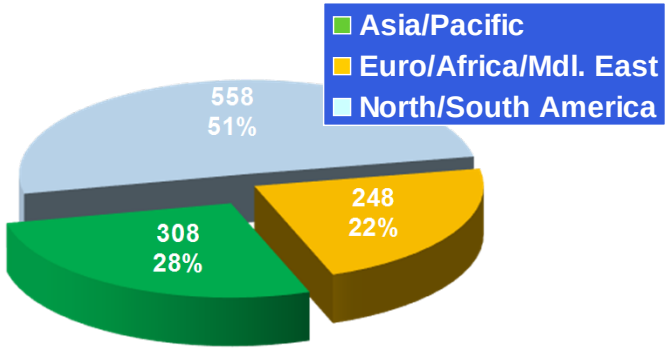
Delivering the Internet of Things with UPnP

Alan Messer, Ph.D. VP
UPnP Forum/Samsung
November 2014

© 2014 UPnP Forum

What is the UPnP Forum?

- Open environment to develop standards for interoperable device services using internet tech.
- Encourage rapid and broad industry deployment of compliant devices
  - Royalty-free terms, Open specs and Open source
- Membership:
  - 1015 Member companies
  - 125 Implementer Members
  - 8 Steering Members:

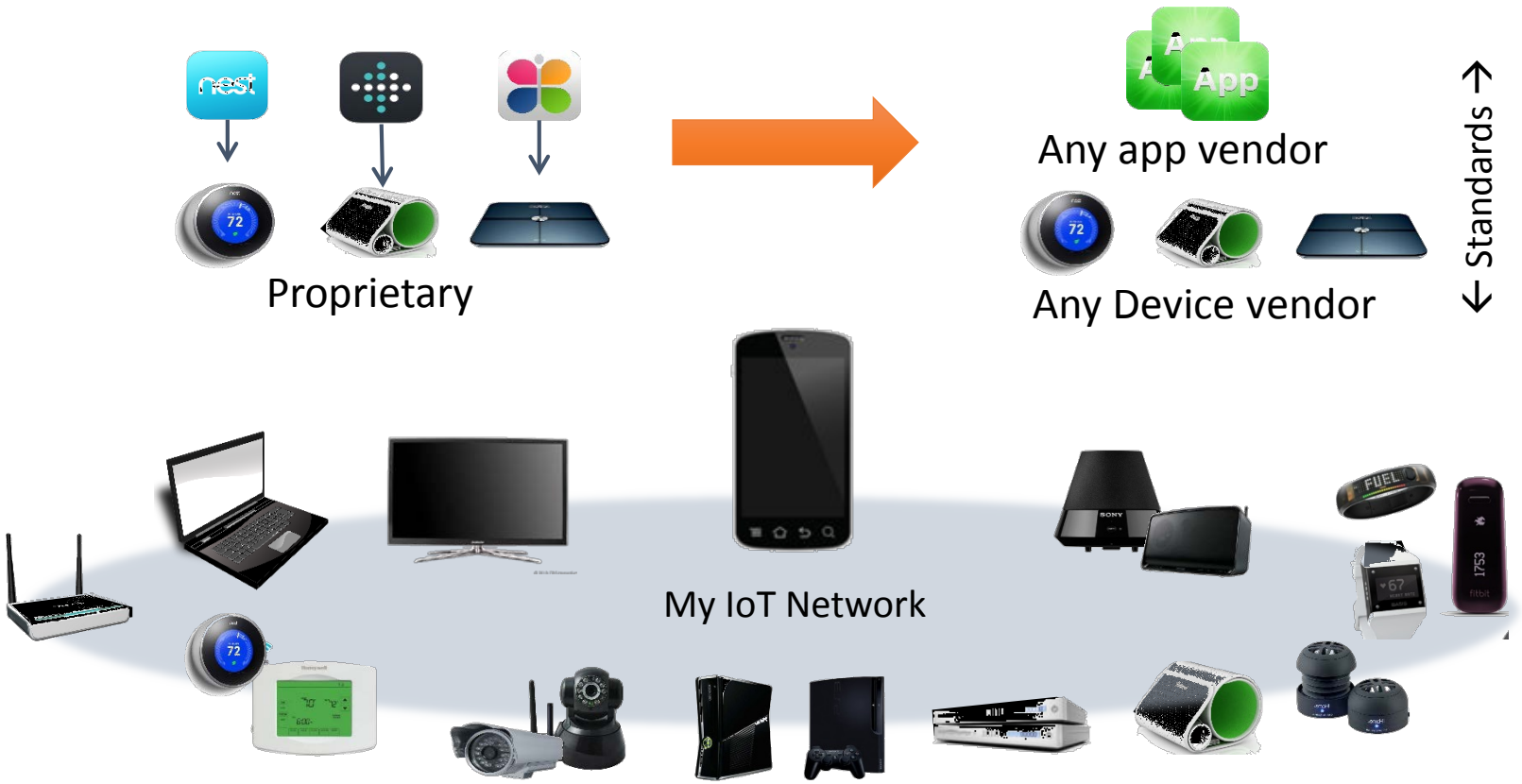


CableLabs · Cisco · intel · LG Electronics · AwoX · TPVISION · SAMSUNG · ZTE

© 2014 UPnP Forum

Unmet User Expectation for IoT #1

- **Users expect seamless access to all their things**
  - Don't want an app per scenario for each vertical
- Not *"Internet of <vendor/standards name>'s Things"*



Unmet User Expectation for IoT #2

- **User expect access to/from any network**
  - Not just LAN or cellular
- **Users have devices distributed over many locations**
  - Home, Car, Work, etc.

© 2014 UPnP Forum

UPnP+ Work Towards the Solution

Build on UPNP's past success with over 3 billion devices in the home networking market

1. Bridge between networks to provide internetworking
   - UPnP SensorManagement allows low power bridging of IP and non-IP networks
2. Support WAN as well as LAN and PAN networks
   - UPnP+ supports discovery of devices anywhere in the internet
3. Allow new IoT devices to be added without creating whole new specifications
   - Define many new device variations by their data models alone

© 2014 UPnP Forum

UPNP+ Bridging LAN/WAN/non-IP

UPNP+
Scalable XMPP Discovery/Comms
Dual IPv4/6 with Security
Standard Service Interfaces

Devices with WAN Connectivity

WAN Discovery,
IP protocols,
Open Source

Cloud services
Inc. 2nd and 3rd tier

UPNP+
Sensor Bridging &
Data Models

Non-WAN aware devices bridged

Non-IP protocols bridged

Limited IP protocols

IP-enabled Devices

Constrained Devices

UPnP+ Sensor Bridging

- Provides expanded support for low power sensors that need bridging to the rest of the Internet
  - Low Power efficient bridge
  - Pass-thru and/or storage of existing data

Non-IP and Proprietary IP Devices

Low Power Data Push

UPnP Sensor Bridge

Any logical device with non-IP PHY and IP

- Bridged Network Access
- Sensor Data Forwarding
- Data Store (Optional)

Standard-based Access Anywhere

UPnP+ Ecosystem

© 2014 UPnP Forum

Impact

- Device and App ‘Freedom of Choice’ is Critical
  - Enable IoT to reach more than a few use cases
  - Competition drives prices down and volume up
- Standard Easy Setup are key to making IoT real
  - Allows end-user purchase/install without re-learning
  - But it also important for installer-based installs
    - Training costs and contractor skill levels
- Without these, we’ll never get to the
  - 10’s of Billions of Interoperable IoT Devices
  - Affordable Smart Cities, Cars, or Energy

© 2014 UPnP Forum

Conclusion

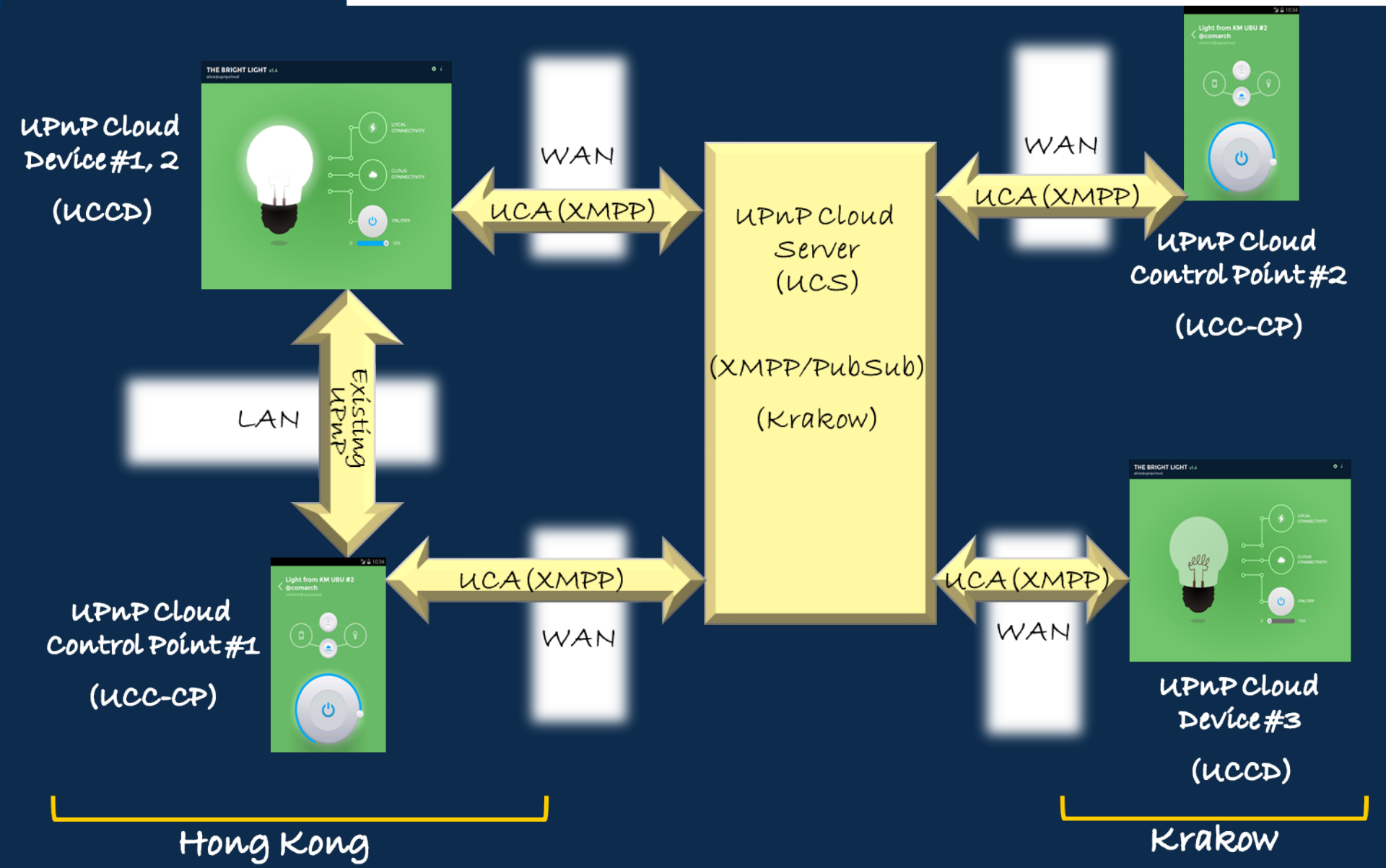
- IoT Device sales continue to grow, but so do:
  1. Proprietary protocols between devices/the cloud
  2. Islands of connectivity per vertical
- UPNP+ enables a standard solution for:
  - Seamless access across networks
  - Integrating connectivity islands into the Internet
- Call to Action
  - Join UPnP to help create open and interoperable solutions for great products
  - Encourage bridging to standards ecosystems

© 2014 UPnP Forum

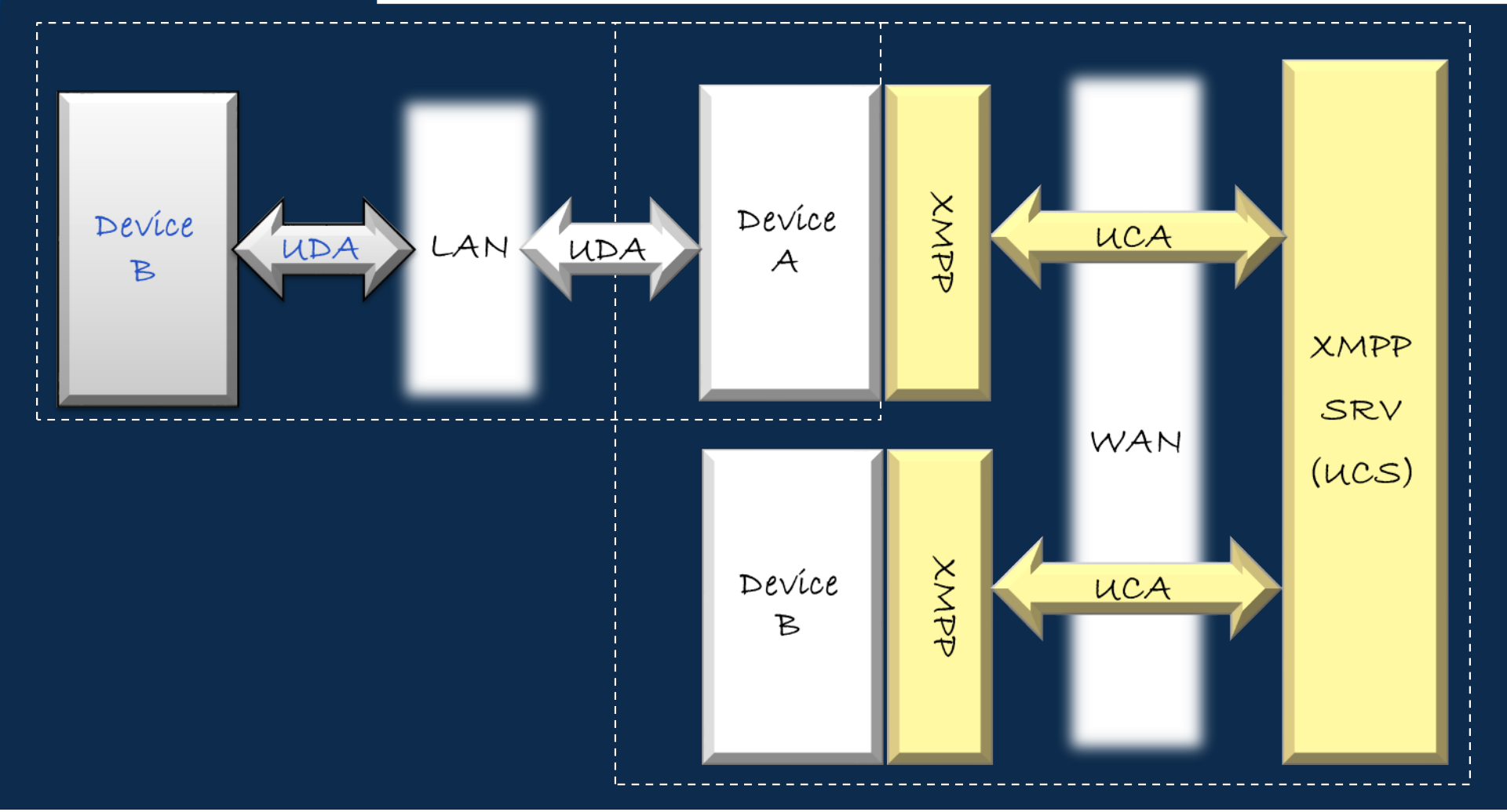
For the interconnected lifestyle

© 2014 UPnP Forum

UPnP+ Cloud Demo Configuration



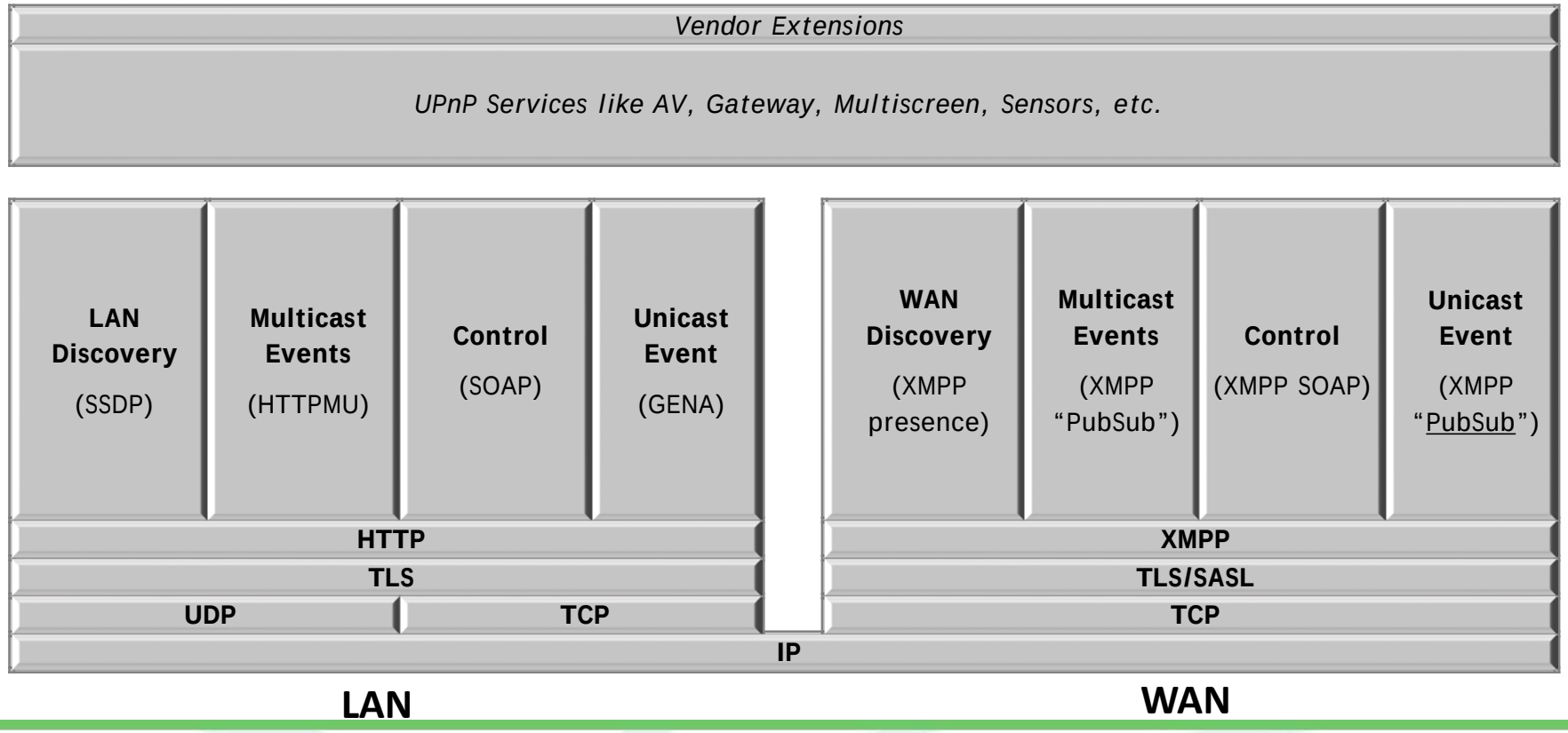
Existing UPnP Devices and UPnP+



- Device can have LAN, WAN or simultaneous interfaces but a singular identity, similar to IPv4/IPv6

UPnP+ LAN+WAN Protocol Stack

- Simple extension leveraging the popular and scalable XMPP to provide equivalent support for WAN as LAN
  - Discovery, Control and Eventing



© 2014 UPnP Forum