Internet Protocol version Six

Thinking about the inevitable

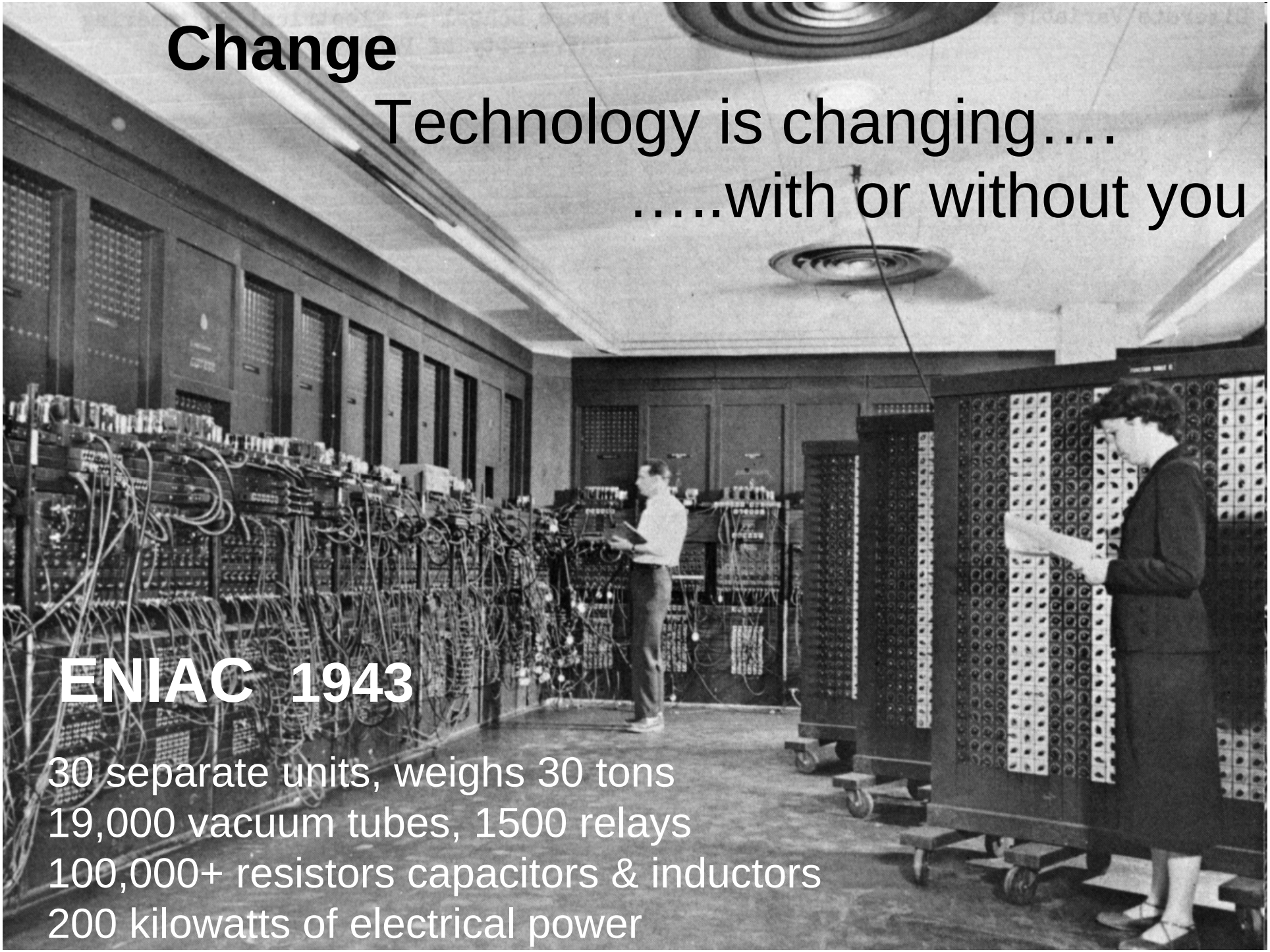
Welcome to RMv6TF Denver 2009

Agenda

- Why IPv6 is inevitable and a major (serious) topic
- Market drivers and where IPv6 sits in the market
- Change
  - What is changing? Dealing with change
  - You, your organization, your mission, your business
- Questions & Answers

IPv6 is a Technical Inevitability

- Best Advice “Be Prepared”
- Solutions and Networking are on a collision course with IPv6
- We need to get past the v4-v6 debate
- Technology is adopted when the IT ecosystems figures out how to make money…..
- Knowledge & Understanding is key

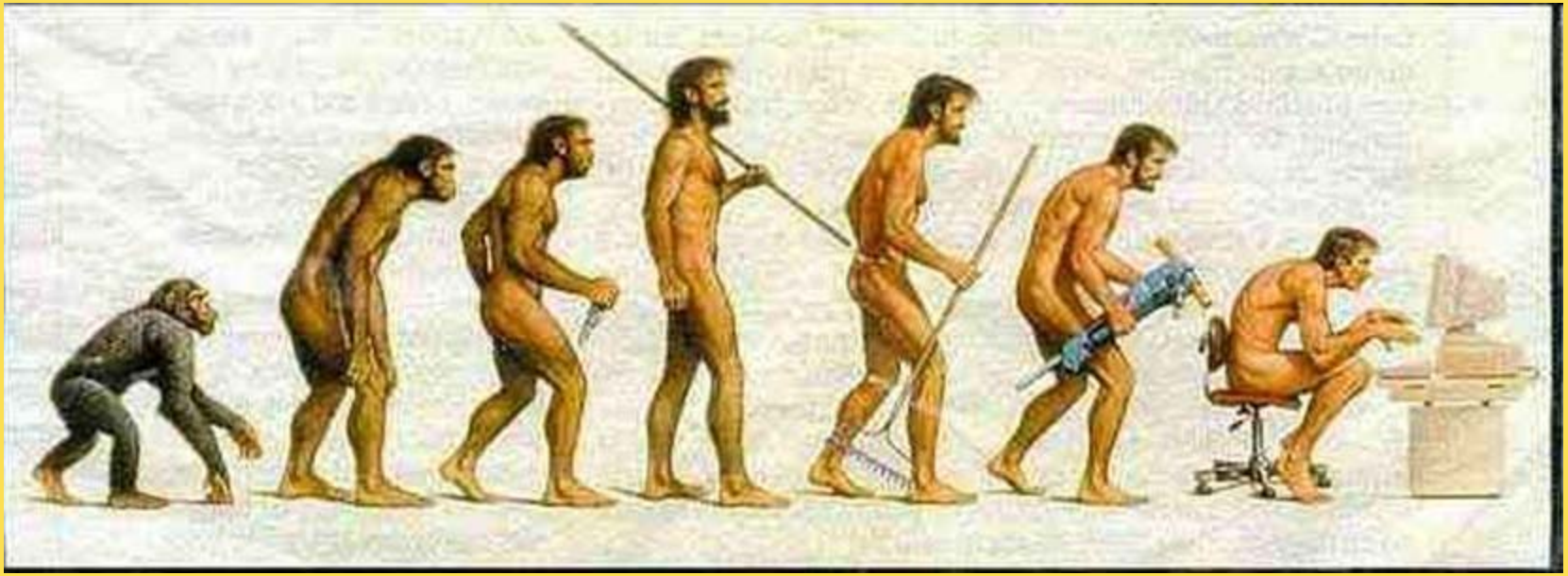

Change
Technology is changing….
…..with or without you
ENIAC 1943
30 separate units, weighs 30 tons
19,000 vacuum tubes, 1500 relays
100,000+ resistors capacitors & inductors
200 kilowatts of electrical power

IPv6 changes the IT landscape

sufficiently discussed topics…remember this slide

- Larger number of IP addresses
- New Node Discovery Architecture
- Advanced Auto-configuration capability
- Enhancements to Mobile IPv6 routing
- Improved multicast
- Different security model
- Restoration of the E2E Internet model
  - End-2-End will facilitate Peer-2-Peer
  - P2P will put pressure on the Client-Server model

“Change is inevitable”



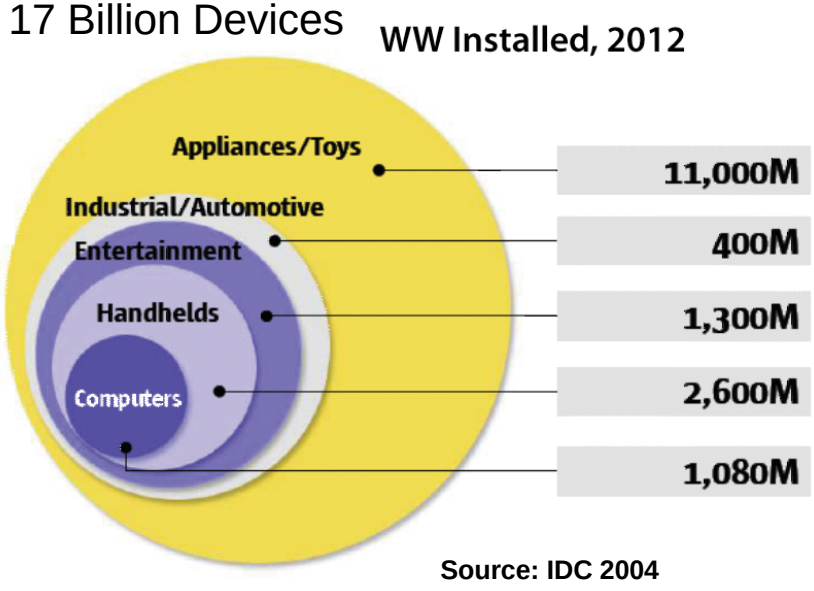
“Adaptation and survival are optional”

E2E=P2P What does your business look like in P2P?

Next Generation Networking-Everything a Network Device

Important to understand the coming changes

17 Billion Devices



•Sun Microsystems.. a *trillion* communicating devices *in a decade*

• DISN.. P2P traffic will quadruple between 2006 and 2011

• IBM.zettabyte of IP traffic (trillion gigbytes)

• Networking is changing-Solutions are changing.

•Are you prepared for change & IPv6?

• IP Consolidation and Internet Protocol is the communications platform

• Fundamental changes for solutions with the change from Client-Server to P2P

• Disruptive on the scale of the Mainframe to Client-Server computing change...Wang, DEC, Prime, etc ..

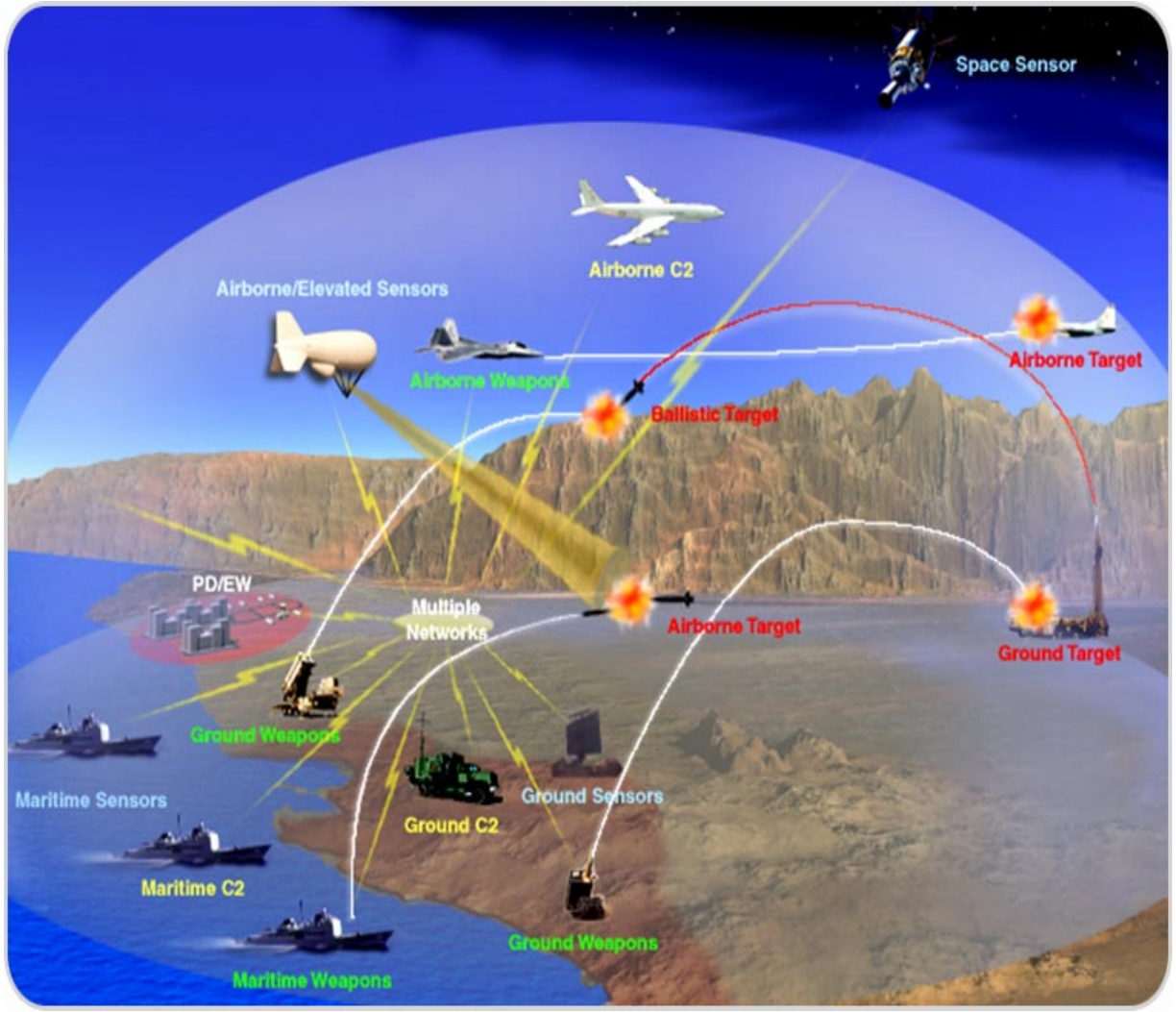
• Very different security model creating new threats and requiring new mitigation strategies

• Modification of the technical skill-set requirements

• New Markets are forming

Network Centric Warfighter- DoD Market

Large scale, mobile, ad-hoc, voice, data, video, secure, IP….



- Land, Air, Space C2
- Sensor-2-shooter, P2P, Mobility, Mesh, Unified Communications, Web 3.0 (3.5,4.0 etc.), neighbor discovery, geo-cast, LBS
- Without IPv6 …. Almost Impossible
- Innovation at the “network edge” will be restricted by the network
- Global Open-standard
- IP Consolidation

Intelligent Transportation Systems

Information & communications intersects vehicles & transportation infrastructure

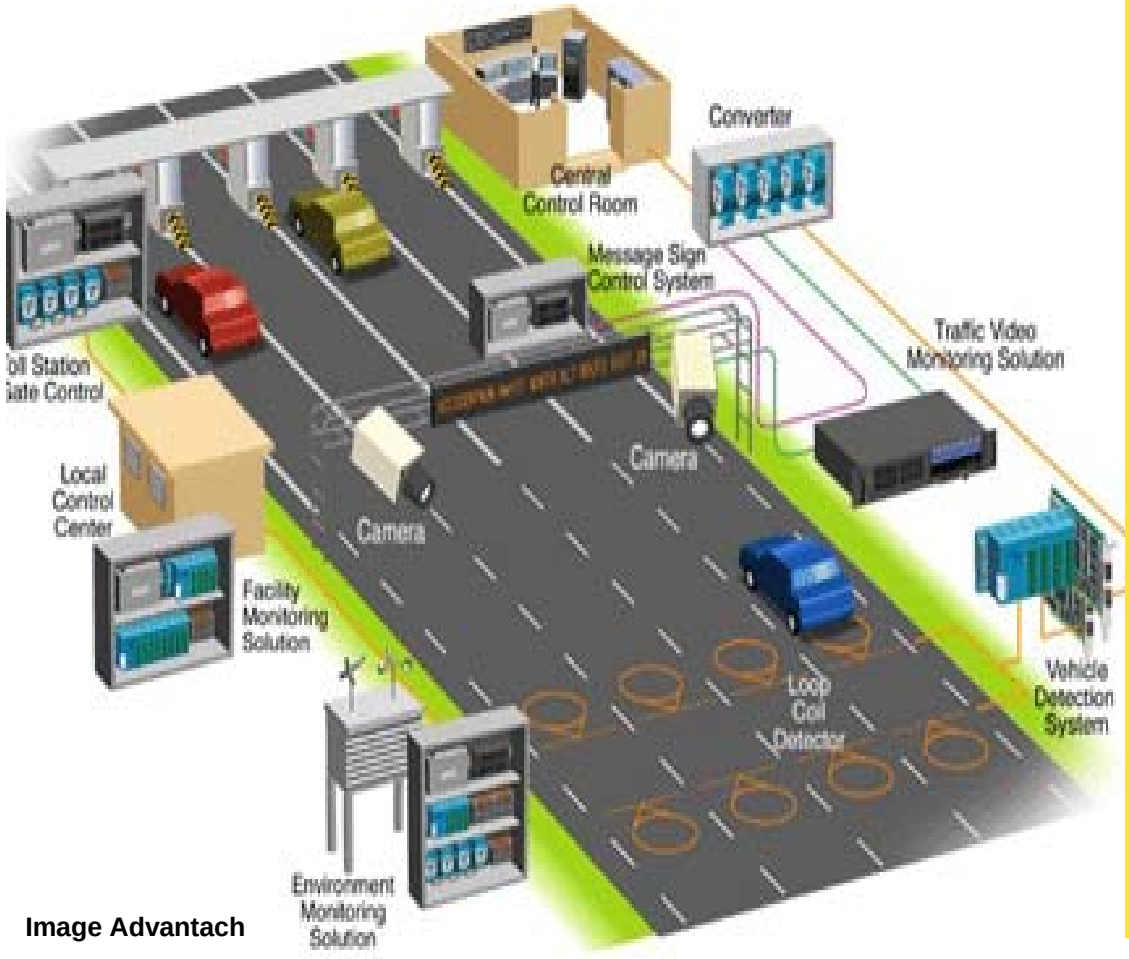


Image Advantach

- Vehicle Infrastructure Integration (VII)…V2V & V2I
- WAVE Wireless Access for Vehicle Environments
- DOT and Commercial
- Smart Highways, Smart Rail, Smart Tolls, Mobility, LBS
- Safety, Traffic management, Fuel efficiencies, Vehicle wear
- Billions of connected devices
- Only IPv6 scales for this market

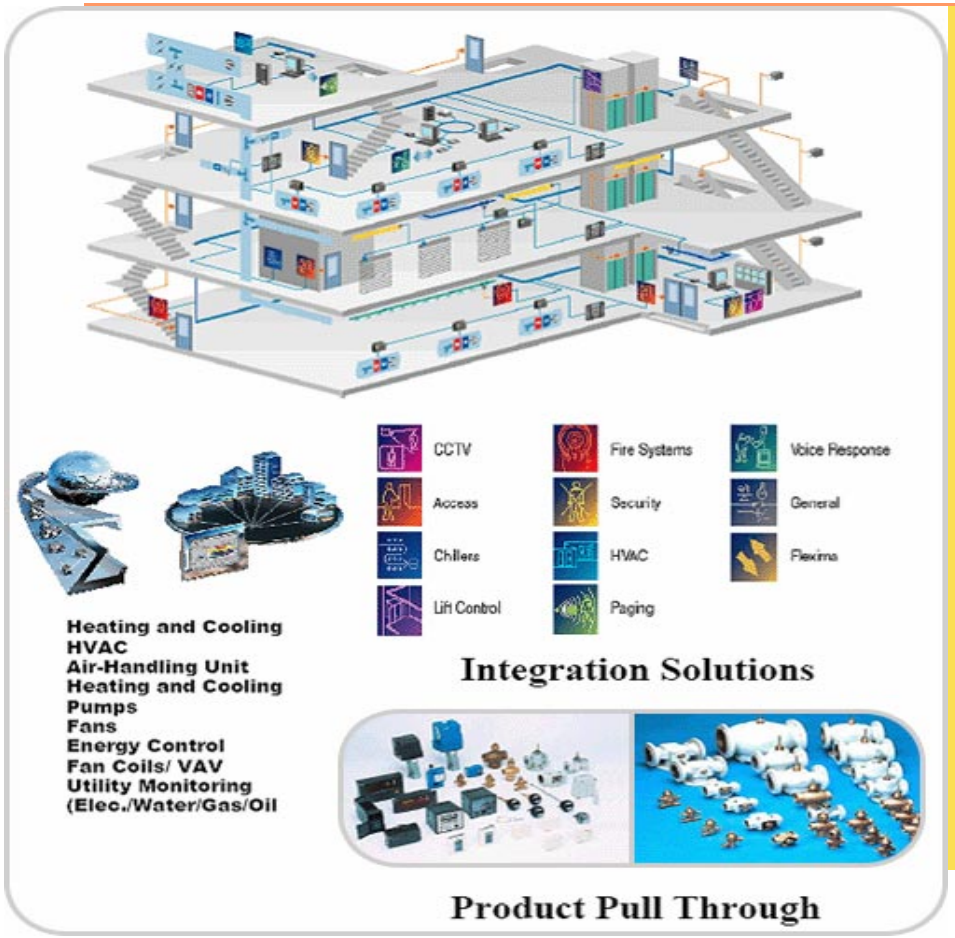
Supply Chain….Assets On-the-move

Single point visibility solutions don't work for global operations

- Supply Chain and Asset Tracking
- BOM and finished goods in transit
- 6Bil social networkers…… 60Bil connectable supply chain items
- Always On, Always connected, Anywhere
- Asset Monitoring and Management
- Push & Pull, Publish & Subscribe
- Port/Facility Security
- Asset Monitoring and Management & Location Based Services

Intelligent Infrastructure a.k.a. “Smart”, “Green”

Sensor networks for Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance C4ISR;



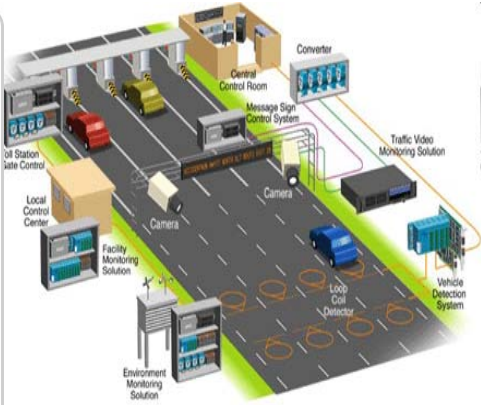
- Big Space….Buildings, Grid, Roads, Tunnels, Bridges…..
- SCADA systems for large scale sensor networks
- Billions of embedded IP devices
- Smart/Green Buildings consolidation of building facilities
- Massive sensor environments
- Incident Response
- New Security issues

Common underlying technologies across markets

NCW

"Smart"

ITS

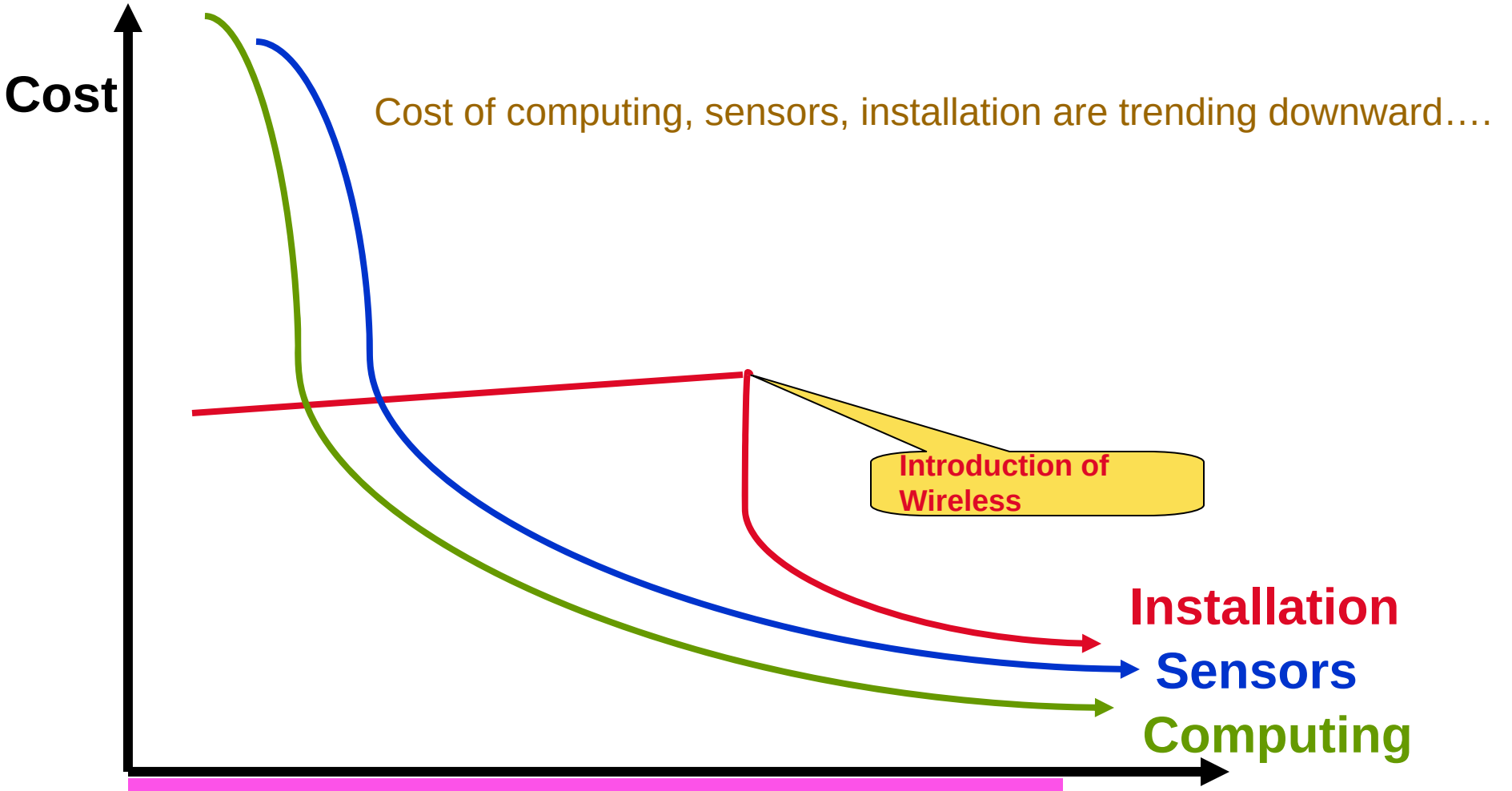


Asset-Track

Reoccurring Theme

- Mobile, Ad-hoc, Voice, Data, Video, Secure
- End-2-End, Peer-2-Peer, Machine-2-Machine
- Push and Pull, Publish and Subscribe
- Assets-on-the-move, Always On-Always Connected-Anywhere
- Location based services, Communities of interest
- Sensor Aggregation, Visual Analytics
- Scalable, Extensible, Open Standards, Wireless….

Wireless vs. Fixed Wired Installation



- Wireless technology dramatically reduces sensor installation costs.
- Wireless enables scatterable sensors that provide easy scalability
- Solutions and Software must respond.

Source: Kris Pister, Dust Networks

Not your business? It still touches you….

"All Global Information Grid (GIG) assets shall be IPv6 capable" *John Stenbit, 2003*
"All agency infrastructures must be using IPv6" *Karen Evans, 2005*

…..No mandate at all in commercial world….

IT Manufacturers Status

- ***Platform vendors-Linux, Vista, Longhorn, Leopard , Android***
- ***Router & Switch-Opportunity for churn***
- ***IPv6 PDA, phones, cameras, all devices, thermostats……***
- ***IPv6 applications coming…***

Carriers

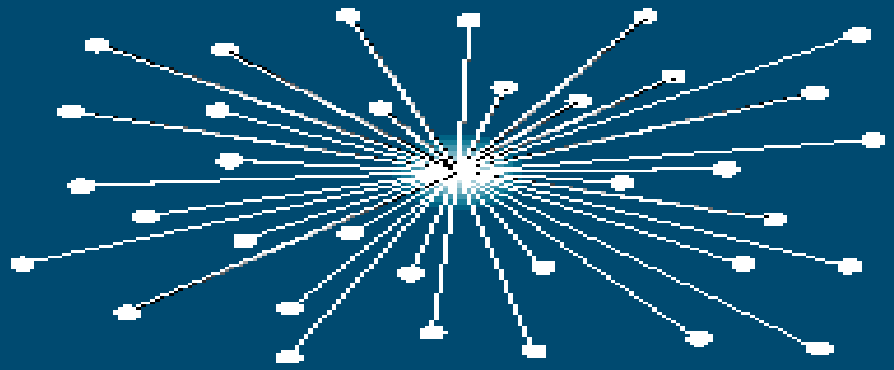
- ***Native IPv6 connectivity available***
- ***Tunneling Transport available***
- ***AT&T, Verizon, BT, NTT all "IP" Business models unclear***

- Dual stack network devices are in your network already
- Security risks from improper installation & configuration exist now
- New Threats: poorly understood protocol, mobility model that is growing rapidly
- Security model is changing Physical to Policy
- Impacting your organization now
- You need to understand what this means…soon
- Independent of your business.

Widespread lack of IPv6 understanding……

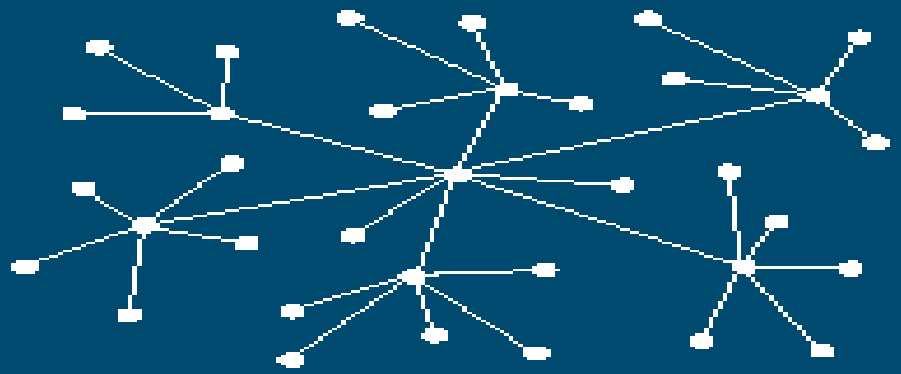
In the beginning . . .

All users connected to one central hub. Not very conducive to individualized uses and needs.



Now . . .

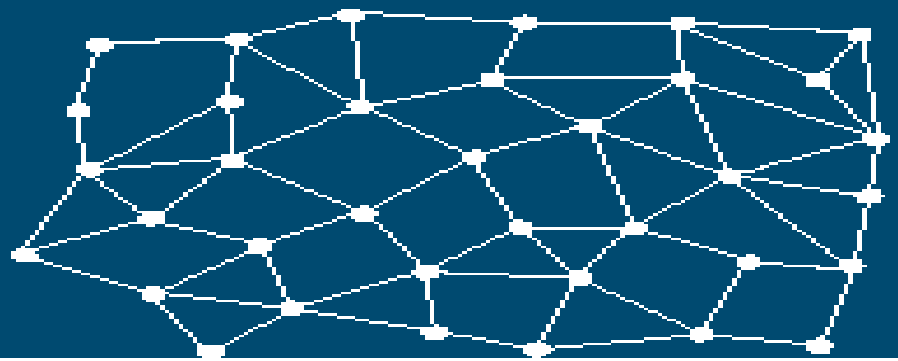
A highly developed distributed system of interconnected hubs exists. Very effective within each campus unit; yet unrealized for its full potential.



In the future . . .

A globally distributed system will offer uniform capabilities throughout the campus. A community-oriented infrastructure that allows for individual freedom.

www.itpb.ucla.edu/about/default.htm



Thinking about the inevitable… Internet of Things

TIME

REPRINTED FROM NOVEMBER 10, 2008

Time's Best Inventions of 2008

30. The Internet Of Things

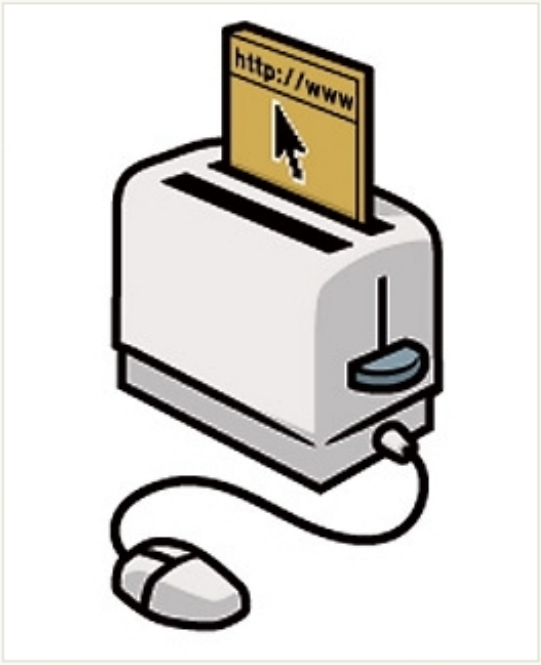
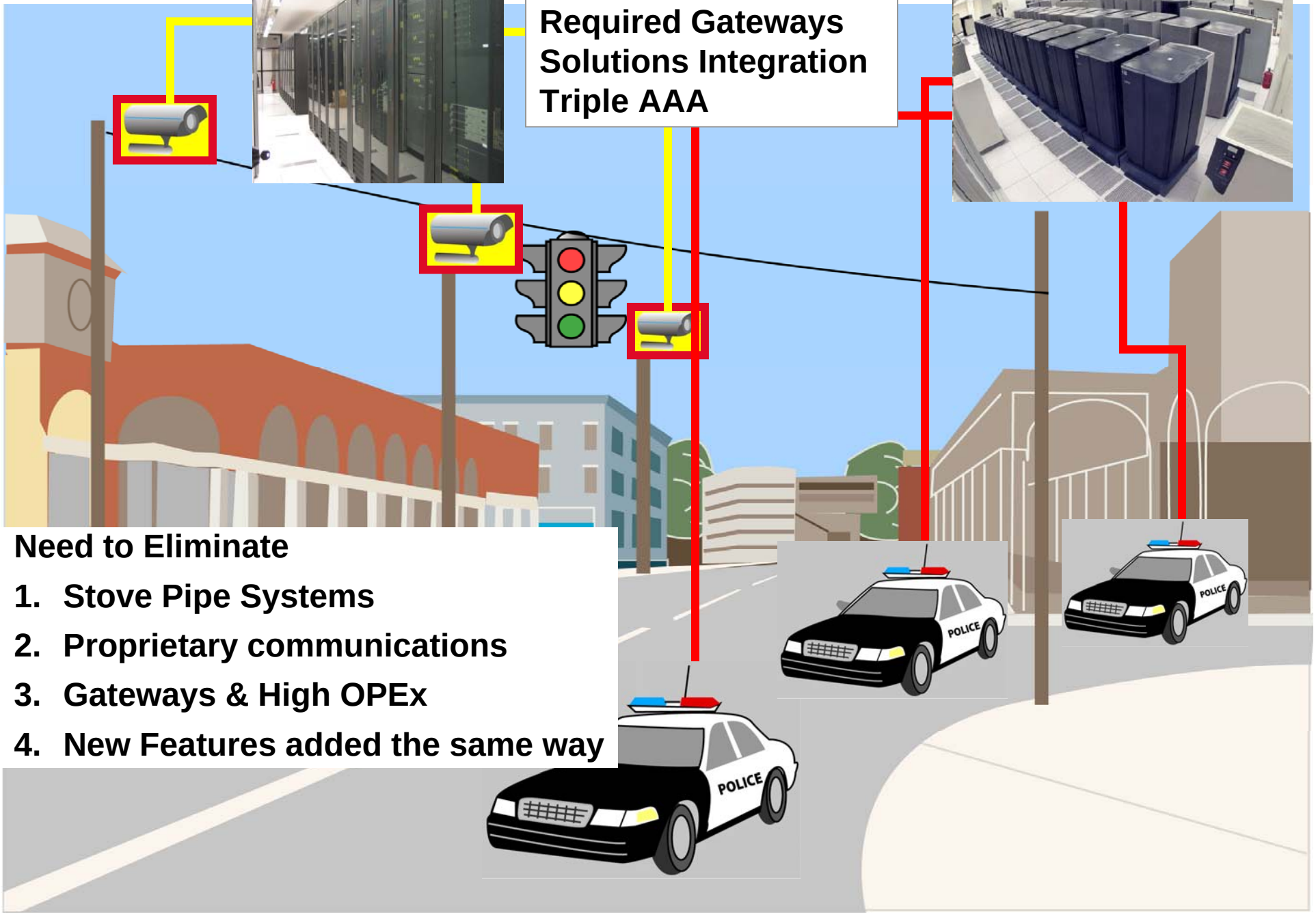


ILLUSTRATION FOR TIME BY CHRISTOPH NIEMANN

In September, a group of high-tech companies that includes Cisco and Sun formed the IP for Smart Objects Alliance. Simply put, the organization intends to create a new kind of network that will allow sensor-enabled physical objects — appliances in your home, products in a factory, cars in a city — to talk to one another, the same way people communicate over the Internet.


What’s your problem

Stovepipe solutions: High Cap-EX, Opp-EX, Operational problems



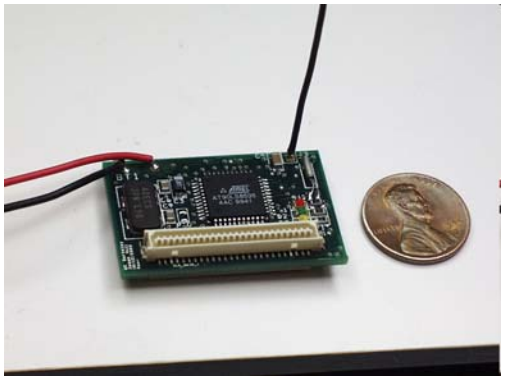
Need to Eliminate

1. **Stove Pipe Systems**
2. **Proprietary communications**
3. **Gateways & High OPEx**
4. **New Features added the same way**

New Computing Environment

DISA

Warfighter of 2016 are the teens of today; they expect constant connectivity and collaboration



Smart devices will be the data collection & computational platforms of the future….

Sensors fixed & embedded in everything, or on the move…

Pulling and pushing to these devices, will define the new computing environment….

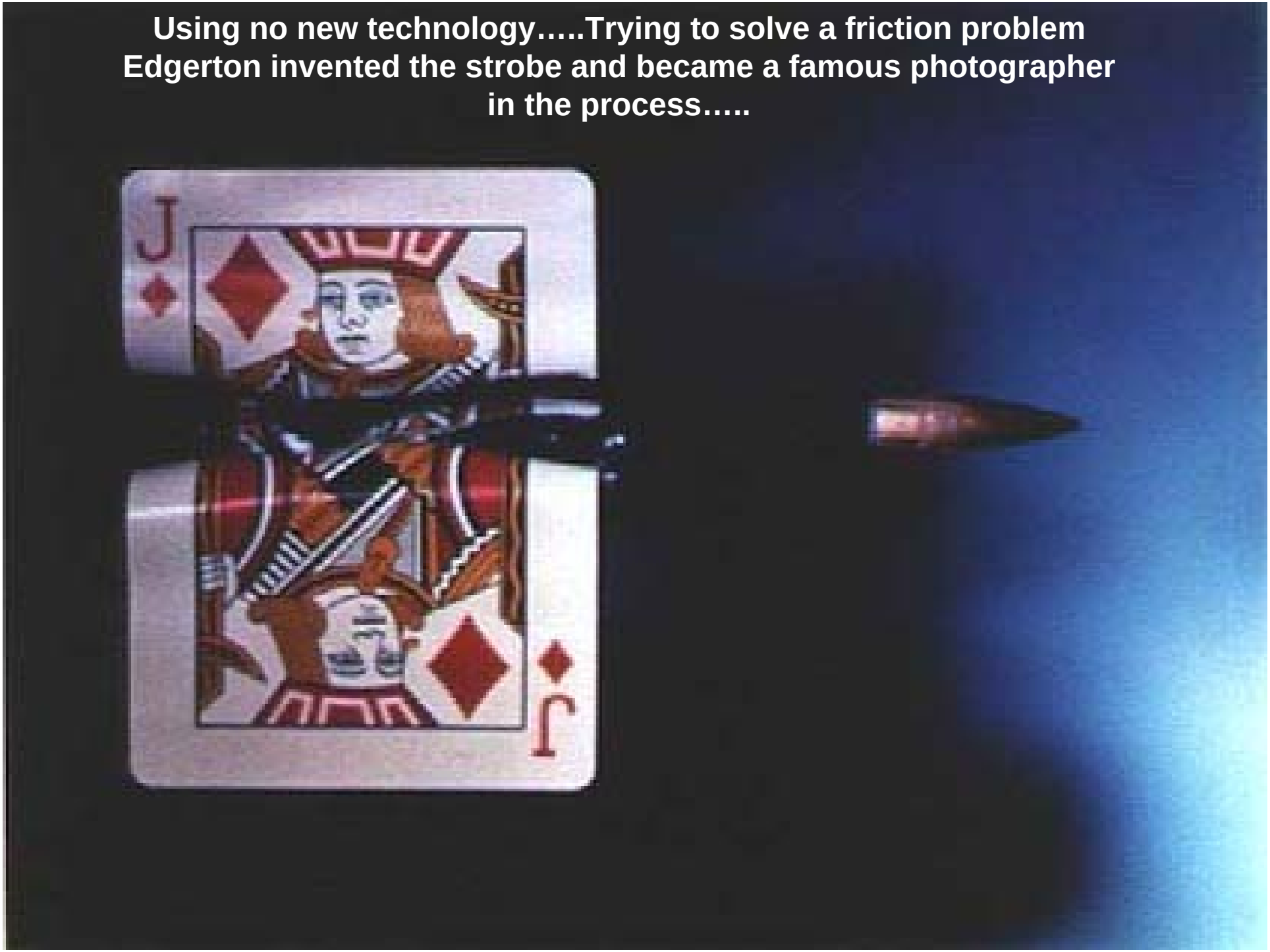
Inevitable Changes in

- Security
- Solutions development
- Networking
- Vendor support
- Mobility…many others

In summary…

- It’s Inevitable….. Be Prepared
- IPv6 is essential for many markets to grow
- IPv6 isn't perfect…neither is v4
- V6 will come just as v4 came….in a cycles of needs driving technology, creating needs….
- V6 is a technology tool and IT departments solve business and operational issues with technology every day
- Markets drive technology

Using no new technology…..Trying to solve a friction problem Edgerton invented the strobe and became a famous photographer in the process…..



Finally!...it’s over

Questions

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Check these out….

http://www.ipso-alliance.org/Pages/Front.php

http://www.youtube.com/watch?v=RU21YO6XF_o

http://www.youtube.com/watch?v=cVtvlQ4Jzbw

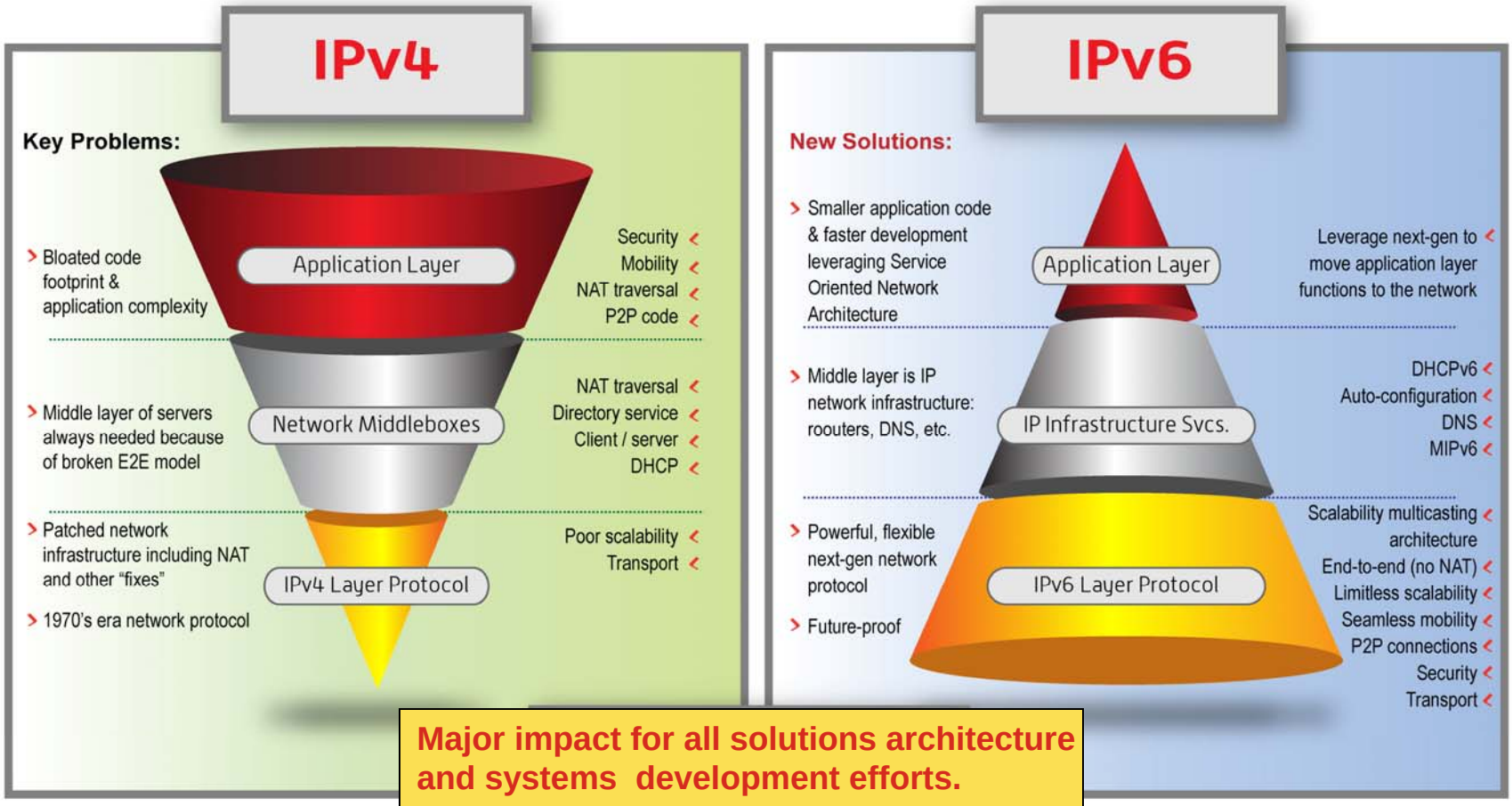
http://www.youtube.com/watch?v=kUbe0VvpYpk

http://www.v6atwork.com/

http://www.6lowpan.org/

http://www.getipv6.info/index.php/Main_Page

Cleaner, powerful networks, smaller applications



Major impact for all solutions architecture and systems development efforts.