

Bringing UPnP to the Cloud and IoT

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Growing World of Connected Things

- **Broadband, Home Connectivity and Smartphone have driven Connected Things over the last decade or so**
 - Device with connectivity availability
 - Ease of use/install



Growing World of Connected Things

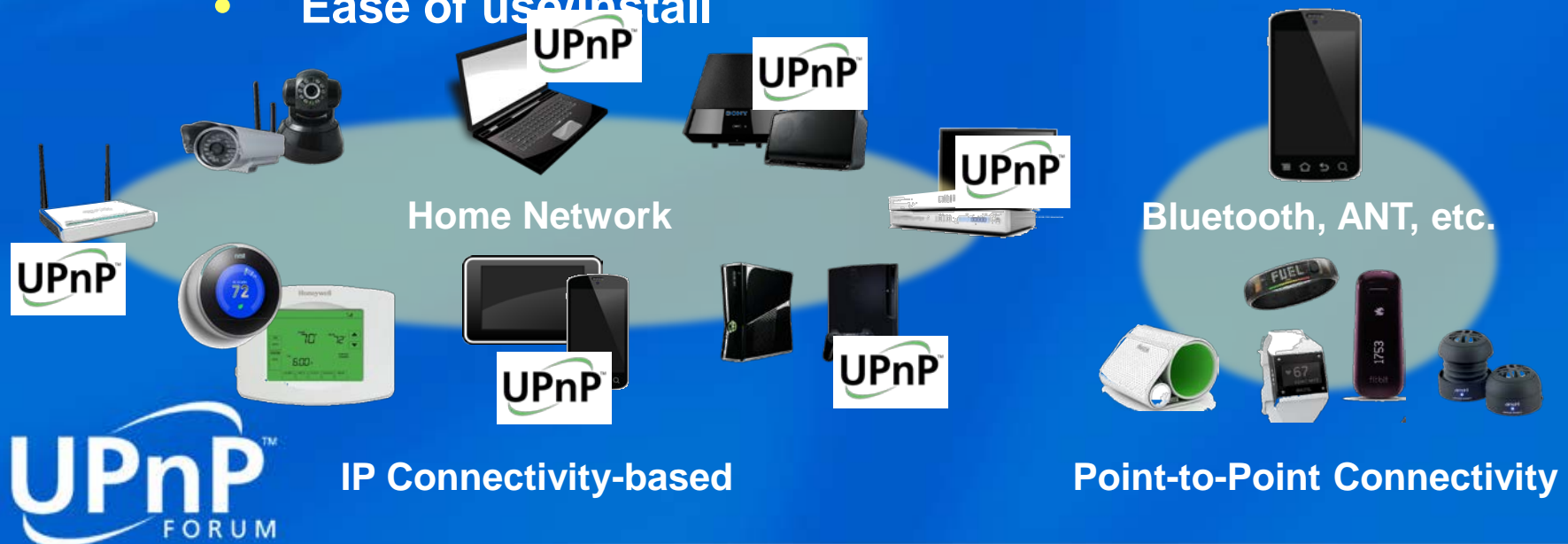
- **UPnP has supported this connectivity**

- Millions of networked AV devices
- Millions of broadband routers
- Millions of connected TVs, BD Players
- Millions of consoles and PCs
- Millions of tablets and phones

>1000 member companies

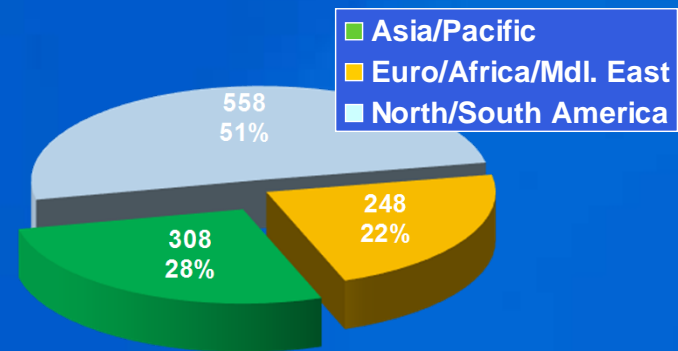
>3 billion devices worldwide

- **Ease of use/install**



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:



IoT Brings New Standards Requirements #1

- **Users expect to access all their things seamlessly**
 - Don't want an app per scenario for each vertical
 - Standard Integration of islands → SensorManagement



IoT Brings New Standards Requirements #2

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



Solution: UPnP+

- **Evolution**

- Full integration of IPv6 with seamless backwards compatibility to IPv4
- Expanded protocol bridging,
 - Broader support for non-IP sensors and bridging them to IP
- Improved interoperability baseline incorporating latest and greatest specifications, including AV, Device Protection, and Energy Management
 - Mandatory security and energy management

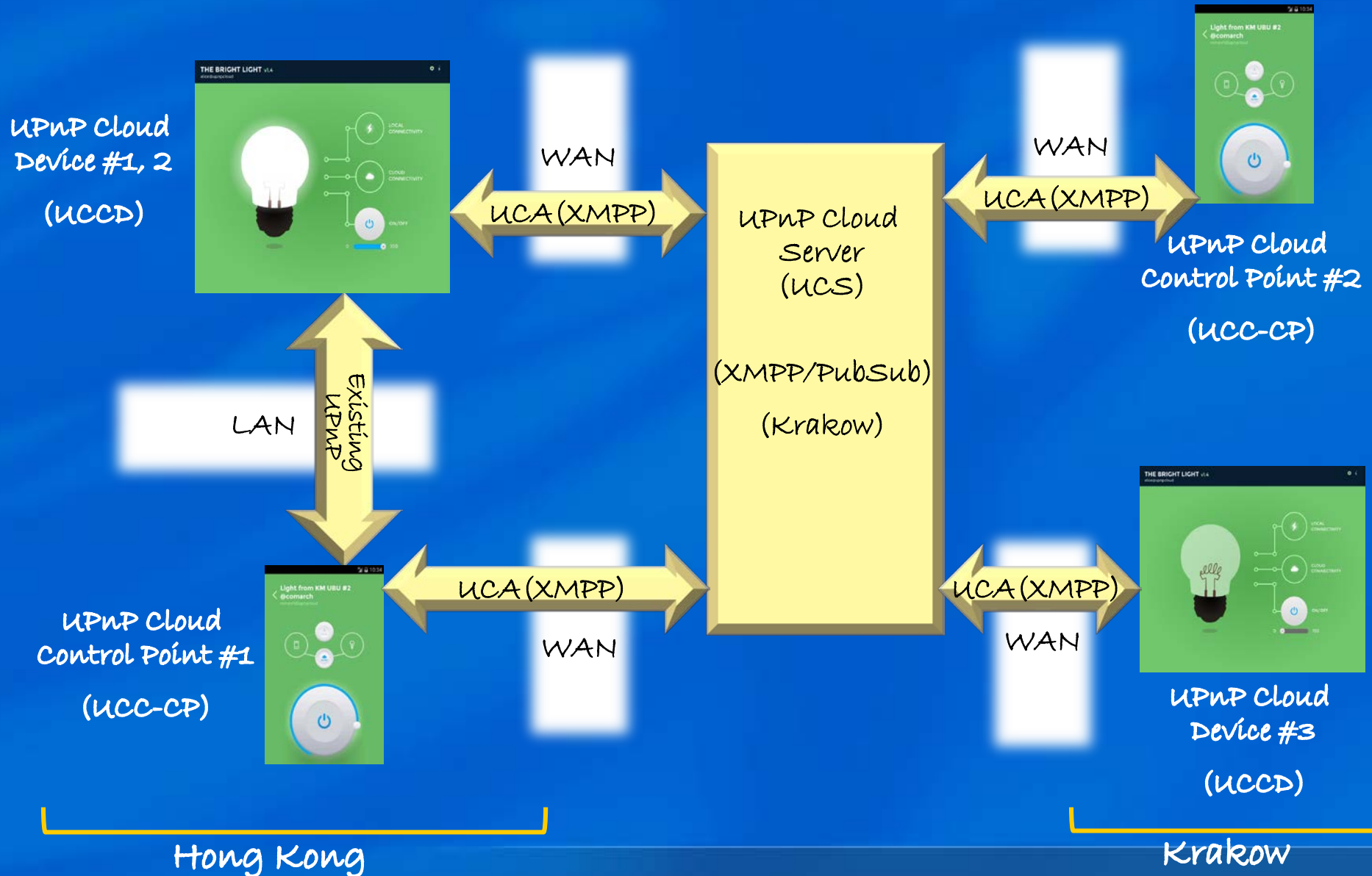
- **Revolution**

- Discovery of cloud services, content, and other devices to extend UPnP's leadership in standards-based machine-to-machine (M2M) communications
- New architectural features such as grouping and device pairing
- Drives UPnP devices to the core of the Internet of Things

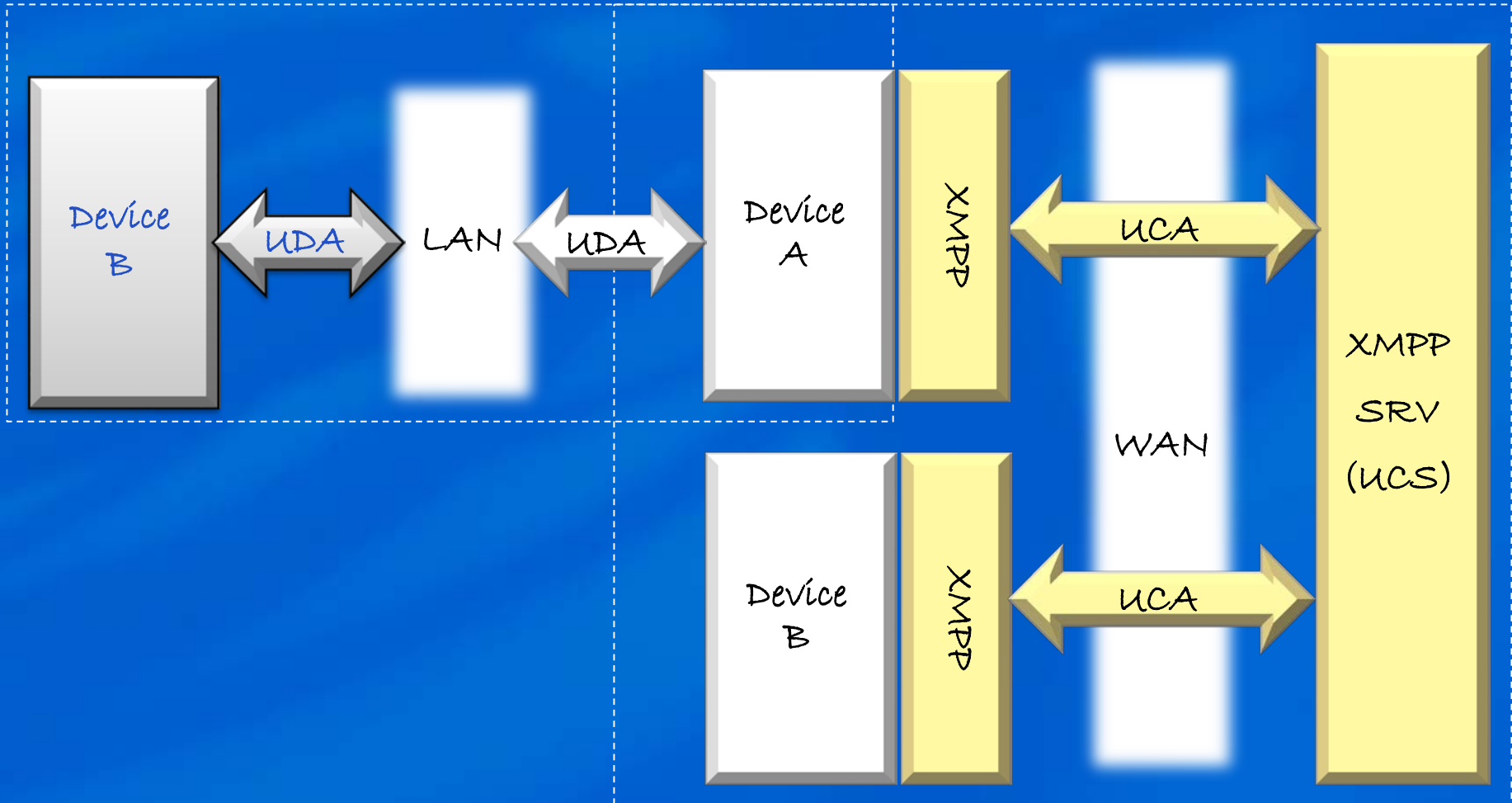
UPnP+ Cloud Support

- Maintain UPnP behavior—it must still just work!
- Cloud-enable all existing UPnP specifications (and existing devices)—adapt & adopt, not re-invent
- Introduce user-specific capabilities
- Facilitate the always-connected lifestyle
- Utilizes the widely-deployed XMPP protocol to extend UPnP capabilities to the cloud
 - Provides a path for low-risk, rapid implementation of UPnP Cloud
 - Enables cloud-scale discovery
 - Opens exciting new possibilities through the synergistic combination of the UPnP and XMPP ecosystems

UPnP+ Cloud Demo Configuration



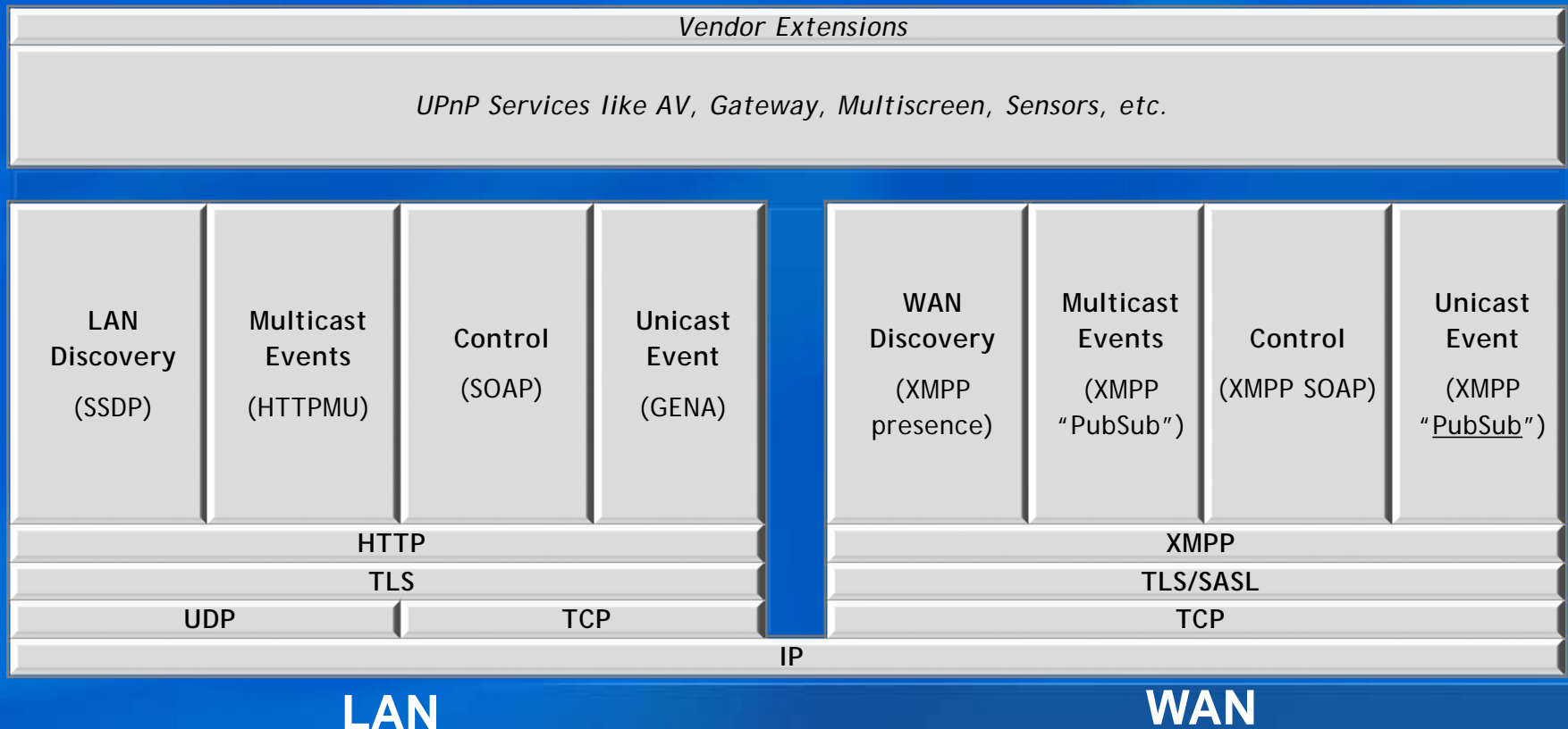
Existing UPnP Devices and UPnP+



- **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



UPnP+ Sensor Bridging

- Provide 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 Devices



UPnP Sensor Bridge

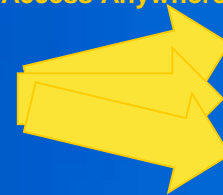
Any logical device with non-IP PHY and IP

Low Power Data Push



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

Standard-based Access Anywhere



UPnP+ Ecosystem



Conclusion

- Device Connectivity continues to grow
- But so do:
 1. Proprietary protocols between devices and to the cloud
 2. Islands of connectivity per vertical
- UPNP+ enables a standard solution for:
 - Seamless cloud access
 - Integrating connectivity islands into the Internet
- Join UPnP to define this future, create open source solutions and make great products for consumers



For the interconnected lifestyle

Future Connected Devices

