



HEAT & SHIFT Conference Expo
Cambridge, 2 December 2010

Approaching the Smart Metering Integration

Making the Grid.. Smarter



Andrew Longyear

Business Development Manager - SmartGrid

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Smart Grid

Market & Regulatory Trends

Changing Supply



- Distributed generation integration
- New renewable energy resources
- Grid reliability and efficiency

Changing Demand



- Consumer demand for renewable energy
- Increase in demand and peak load
- Flexible pricing to shift demand

Regulation/Compliance



- Climate change and energy efficiency goals
- Standards and interoperability
- Stimulus funding and rules

New Opportunities



- Consumer participation in delivery chain
- New service & business models
- **Smart Grid as an innovation platform**

Smart Grid

What is it?



Definition

A smart grid is the electricity delivery system from **point of generation to point of consumption** integrated with communications and information technology for enhanced grid operations, customer services, and environmental benefits.

Communications infrastructure enables an analog grid to become

Observable

Controllable

Automated

Integrated

Smart Grid Vision

Enabling Energy Service Innovation



Residential / Business

- Cost management
- Monitor and control consumption
- Corporate sustainability



Government

- More renewable energy sources
- Lower GhG emissions
- New skilled jobs

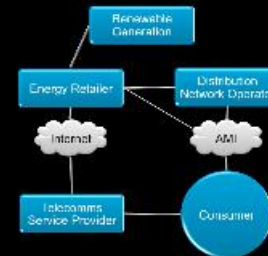
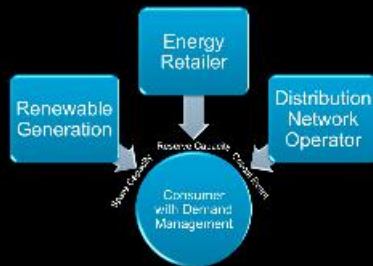


Utilities

- Manage demand
- Reduce OpEx
- Efficient integration of renewable energy
- Regulatory compliance

Energy Management

The New Eco System



- Regulation is Required to define Prioritisation
- Interoperability and Standardisation is vital
- New interconnections required between stakeholders
- Complex rule set to enable grid automation
- New stakeholders will start to play a part such as energy aggregators



Smart Grid

What role does the Smart Meter Play

End to End Reliable, Secure and Standards-Based Architecture

**Power
Generators &
Renewable
Energy**



**Grid Ops &
Inter-Utility
Network**



**Transmission
& Substation
Network**



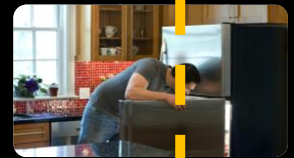
**Distribution
Network & Field
Area Network**



**Smart Meter &
Neighbourhood
Area Network**



**Premise Area
(HAN/BAN)**



Near Real Time Meter Reading

15 minutes or half hour Meter reads

Improved Fault Diagnostics

Interpretation of dying gasp

Accurate Energy Consumption

Allows accurate forecasting & Billing

Home Energy Information

Employs the Human feedback loop

Time of Use pricing

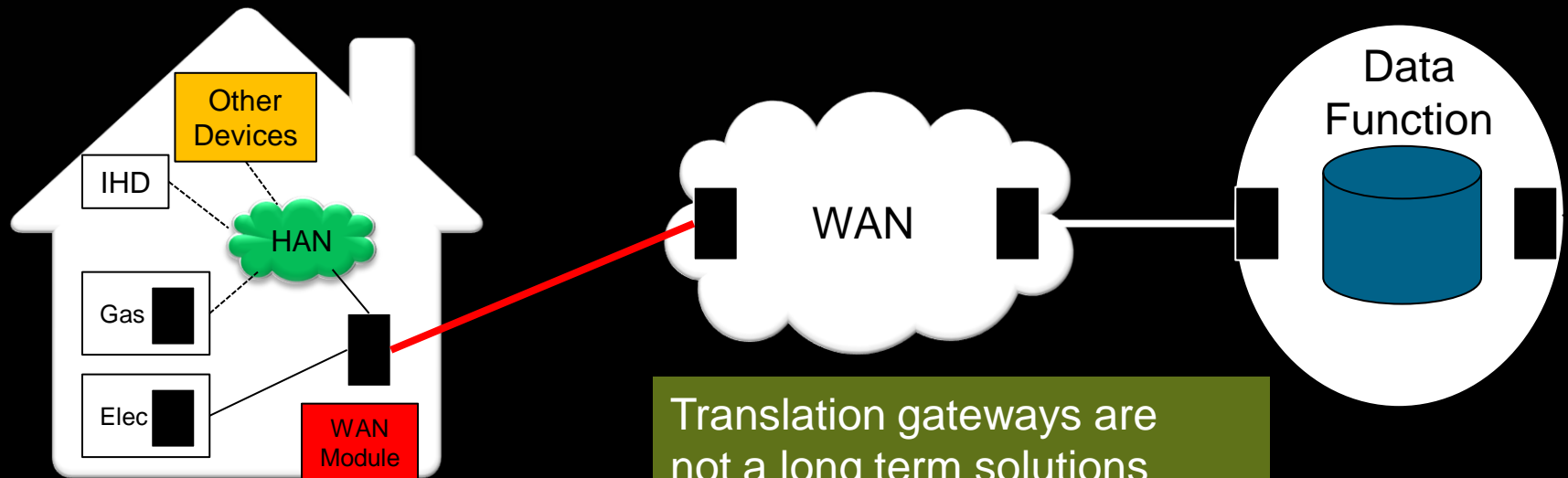
Allows TOU Pricing to be implements

Demand Management

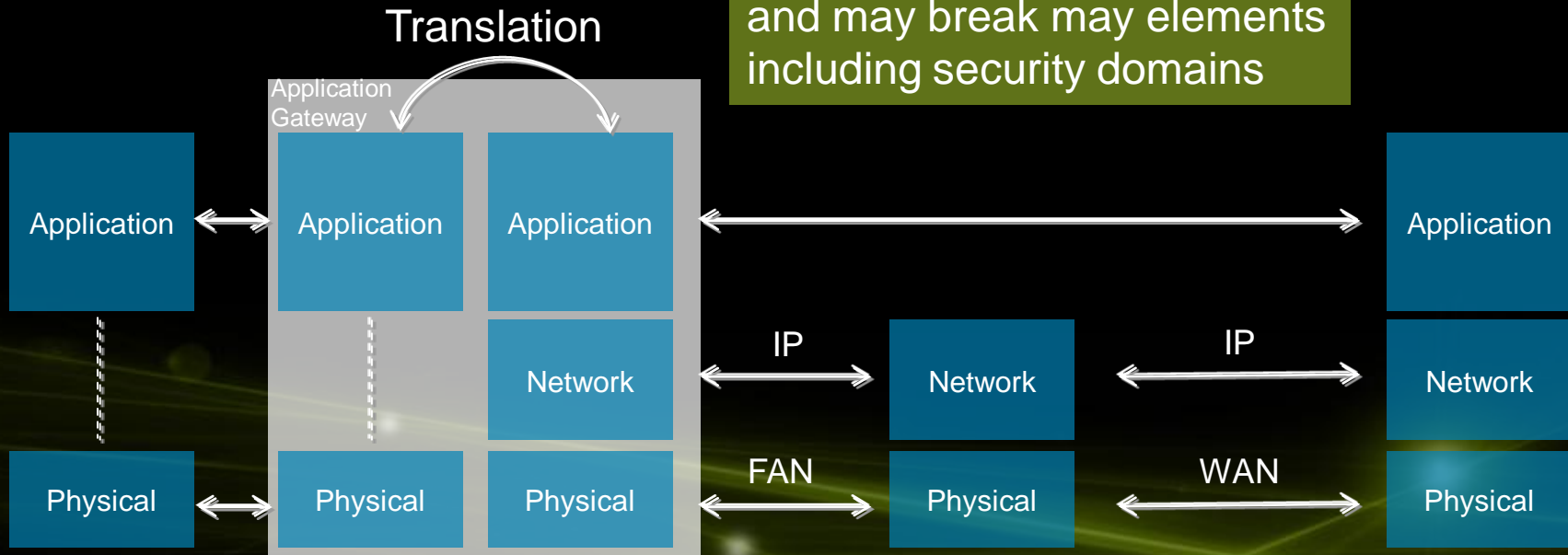
Enables Demand Response and Demand side Management

Smart Meter Integration

Current Translation Architecture

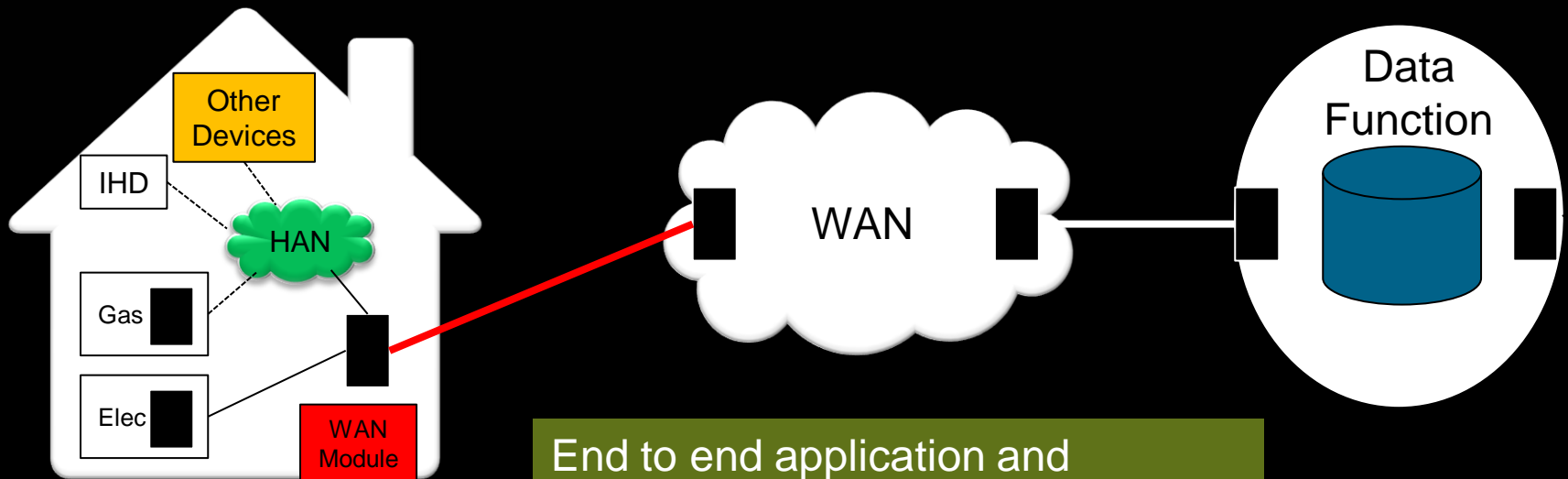


Translation gateways are not a long term solutions and may break may elements including security domains

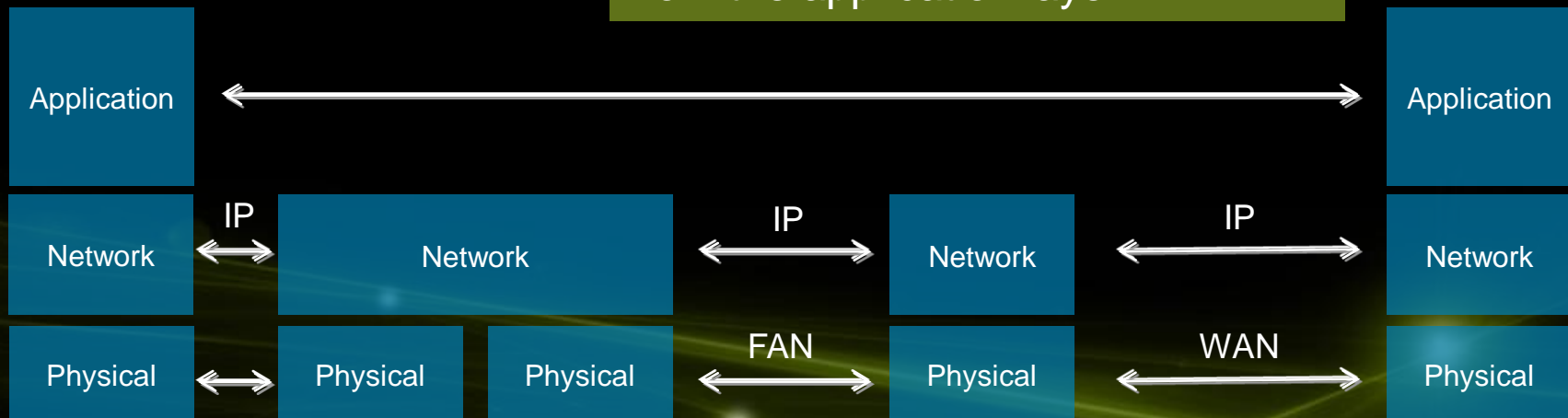


Smart Meter Integration

End to End Architecture



End to end application and security integrity can be maintained
Decouple the Physical Layer from the application layer



Why IP Communications?

Secure, Interoperable, Scalable Infrastructure

Reliable, Secure and Standards-Based

**Power
Generators &
Renewable
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**Grid Ops &
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**Premise Area
(HAN/BAN)**



Interoperable

Across vendors, standards-based

Scalable

IPv6 to address millions of devices

Secure

Data protection & system integrity

Media Independent

Support many types of media

Convergence

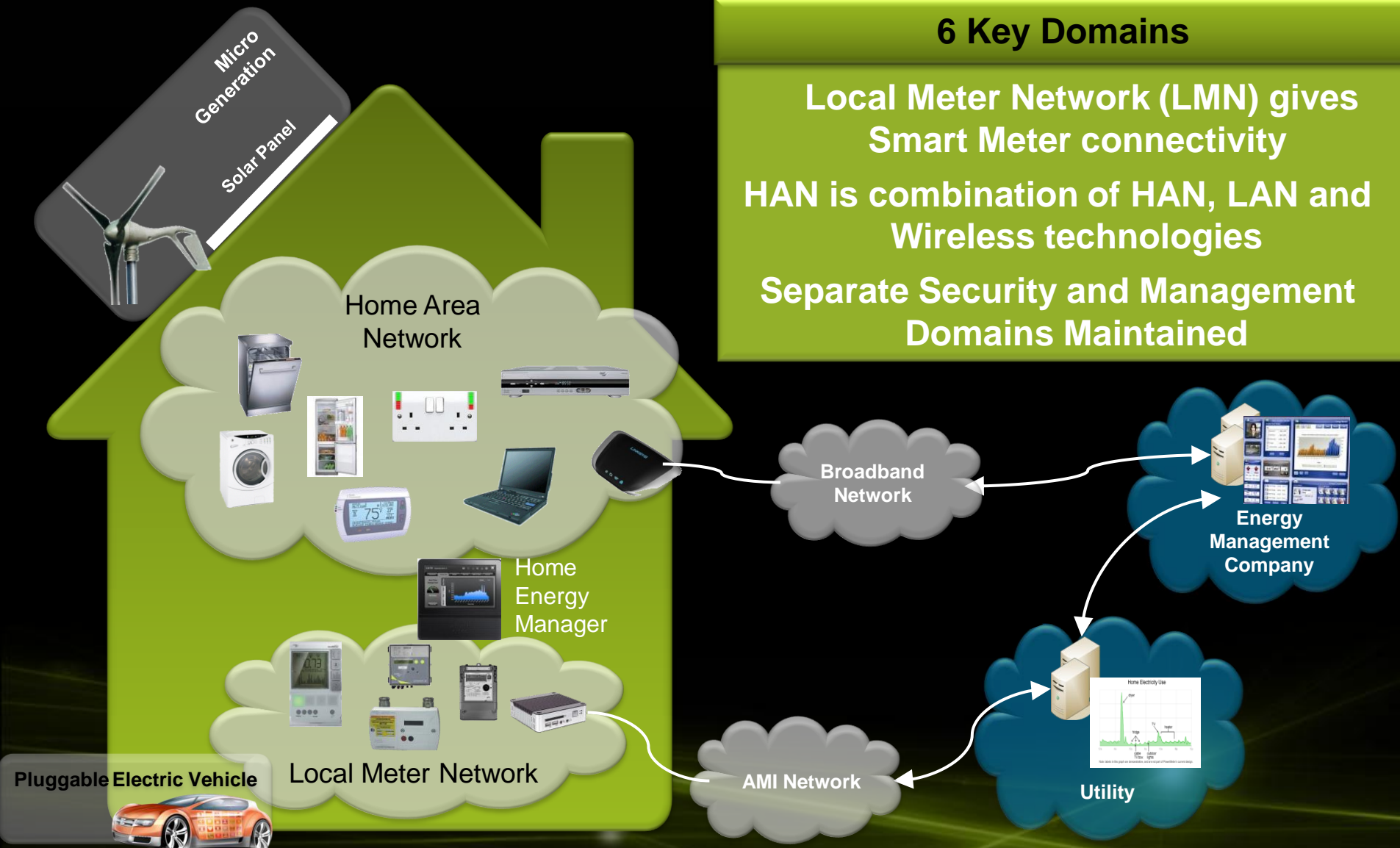
Proven consolidation of proprietary networks

Performance

Prioritize traffic, collect & analyze large amount of data

Energy Management

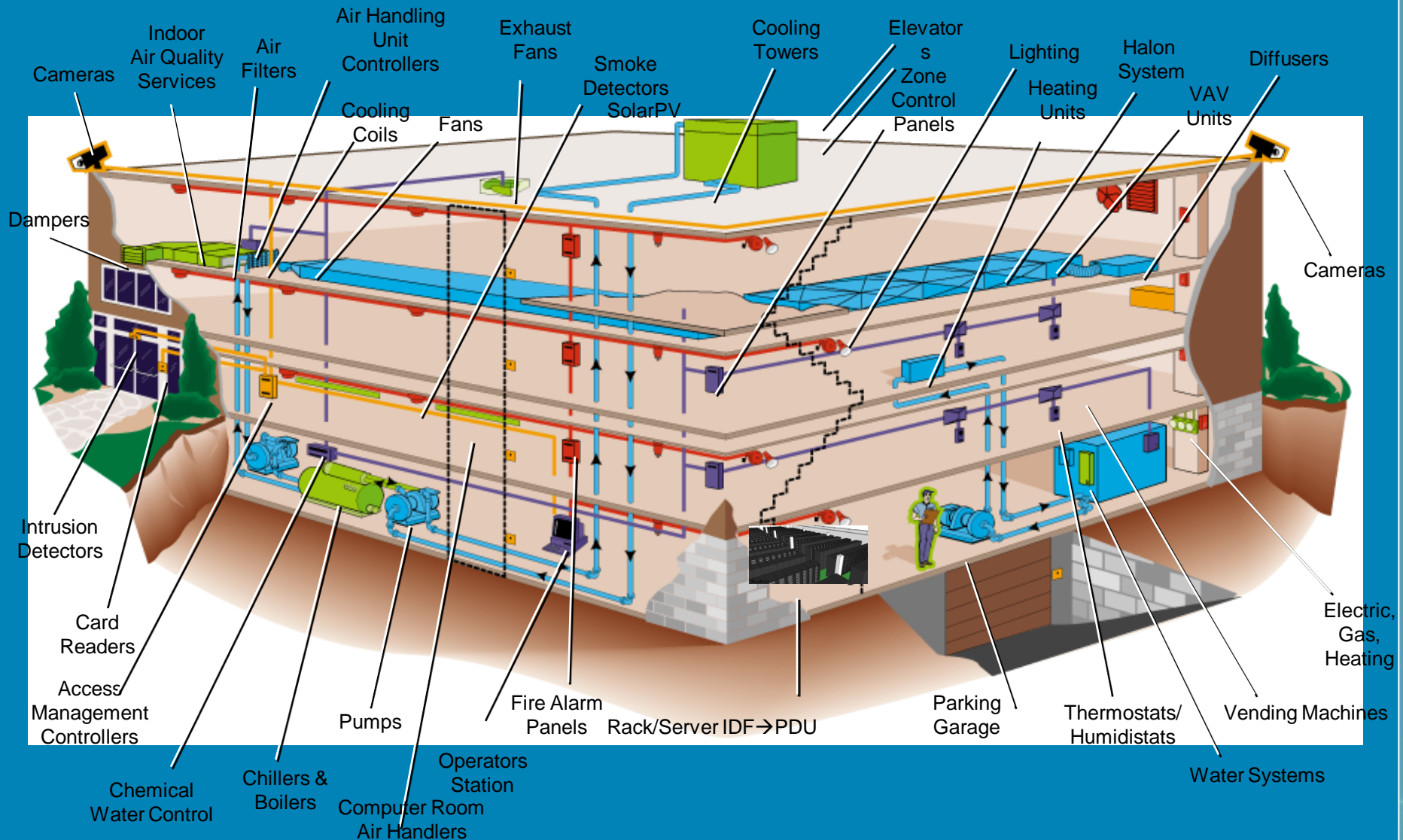
Key Domains



Building Management remove the silo's

One Building – Multiple Industries → Smart Buildings

lighting, HVAC, metering, industrial, access control, and more



Market Factors Driving IPv6 Deployment

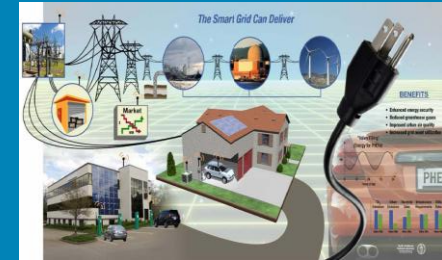
Enabling the End to End Architecture

IPv4 Address Run-Out

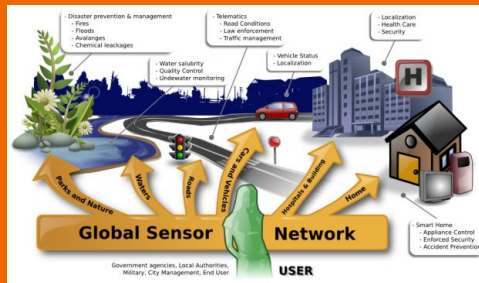


2011

Smart Grid



Smart Cities



Smart Building



IETF Decision was to elect IPv6 as the protocol of choice for The Internet of Things

Applying Lessons Learned

From Internet to Smart Grid

Ability to Scale
is Critical

Open standards, owned by non-profit and industry groups enable interoperability, growth, adoption and innovation

Think Security
on Day One

Retrofitting security is nearly impossible and current IP specifications mandate security consideration

Simplicity over
Perfection

IP is not customized for any one application yet it can serve all applications “Better is the enemy of good”

Innovate at
Core and Edge

Open communication and programmable endpoints lead to serendipity and innovation

Government
Can Help

US Department of Defense helped fund the birth of the Internet in 1969

Building Tomorrow's Grid... Today

End-to-End Communications Infrastructure
From Power Generation, to Businesses
and Homes

Opening an Era of Energy Service
Innovations and Efficiency

