What if?

Healthcare

What if we had a communications technology available to us today that…

Saves lives and significantly reduces cost by enabling a dramatic shift from reactive to predictive healthcare?

Disaster Response / First Responder

What if we had a communications technology available to us today that…

Allows us to put machines to work in places where no humans can survive?

Military

What if we had a technology available to us today that…

Enables our war fighters to act more precisely to execute in individual conflicts, battles and wars based on information received by new command and control capabilities?

The World…

What if we had a technology available to us today that…

Removed all limitations for global, ubiquitous communication for every person, regardless of the type of information that is needed?

The Solution:

Internet Protocol, version 6 (IPv6)

Delivering Innovation Without Limits

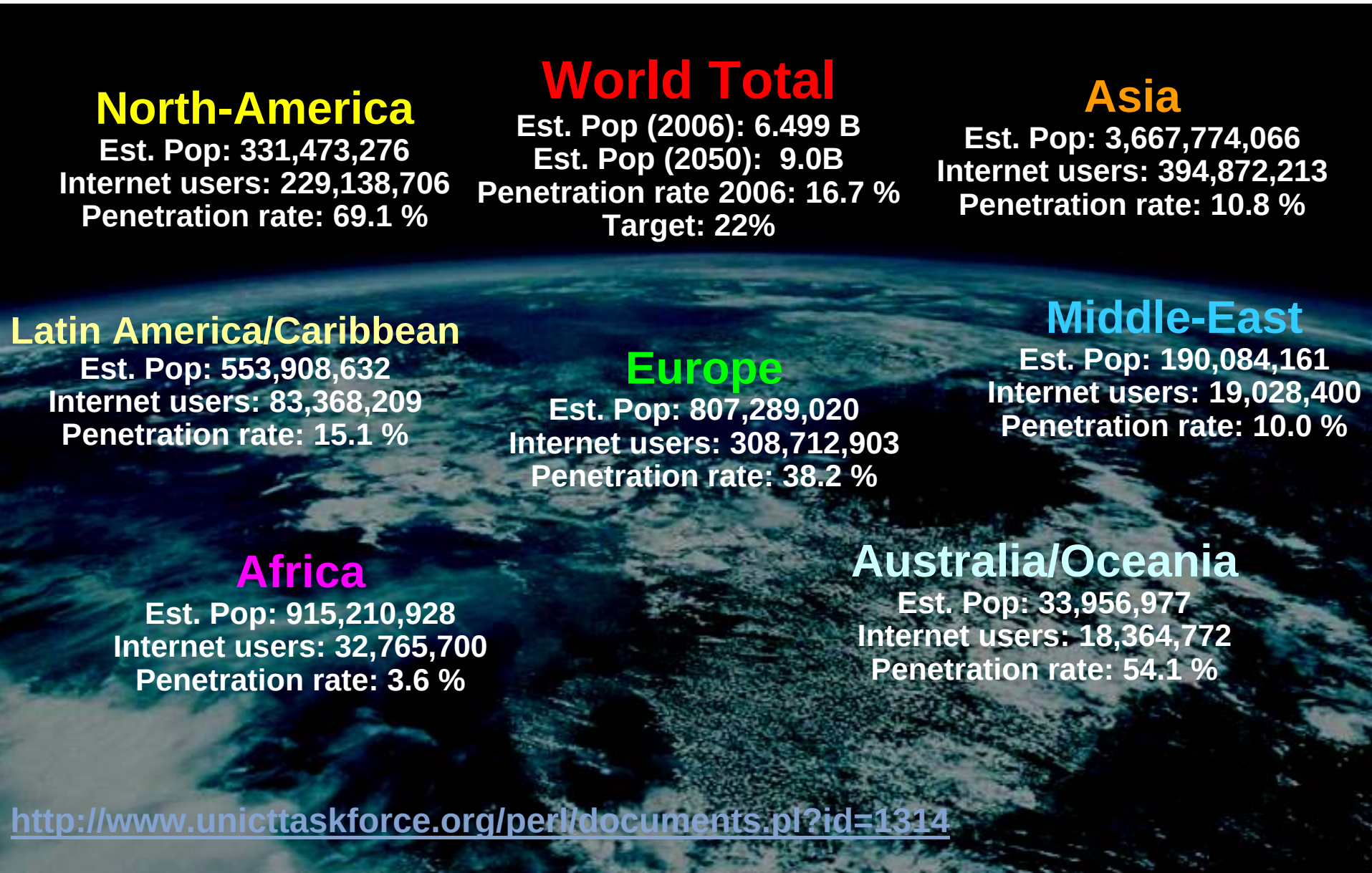
IPv6 Migration:

Technologies and Techniques

David Rubal
Cisco Worldwide IPv6 Task Force Lead, US & Canada

Member, IPv6 Forum
Member, North American IPv6 Task Force

Internet around the world



North-America
Est. Pop: 331,473,276
Internet users: 229,138,706
Penetration rate: 69.1 %

World Total
Est. Pop (2006): 6.499 B
Est. Pop (2050): 9.0B
Penetration rate 2006: 16.7 %
Target: 22%

Asia
Est. Pop: 3,667,774,066
Internet users: 394,872,213
Penetration rate: 10.8 %

Latin America/Caribbean
Est. Pop: 553,908,632
Internet users: 83,368,209
Penetration rate: 15.1 %

Europe
Est. Pop: 807,289,020
Internet users: 308,712,903
Penetration rate: 38.2 %

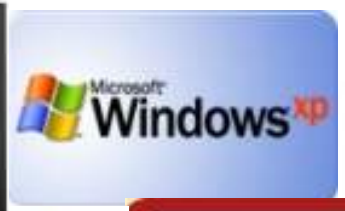
Middle-East
Est. Pop: 190,084,161
Internet users: 19,028,400
Penetration rate: 10.0 %

Africa
Est. Pop: 915,210,928
Internet users: 32,765,700
Penetration rate: 3.6 %

Australia/Oceania
Est. Pop: 33,956,977
Internet users: 18,364,772
Penetration rate: 54.1 %

http://www.unicttaskforce.org/perl/documents.pl?id=1314

Key Drivers to the Next Generation of Communications



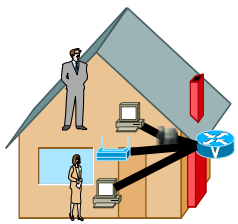
Windows Vista

Business

IP Mobility

Devices, Mobile Networks, mobile wireless

The Ubiquitous Internet



Home

Appliances, Gaming & Services

Higher Ed./Research

Government/ Public Sector

IPv4 address space depletion

IPv6 is…

The Second Generation Internet Protocol that:

- Increases the quantity of unique IP addresses available to network devices to an almost infinite number
- Fosters broad Internet expansion
- Enables new levels of instant, personal mobility
- Creates new information sharing and security possibilities
- Provides the foundation to radically change the way we communicate

The Global Need for Communication Innovation

- Building sensors
- Media services
- Collaboration
- Mobility

Higher Education/Research

- Set-top boxes
- Internet gaming
- Appliances
- Voice/video
- Security monitoring

Consumer

IPv6

- Embedded devices
- Industrial Ethernet
- Logistics

Manufacturing

- Net-Centric Military
- New Citizen Svcs
- First Responders

Government (Federal/Public Sector)

- Telematics
- Traffic control
- Hotspots
- Transit services

Transportation

- Animal tags
- Imagery
- Botanical
- Weather

Agriculture/ Wildlife

- Home care
- Imaging
- Mobility

Medical

Important Trends in Government

- The World is “Flattening”
- Geopolitical impact – race for IT dominance
- Rapidly changing military requirements
- Rapid maturity of sensor technology
- Mainstream need for ad-hoc communications

IPv6 Migration Realities

- ✓ IPv6 seems simple - Impacts multiple levels
- ✓ Requires holistic planning – Not organic usage
- ✓ People, Process, Short / Long Term Operational Cost
- ✓ Legacy transition plans will take years
- ✓ IPv4 will continue to live (where required)

➢ The real innovation starts after networks are migrated

IPv6 Impact Analysis

- OMB M-05-22 memo to CIOs required impact assessment – risk assessment
- Cost and risk elements as described in OMB Circular A-11
- Cost estimate
  - All costs related to IPv6 migration
  - Equipment upgrades, lab, training, cost of migration effort, …
- Risk Analysis
  - OMB risk analysis methodology
  - 18 different areas to address the impact of IPv6

IPv6 Transition Plan

- OMB M-05-22 memo to CIOs required a transition plan
- OMB's Federal Enterprise Architecture Assessment Framework:
  - ✓ Requirements analysis to identify current scope of IPv6 within an agency, current challenges using IPv4, and target requirements
  - ✓ Sequencing plan for IPv6 implementation, integrated with agency enterprise architecture
  - ✓ IPv6-related policies and enforcement mechanisms
  - ✓ Training material for stakeholders
  - ✓ Test plan for IPv6 compatibility and interoperability
  - ✓ IPv6 using a phased approach
  - ✓ Management Strategy
  - ✓ Target Architecture

IPv6 Design Impact

- Organizational structure and current topology impact
- IPv6 will use some of the same topology and traffic patterns
  - IPv4 made heavy use of Unicast and client/server model
  - IPv6 will add more mobile and peer-to-peer traffic flows
- Addressing based on current topology
  - The physical topology won’t change with IPv6
- IPv6 Security architecture will be similar to current protections
  - The perimeter security model is still valid with IPv6

IPv6 Implementation

- Planning will prevent issues related to IPv6 from impacting current IPv4 network
- Dual stack where you can, tunnel where you must
  - Chose simplicity over complexity
- Security will be key to your strategy
  - IPv6 must have the same protections as IPv4
  - Purchase/upgrade firewalls for IPv6 rather than tunnel IP Protocol 41 through IPv4 firewalls
  - Apply best practices for IPv6 filtering and security
    - Least privilege, defense in depth, diversity of defense, choke point, weakest link, fail-safe stance, universal participation

Building IPv6 Capability

- Training is key to developing IPv6 operational capability
  - Scarcity of IPv6-skilled IT staff
  - Must train existing employees
- Training for all aspects of IT
  - Basic IPv6 training – everyone & operations
  - IPv6 advanced networking
  - IPv6 for system administrators / architects
  - Application developer sessions on IPv6 coding

Cisco IPv6 Network Assessor and Transition Services

- IPv6 Network Assessor is a stand alone portable tool that can inventory classified and non-classified networks
- The tool identifies and polls selected devices and collects appropriate data which indicates the capability to support IPv6
- The tool provides customer understanding of their current IPv6 status

Cisco's Assessment Services

Collection-and-reporting tool to determine the IPv6 capability of Federal agency's core infrastructure

Customized scorecard, assessment, and audit based on your IPv6 readiness

Migratory roadmap aligned with your strategic business objectives

IPv6 Closing Thoughts…

- Provides the foundation to radically change the way we communicate – “Internet 2.0”
- The best example in our time of Horizontal Integration in Enterprise Architectures, key to SOA transformation
- Creating geopolitical leverage, transforming all levels of Federal, State & Local government capabilities and services

➢ IPv6 Delivers Innovation Without Limits

Q & A

David Rubal
drubal@cisco.com
(703) 626-4779


CISCO