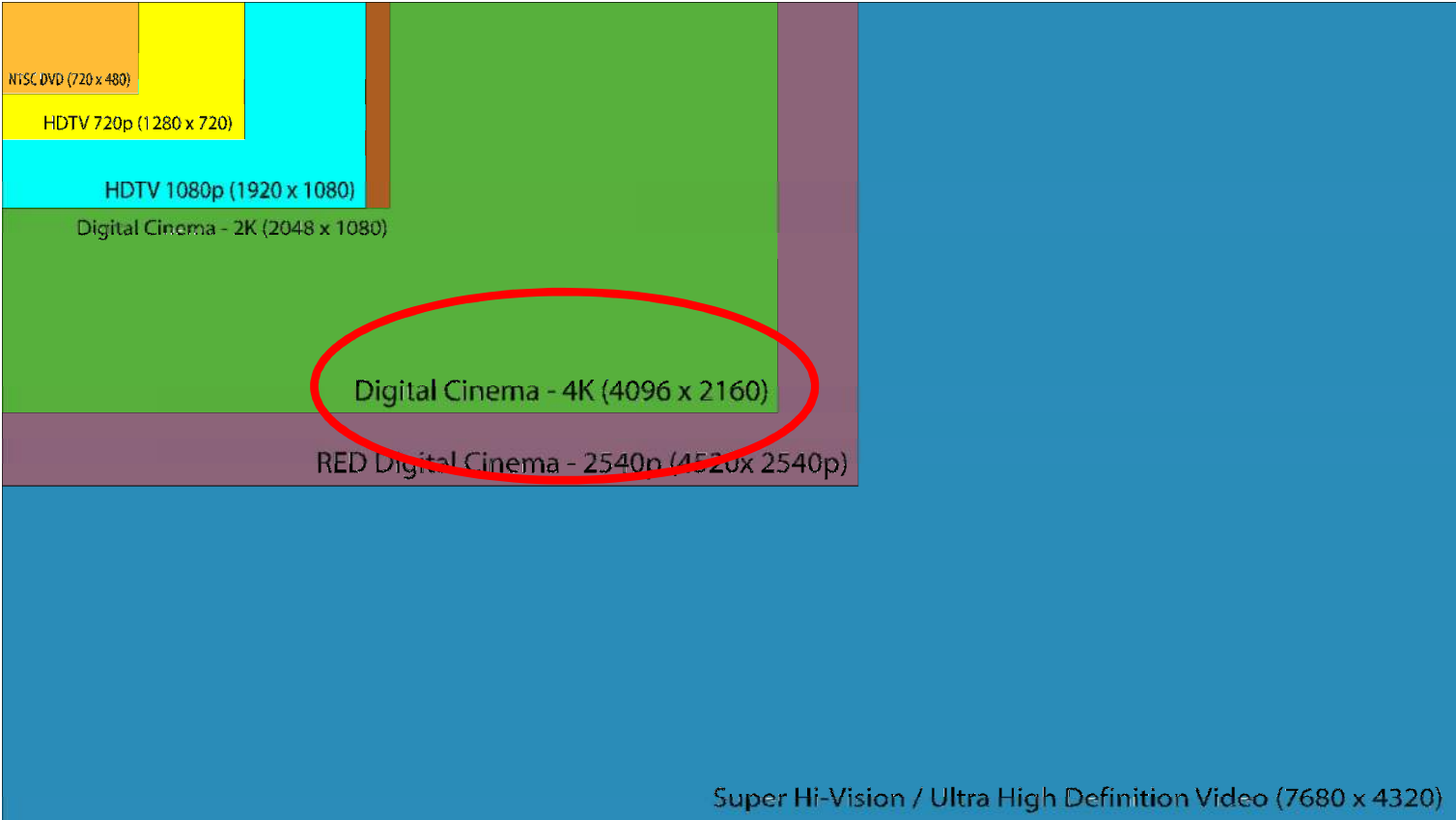
5Play convergence via a 100m/328ft CAT5e LAN cable



HDbaseT™

6

ULTRA HI-DEF VIDEO (UHD) AKA "4K"



OLED DISPLAYS



FLEXIBLE OLED DISPLAYS



From LG, only .97 mm thick, it peels off its magnetic backing...

FLEXIBLE OLED DISPLAYS



LARGE SCREEN DISPLAYS



FLEXIBLE LED DISPLAYS



MULTI-TOUCH 'SMART' DISPLAYS



MULTI-TOUCH 'SMART' WINDOW



OLED MIRROR



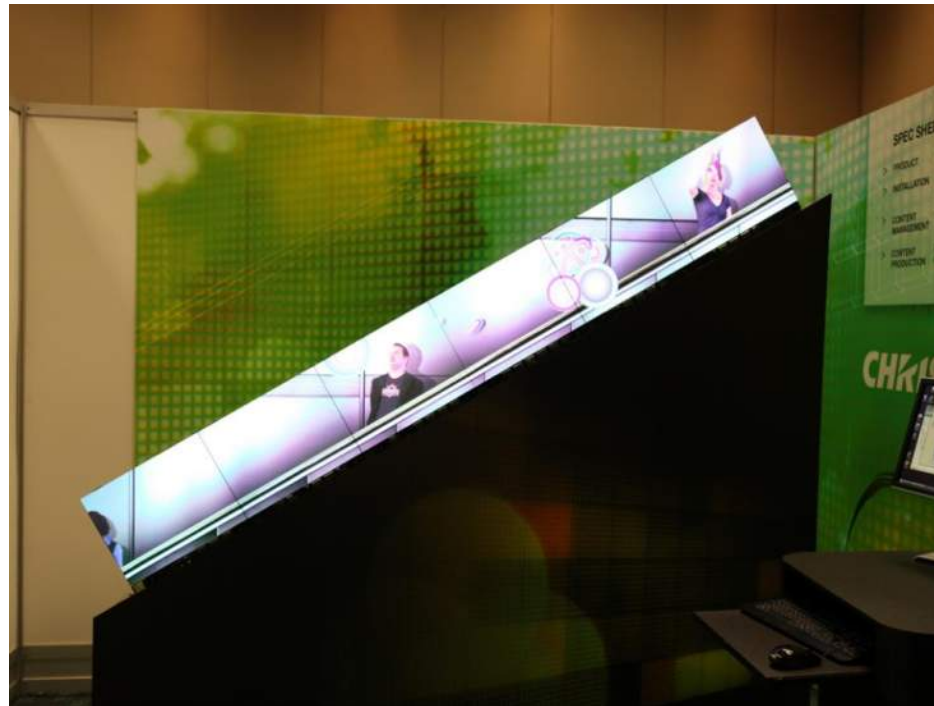
LASER PANEL / TOUCH SCREEN



BUILDING BLOCK DISPLAYS



Christie
Microtiles





COLLABORATION

Screen Sharing to Group Interaction

ANALOG IN A DIGITAL WORLD





COLLABORATION TOOLS

GROUP PRESENTATION



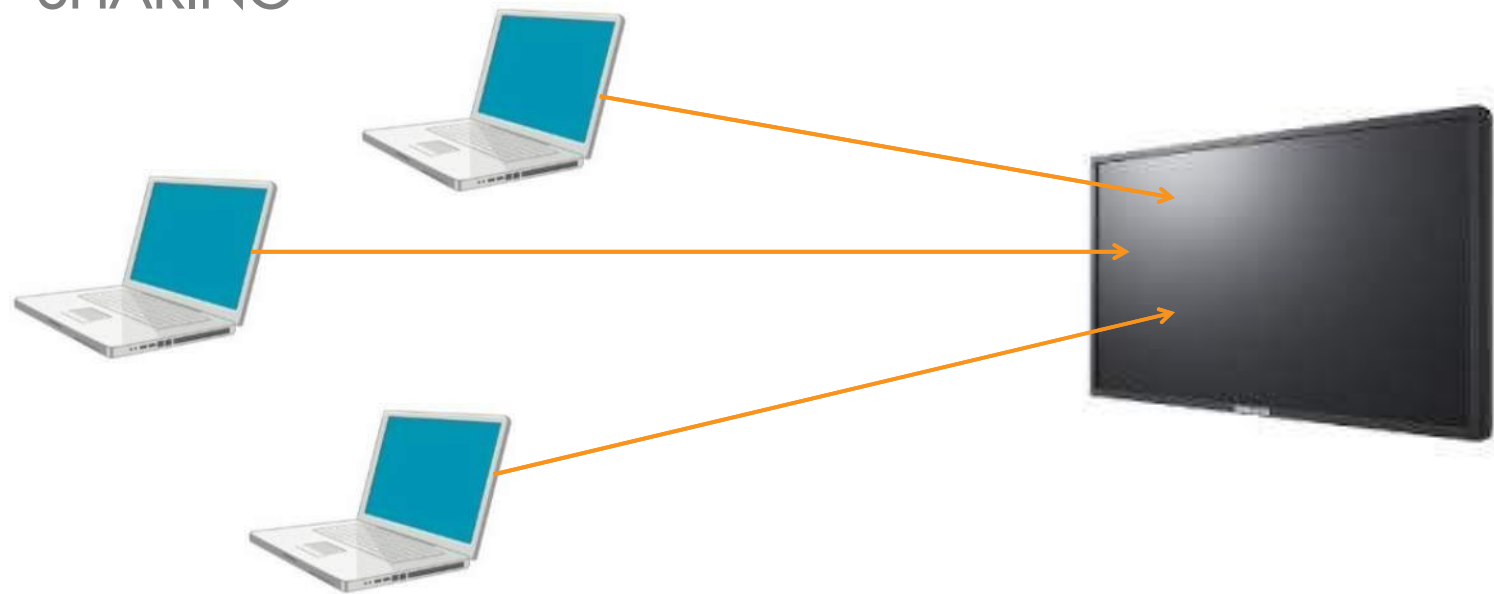
One device presenting on display

All content is generated on one device

- Hard-wired directly to a wall or table connection point

COLLABORATION TOOLS

GROUP SHARING



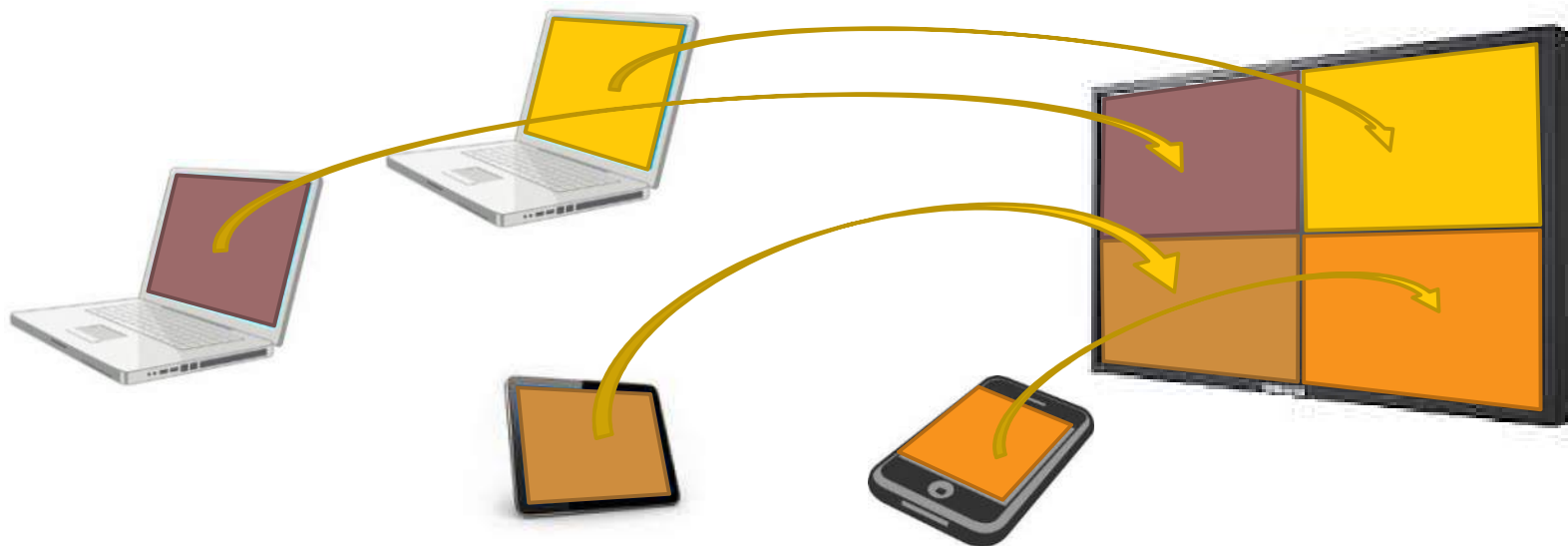
Content can come from one to many wired devices

Content displayed one at a time, or in a split screen fashion

Examples: Crestron, AMX, Extron digital media switching

COLLABORATION TOOLS

GROUP WIRELESS SHARING



Multiple devices presenting independently on display wirelessly

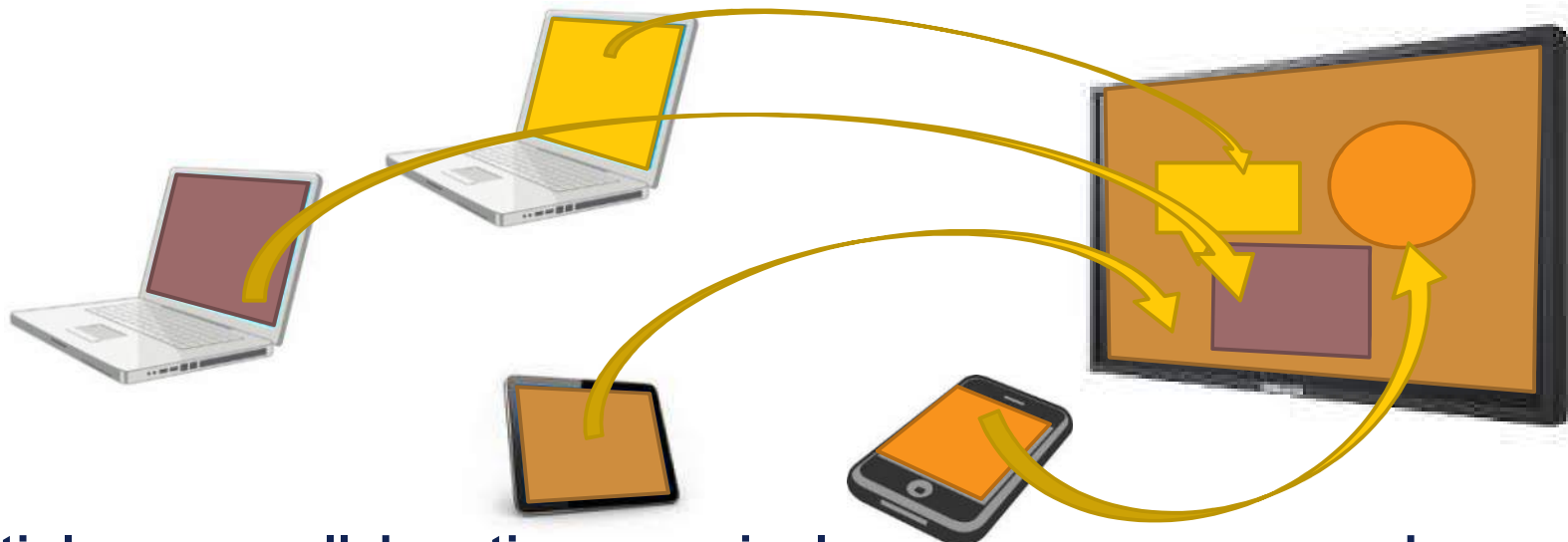
Content can come from one to six devices

Content displayed one at a time, or in a split screen fashion

Examples: Mersive Solstice Pod; wePresent 2000, etc.

COLLABORATION TOOLS

GROUP WIRELESS COLLABORATION



**Multiple users collaborating on a single screen on a common document;
Content can come from many different devices; saved to the cloud
Examples: TideBreak “Teamspot”, Kramer “Collab8”**

COLLABORATION SPACE



University of Texas Southwestern Medical Center TBL Classroom

THE COLLABORATION ANALOG



MULTI-SCREEN VISUALIZATION



Image: Oblong Mezzanine

MULTI-TOUCH VISUALIZATION



MULTI-TOUCH VISUALIZATION



Image: BlueScape

MULTI-TOUCH VISUALIZATION



Image: Anacore Synthesis

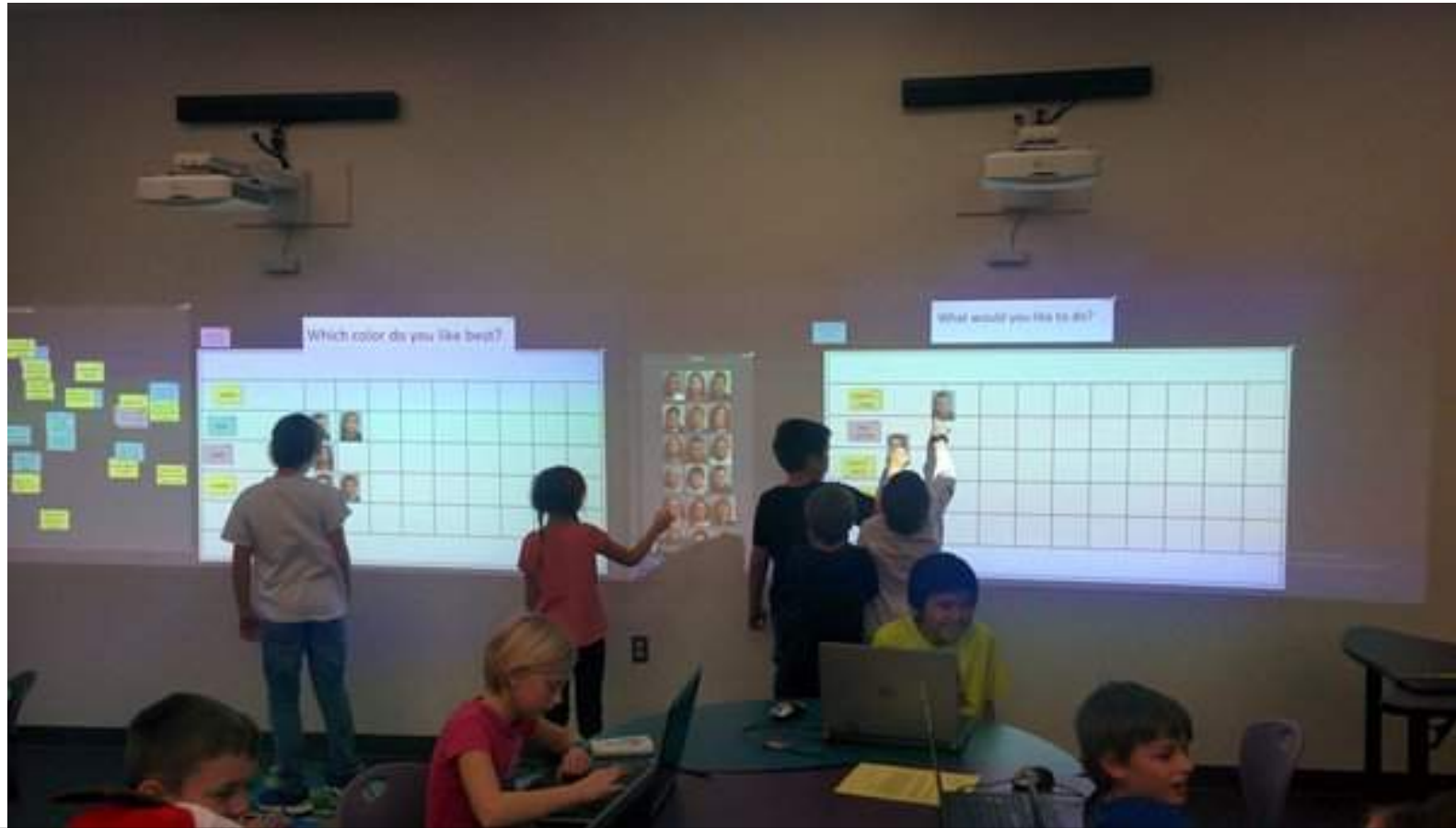








NUREVA "SPAN"



INTERACTIVE TABLES



SERIOUS GAMING

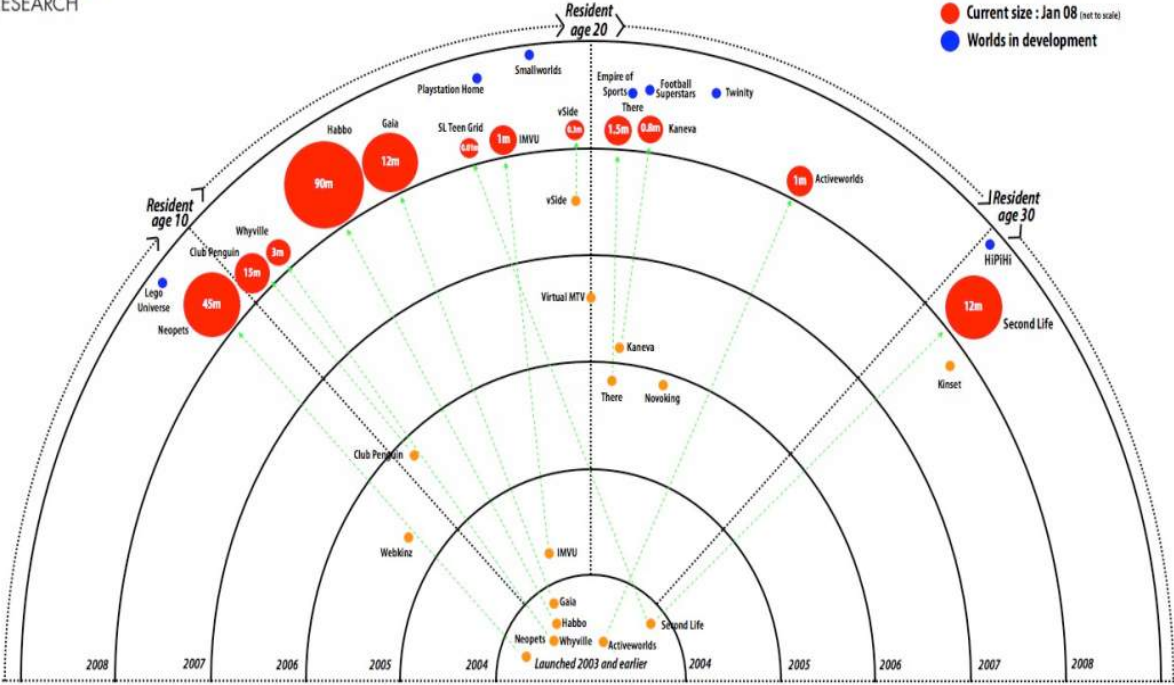


VIRTUAL REALITY

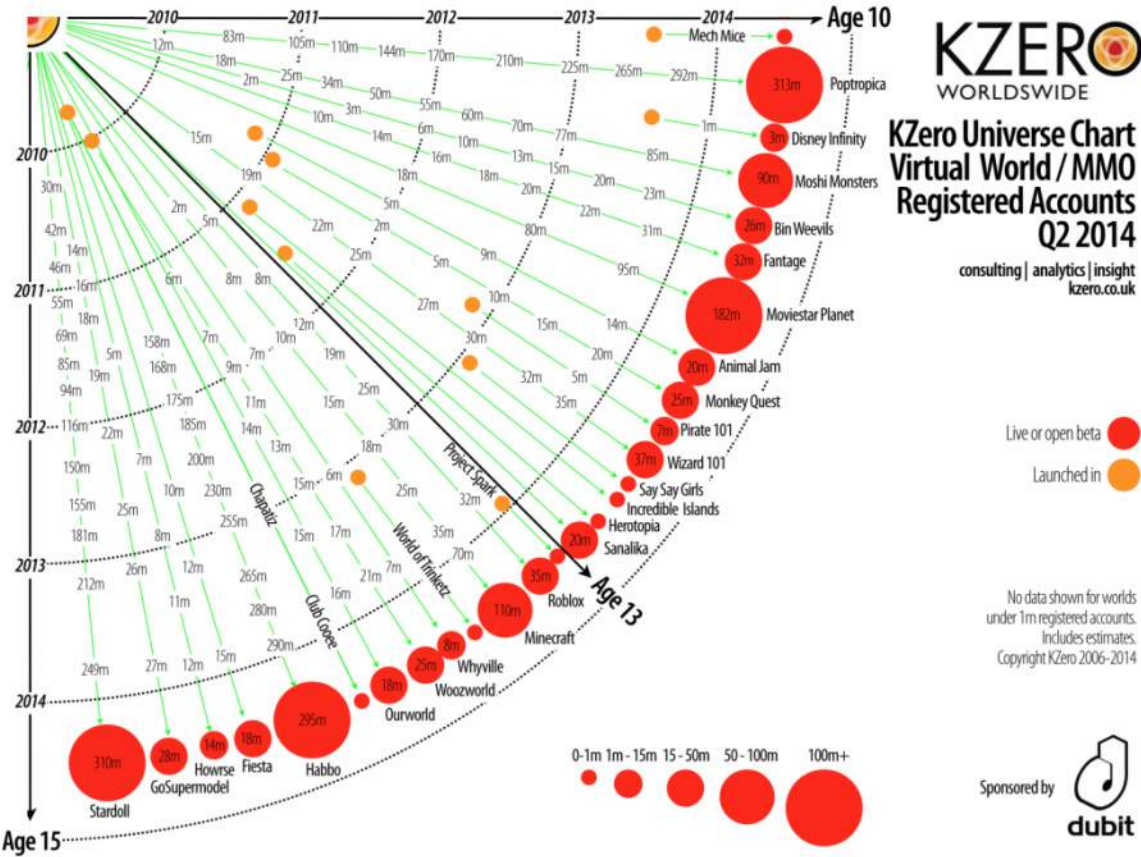


Virtual World total registered accounts

- Year/month of launch
- Current size : Jan 08 (not to scale)
- Worlds in development



VIRTUAL REALITY 2014



OCULUS RIFT



OCULUS RIFT



OCULUS RIFT

“Our goal is to make virtual communication even better than real-world communication,” Luckey said.

“VR is the only thing that will get us there.”

The time is coming when, if someone says “let’s meet,” everyone will know that means let’s meet in VR. The default mode of VR is “together.”

-Palmer Luckey

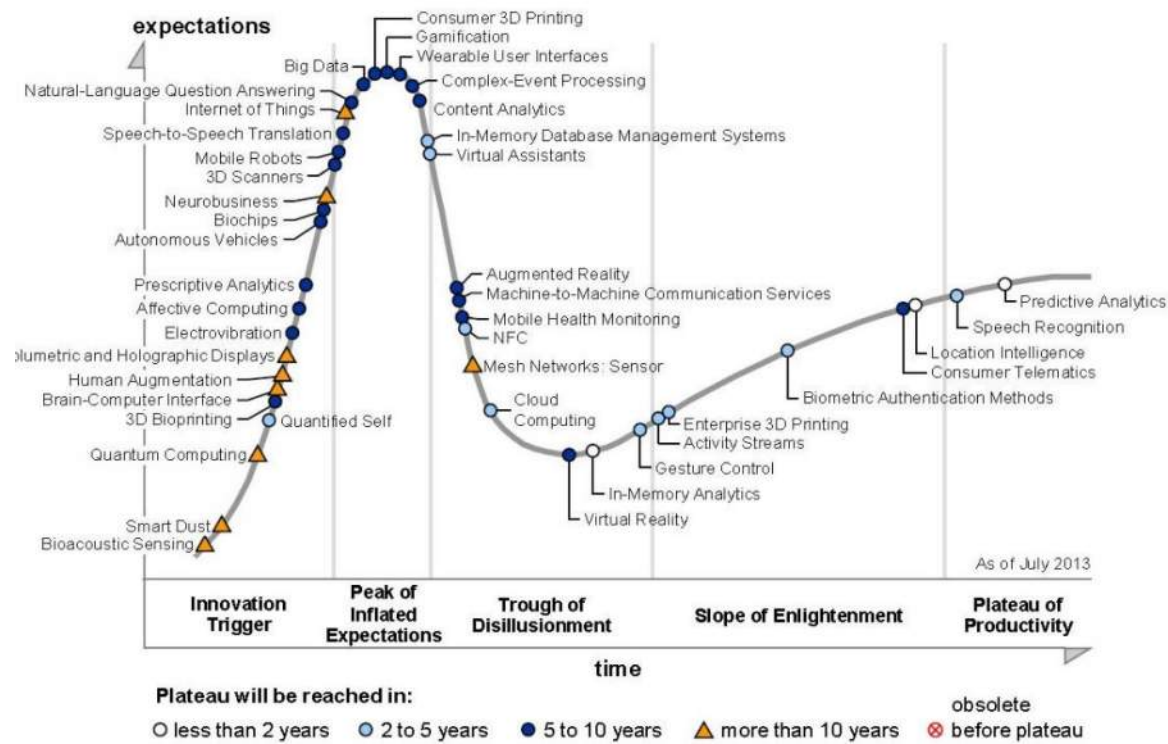
Founder of Oculus Rift

MAGIC LEAP

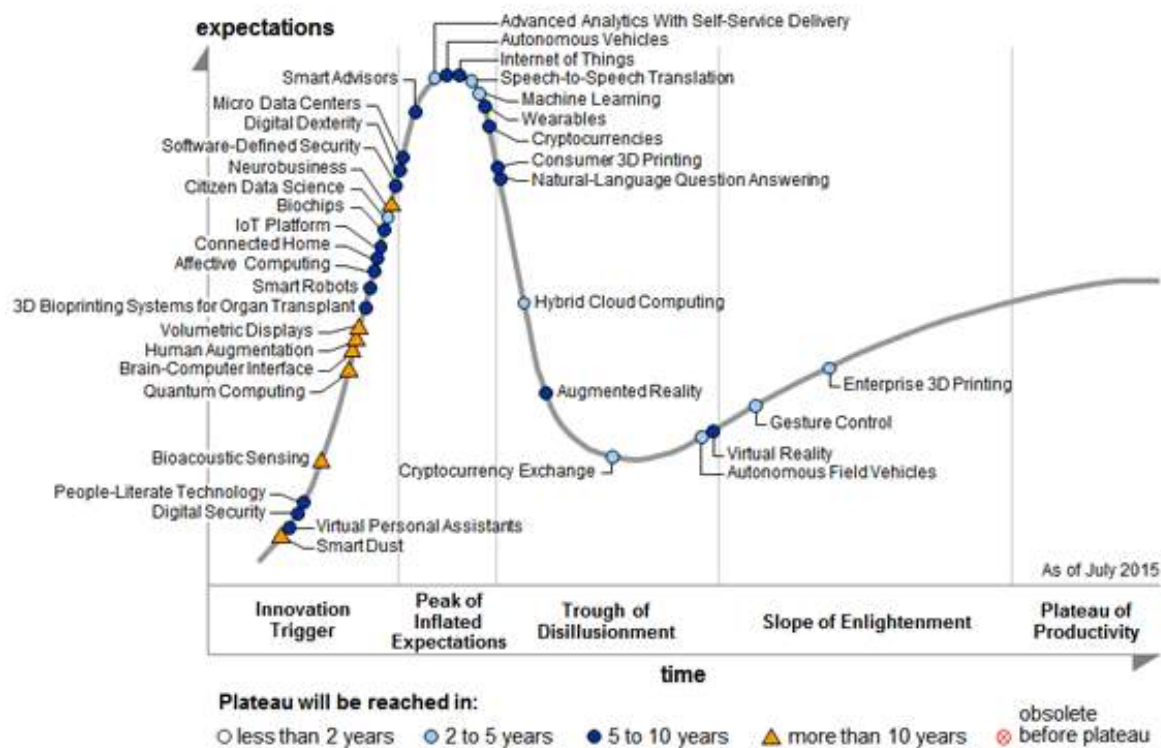


© 2017 The Sextant Group, Inc.

GARTNER TECHNOLOGY HYPE CURVE



GARTNER TECHNOLOGY HYPE CURVE



INFORMATION APPLIANCES



This “Digital Refrigerator” tracks its contents, automatically orders groceries, and provides recipes based on what’s inside.

(It’ll also provide news, sports, and weather!)

A WORLD OF SENSORS



30 BILLION

Sensor enabled objects
connected to networks
by 2020



212 BILLION

Total number of
available sensor
enabled objects by
2020

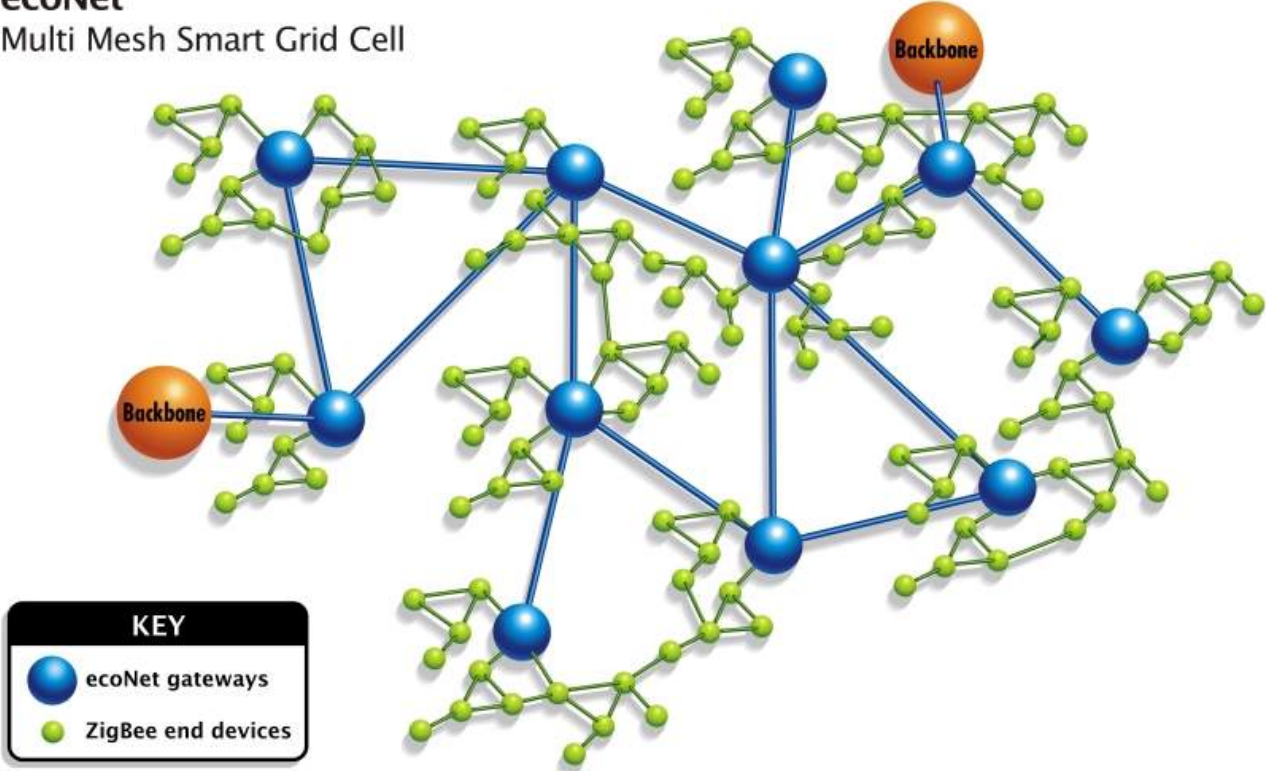
212B is **28x** the
total population of
the world



MESH SCALABILITY



ecoNet
Multi Mesh Smart Grid Cell

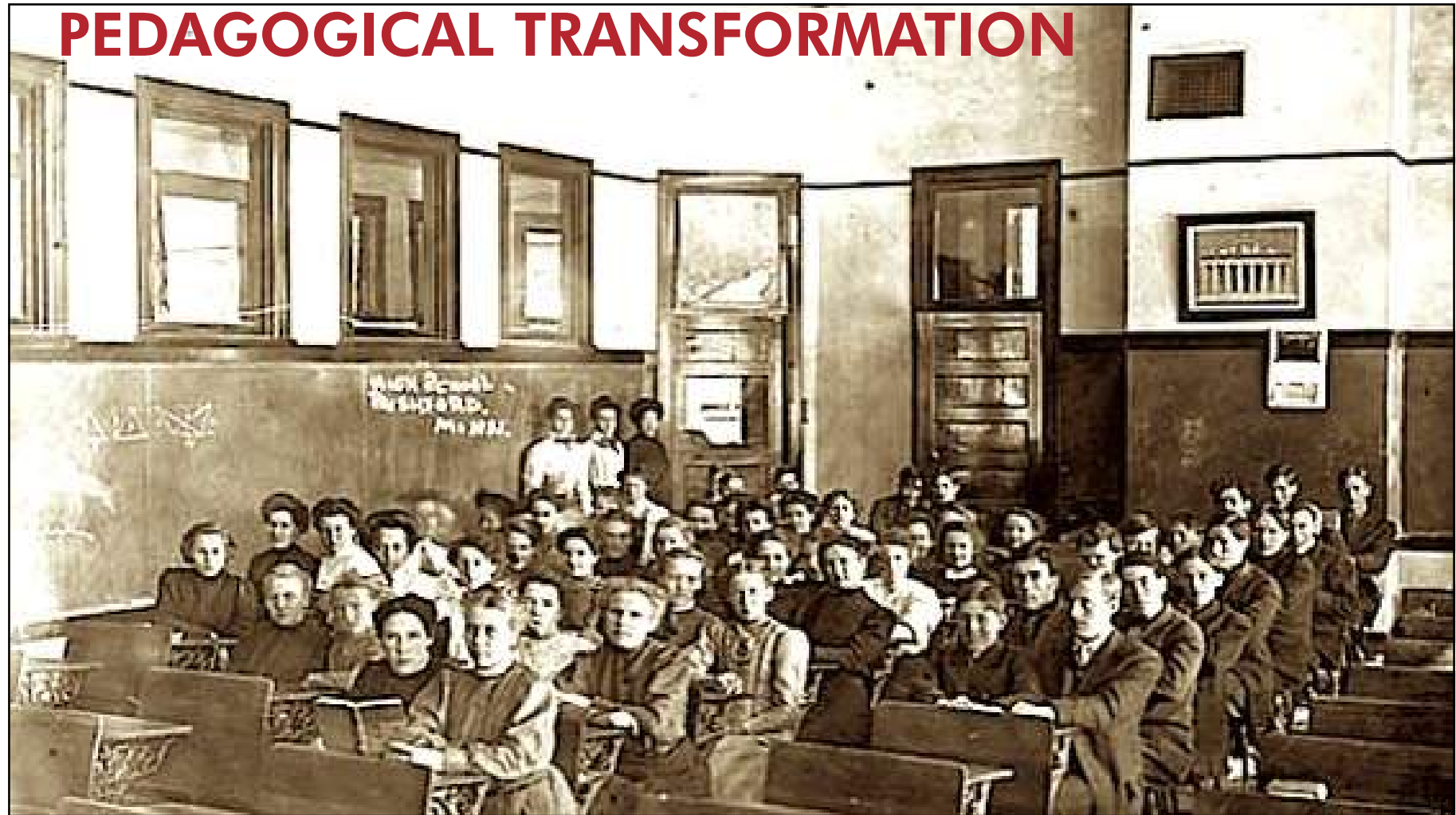


THE LIGHTING REVOLUTION



**Power over Ethernet (PoE)
meets
Light-Emitting Diode (LED)**





TRANSFORMATION



“Paradigm shifts come when technologies are disruptive to the status quo. On this basis, it is safe to conclude that technology has thus far not produced a paradigm shift in education.”

*- David Thronburg
The Thronburg Institute*

TRANSFORMATION ?



REAL TRANSFORMATION



University of Minnesota

THE DILEMMA

We are currently preparing students for jobs that don't yet exist, that will use technologies that have yet to be invented, to solve problems we don't even know are problems yet.

- Karl Fisch
Shift Happens
2008

THE CHALLENGE

Five years from now you'll be able to find the best lectures in the world on the Web for free...

So... place-based learning will be five times less important than it is today.

- Bill Gates
Microsoft
2010

LEARNING ANYWHERE

Worldwide networked learning will replace place-bound teaching.

- Dolence and Norris
*Transforming Higher Education:
A Vision For Learning in the 21st Century*
1995

INFORMATION EVERYWHERE

The university as mainframe will be replaced by the university as network.

– Don Tapscott
Growing Up Digital
1996

TRENDS IN PEDAGOGY



Traditional Pedagogy

- ✦ Teacher-centered instruction
- ✦ Single sense stimulation
- ✦ Single path progression
- ✦ Single media
- ✦ Isolated work
- ✦ Information delivery
- ✦ Passive learning
- ✦ Factual, knowledge-based
- ✦ Literal thinking
- ✦ Reactive response
- ✦ Isolated, artificial context

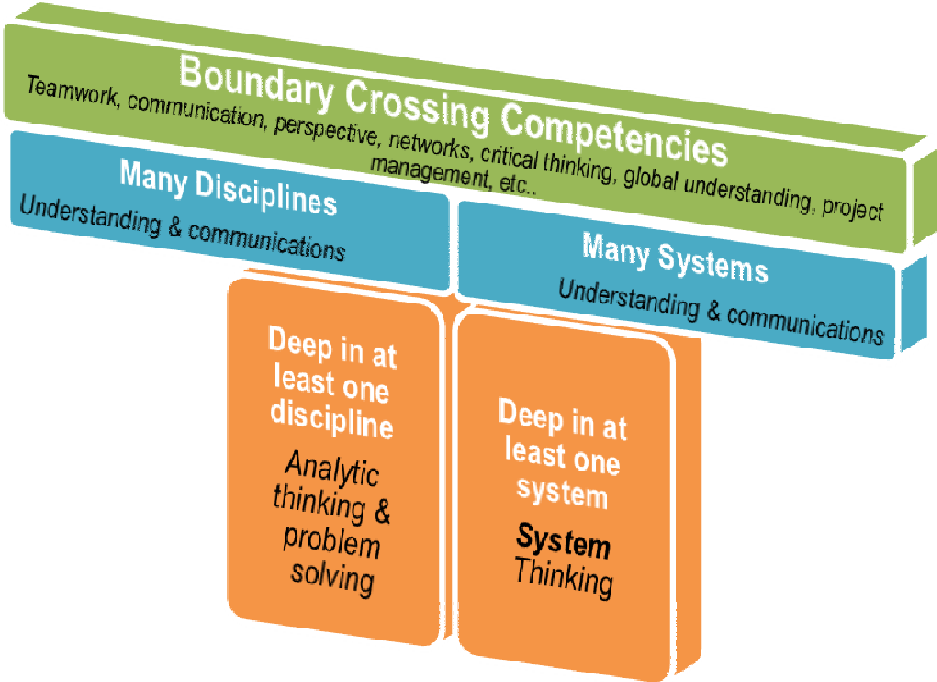
Contemporary Pedagogy

- ✦ Student-centered instruction
- ✦ Multi-sensory stimulation
- ✦ Multi-path progression
- ✦ Multimedia intensive
- ✦ Collaborative work groups
- ✦ Student-centered activities
- ✦ Active/exploratory learning
- ✦ Inquiry-based learning
- ✦ Information exchange
- ✦ Proactive/planned action
- ✦ Authentic, real-world context



The National Educational Technology Standards (NETS) Project is an International Society for Technology in Education initiative.

The “T-Shaped Student”



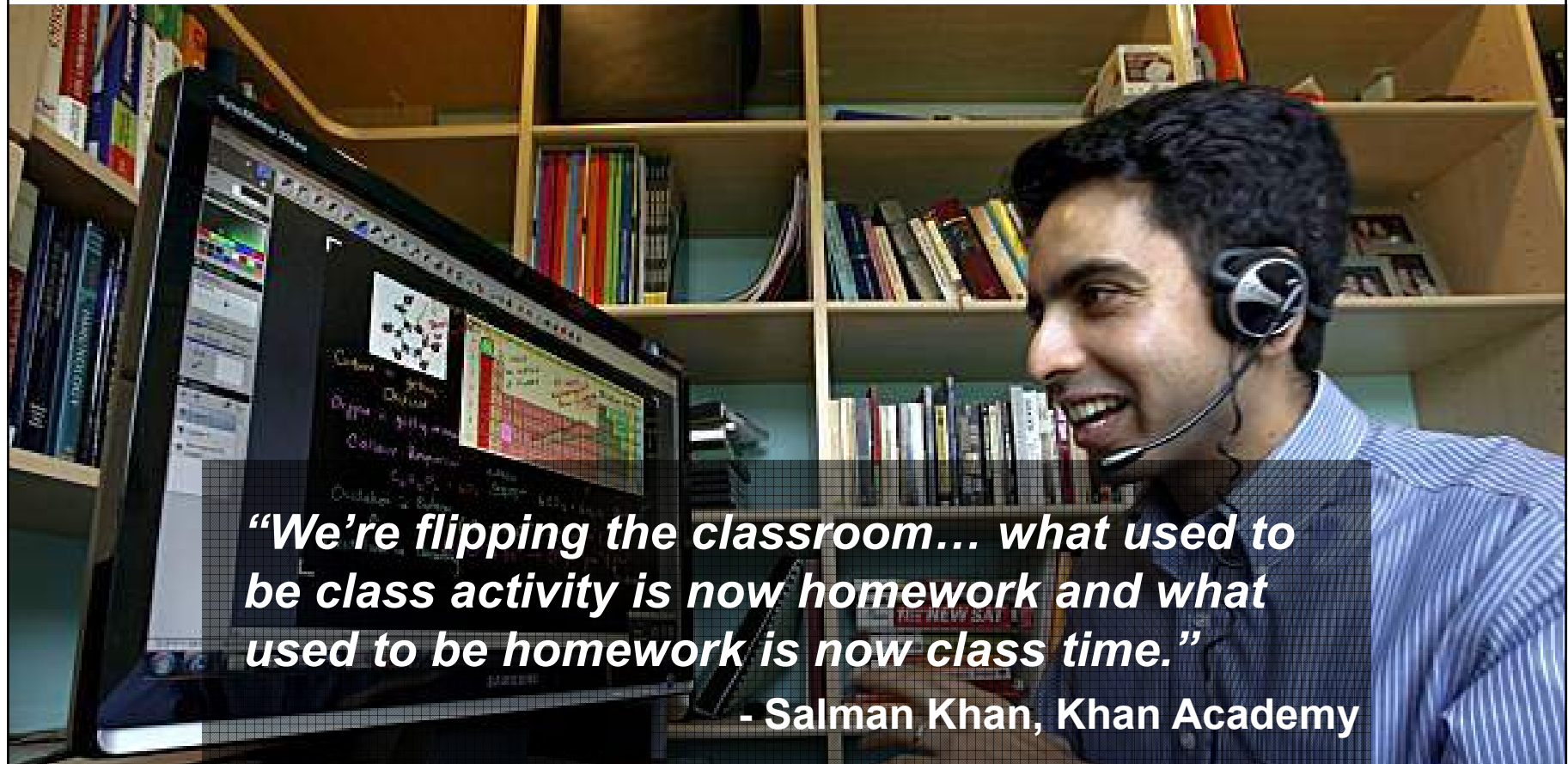
© 2015 IBM & Michigan State University
Designing for the T-Shaped Student

THE iGEN STUDENT

- ✦ Always On, Connected
- ✦ Active, Social & Visual
- ✦ Expect Full & Immediate Access to Media and Information
- ✦ Creates & Consumes Media
- ✦ Visual, Multi-sensory
- ✦ Connect Living & Learning
- ✦ Technology Is Cool
- ✦ Prefer Authenticity to Hype
- ✦ Want To Collaborate
- ✦ Global Thinkers; Connected to Others, World-wide



FLIPPING THE CLASSROOM



“We’re flipping the classroom... what used to be class activity is now homework and what used to be homework is now class time.”

- Salman Khan, Khan Academy



THE EMERGING ENVIRONMENT

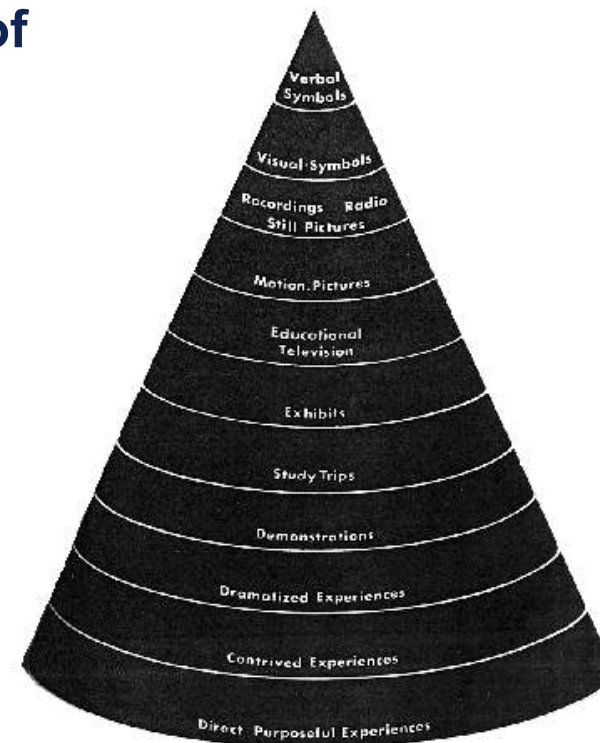
- **Learners have almost unlimited access to content, tools, resources, faculty, experts**
- **Unbundling of educational activities**
- **Importance of “the collective” is growing**
- **New “active learning” models gaining adoption**

Diana G. Oblinger, PhD
President, Educause

THE ROOM IS AN I/O DEVICE...

THE LEARNING PYRAMID

Edgar Dale's original "Cone of Experience" (1946)



THE LEARNING PYRAMID

10% of what we READ

20% of what we HEAR

30% of what we SEE

50% of what we both
HEAR and SEE

70% of what we SAY

90% of what we both
SAY and DO



THE LEARNING PYRAMID

10% of what we READ

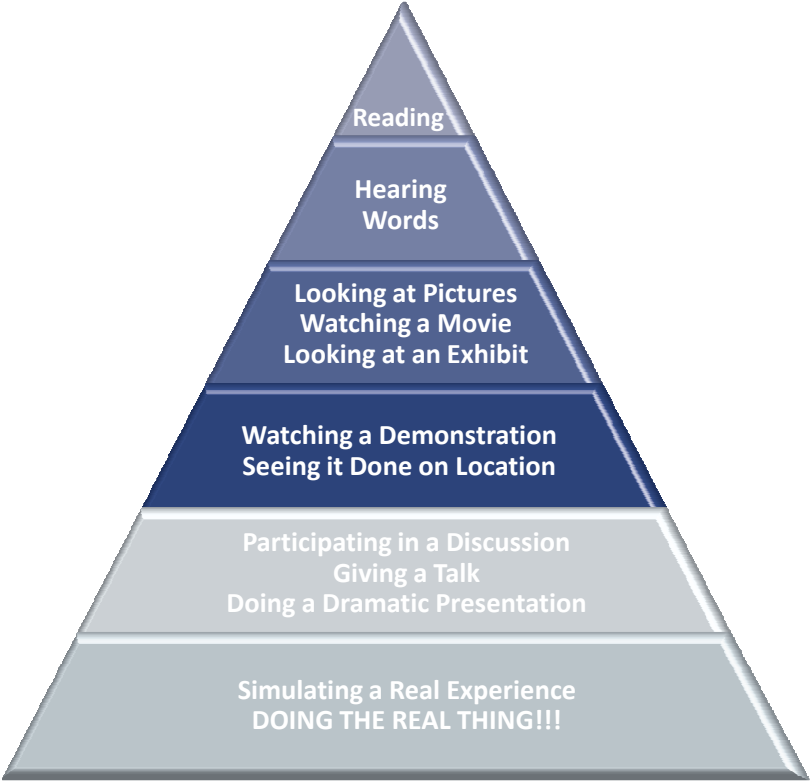
20% of what we HEAR

30% of what we SEE

50% of what we both
HEAR and SEE

70% of what we SAY

90% of what we both
SAY and DO



THE LEARNING PYRAMID

10% of what we READ

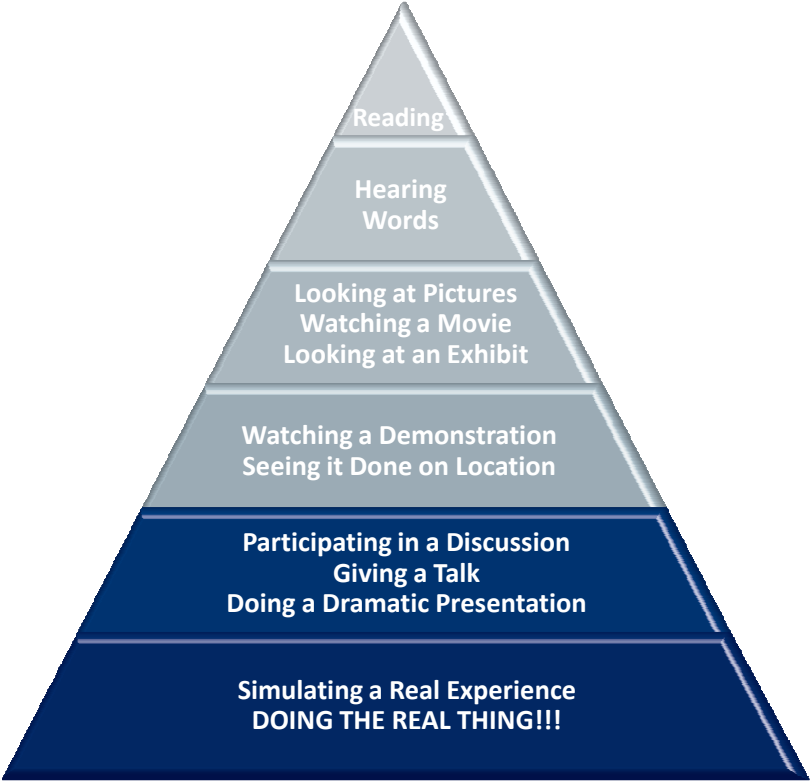
20% of what we HEAR

30% of what we SEE

50% of what we both
HEAR and SEE

70% of what we SAY

90% of what we both
SAY and DO

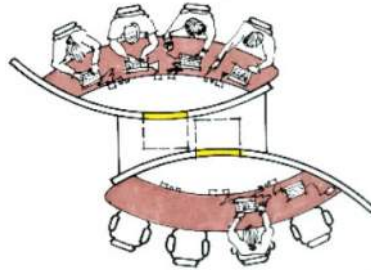


ST. VINCENT COLLEGE



Library Addition

Digital Lounge, 1996



WESTMINSTER COLLEGE



Student Union, 2000



COLLABORATION



UNIVERSITY OF MINNESOTA



UMKC BLOCH HALL FOR INNOVATION & ENTREPRENEURSHIP



CASE WESTERN RESERVE UNIVERSITY



CASE WESTERN RESERVE UNIVERSITY



CASE WESTERN RESERVE UNIVERSITY



UNIVERSITY OF VIRGINIA



UNIVERSITY OF MICHIGAN



PRESENTATION PRACTICE & RECORD



NEXT GEN ON-LINE INSTRUCTION

Northwestern University
LIGHT BOARD

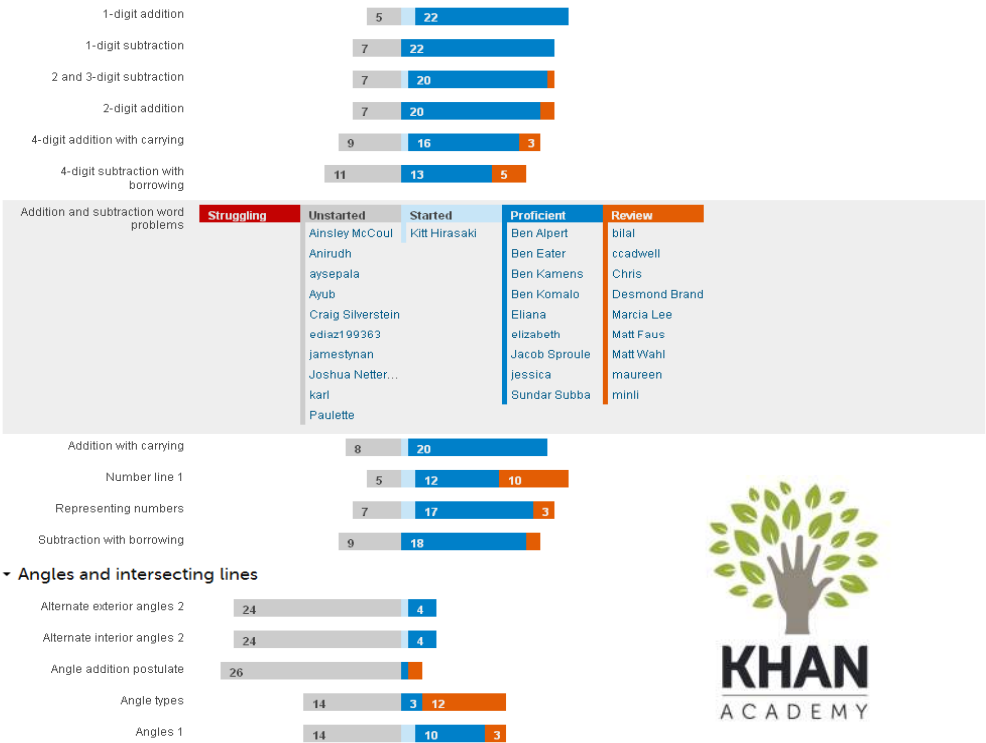


ANALYTICS

Energy Points
Goals

Expand All - Collapse All

▼ Addition and subtraction



ADAPTIVE LEARNING



[About](#) [Courses](#) [Adaptive Learning](#) [Blog](#) [Log In](#) [Plans & Pricing](#)

Adaptive Learning

[High Schools](#) [College Readiness](#) [Colleges/Universities](#) [Publishers](#) [Organizations](#) [Developers/API](#)

Adaptive Learning for Organizations

Power smart, scalable training and assessments with Knewton's open platform.



ADAPTIVE LEARNING

Irene Bloom, lecturer in math at Arizona State U., shows off Knewton, adaptive-learning software that gives students immediate feedback based on what they've learned.



ASU Remedial Math	Fall '09-Spring '11	Fall '11-Spring '12 (with Knewton)
Pass Rates	64%	75%
Withdrawal Rates	16%	7%
Students Finishing Early	n/a	45%

ARTIFICIAL INTELLIGENCE

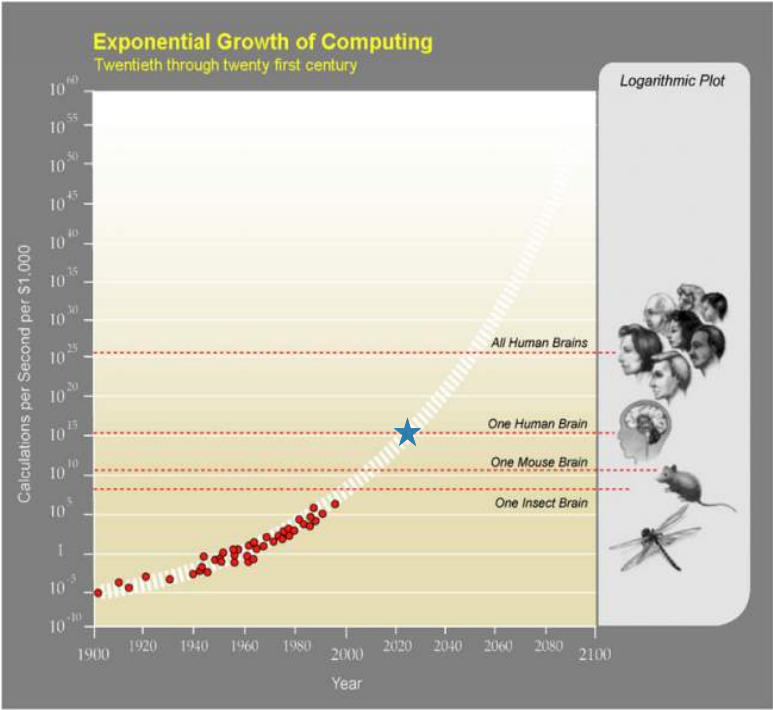
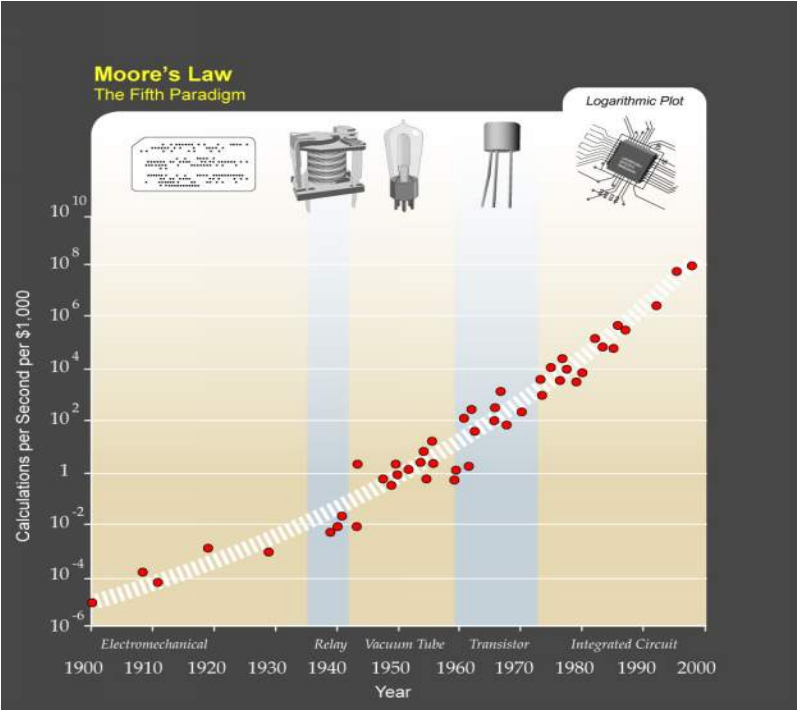


- ✦ **By 2029, sufficient computation to simulate the entire human brain, which I estimate at about 10^{16} (10 million billion) calculations per second (cps), will cost about a dollar.**

- Ray Kurzweil,
Foreword to “The Intelligent
Universe” by James Gardner



KURZWEIL'S SINGULARITY



2019?



**This is
Watson**



DISCUSSION



MOST IMPORTANT TECHNOLOGY TRENDS

Virtual Reality

Flexible Collaborative Spaces

Inside the class period

Artificial Intelligence

Active Learning & Collaboration Tools (2)

Learning Analytics

Infrastructure (2)

Connected

MOST IMPORTANT PEDAGOGICAL TRENDS

- **Multi-modal learning options**
- **Multi-modal assessment**
- **Teacher as facilitator (2)**
- **Problem-based learning (comfort zone for teachers)**
- **Smaller class size (no. of students)**
- **Prepare for disruption**
- **Flipping the band**
- **Moderate and balance the use of technology**
 - **Maintain the human interaction**

AND THE ANSWER IS...



Ohio State University 1906
Architectural History Class
Kerosene-fired projector with glass slides



THANKS!

Mark S. Valenti
President & CEO
The Sextant Group, Inc.
mvalenti@thesextantgroup.com
412.323.8580

