IPv6: Smart Infrastructure for a Smarter Singapore

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Silver Spring NETWORKS

What You'll Hear from Me Today

- Smart infrastructure / Energy / IoT
- IPv6 is critical building block
- Proven globally, at scale - Now real in Singapore
- Lessons learned / Next Steps

Company Overview

- The leader in open energy networks
- Global customer deployments
- 18M+ Silver Spring-enabled devices delivered
- More than a decade of industry leadership
- The broadest ecosystem, with over 75 partners
- Listed on the NYSE – SSNI

Bloomberg NEW ENERGY FINANCE

Global Cleantech 100

2011 BAY AREA MOST ADMIRED CEO AWARDS

SMARTGRID PRODUCT OF THE YEAR 2011

technology review Published by MIT

WALL STREET JOURNAL

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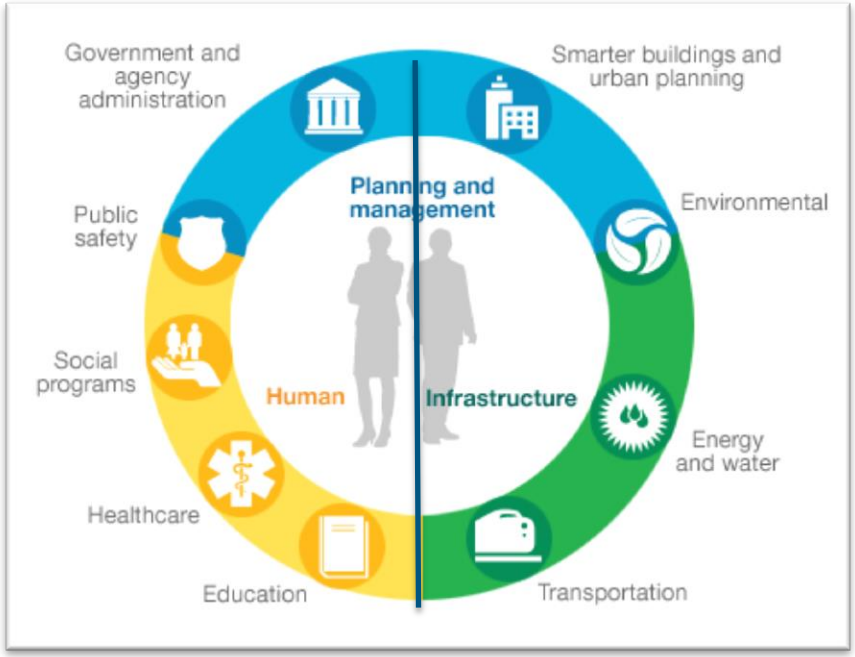
Focus Today: Infrastructure

- Much focus on ‘Human’
- Infrastructure represents immense opportunity
- Technology is accelerating opportunities to improve critical infrastructure
- Pace to the speed of value



Graphic - IBM

Global Market Drivers

- Policy, Environment, Regional Economic Advantage

Competitiveness

Efficiency

Reliability

Control

- Technology

Shared Characteristics

- Standards Based
- High Reliability
- Scalable
- Extensible
- Secure
- Cost Effective

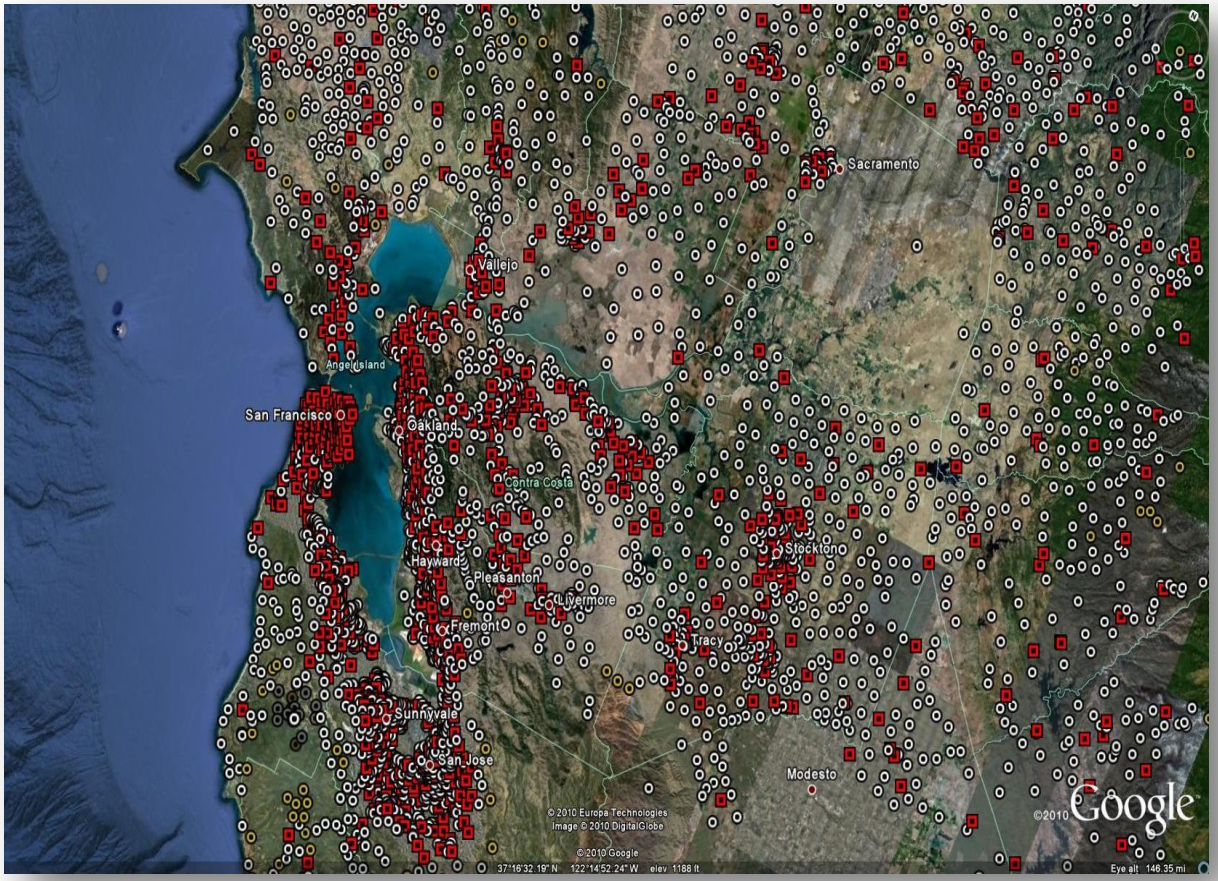
- IPv6, 802.11 / 802.15.4g
- 99.95%++
- Millions of devices
- Multi-application / vendor
- More than encryption…
- ¢/mo, decreasing w scale

Why IPv6?

- Addressing
  - Massive address space
  - Stateless auto configuration….
- Security
  - Deep hooks
  - Leveraging tremendous collective spend, testing
- Reliability
  - Native multi-homing

Northern California

5M+ Homes and Businesses Connected with IPv6



- 70K sq/mi
- Rural, urban, suburban
- 99.9% coverage
- 99.9% reliable

Access Points Relays

Fundamental Change in Thinking

Before

Existing sensor networks have not had a major impact on our lives - yet

- Small-scale
- Short-lived
- Mostly-static
- Application-specific
- Few types of devices
- Single-vendor protocols
- Cellular
- Insecure
- Very energy-constrained
- Mostly process management

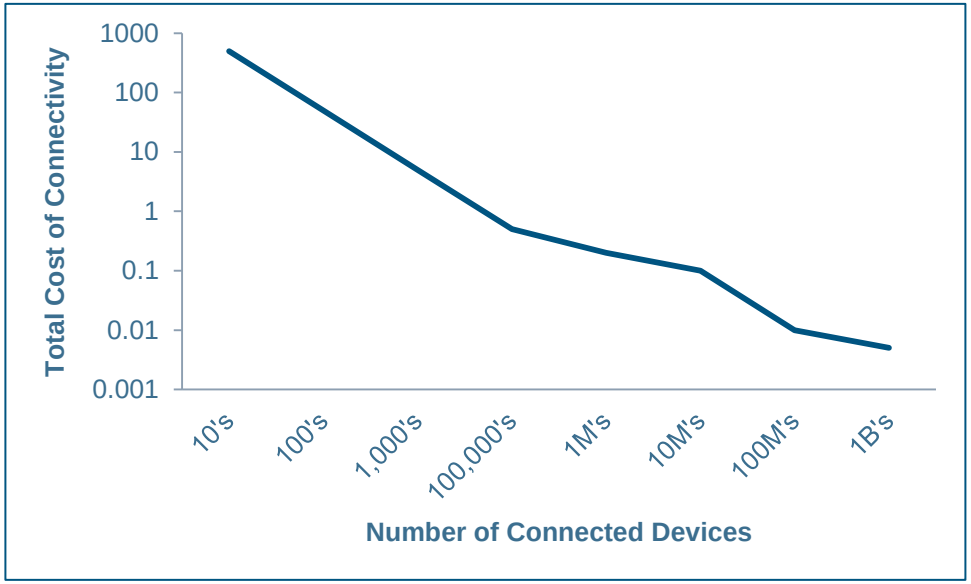
Now

Extending M2M sensor platform adds *Things* at near zero marginal cost

- Large-scale (country-sized)
- Multi-decade product lifetimes
- Network is dynamic
- Application-agnostic
- Many types of devices
- Standards-based
- Mesh capillaries to WAN
- Commerce grade security
- Not energy constrained
- Mostly lifestyle management

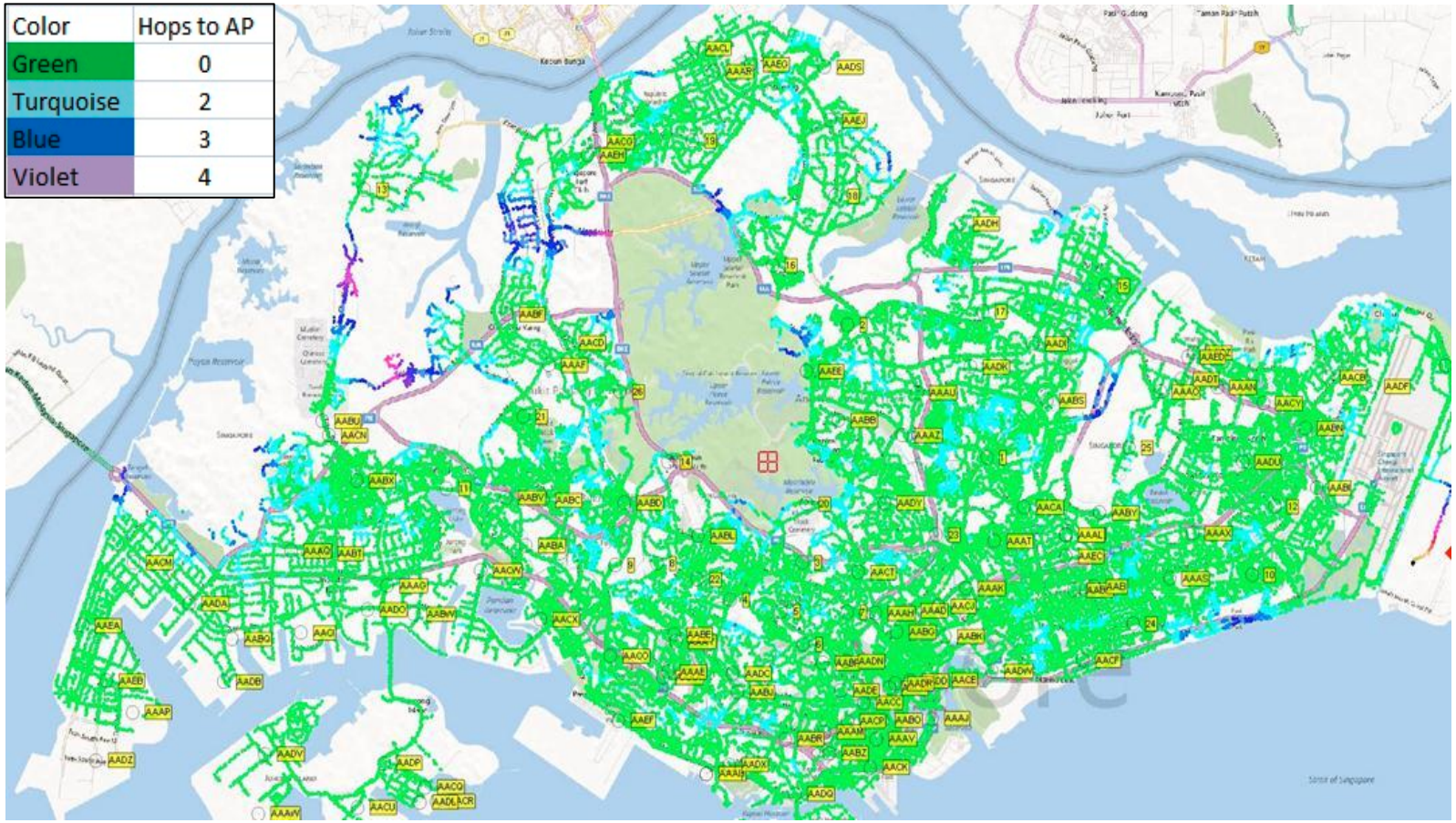
What Makes it Possible?

- Confluence of two well-known technology ‘laws’
  - Moore’s Law – ever increasing computing power and lower cost
  - Metcalf’s Law – value of network = square of devices (network effect)



With massive scale, cost of connectivity approaches zero

Singapore's Ubiquitous IPv6 Network Platform



Singapore Power's Secure IPv6 Network covering all of Singapore .

Capable of supporting a variety of critical infrastructure applications

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Case Study - Copenhagen

Native IPv6

Network-as-a-Service

“Anchor” application is lighting

Immediate plans to implement range of sensors / controls

EU’s most sustainable city

Aggressive carbon reduction targets

Collaborative city departments all leveraging the network to achieve automation aims

Lessons Learned

- ✓Don’t believe ‘it can’t be done’
- ✓SW upgrades = easy, HW upgrades = hard
- ✓Design architectures independent of devices
- ✓Unleash a flood of innovation