Creating Infinite Possibilities.

SCTE
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CableLabs® Custom Connectivity

Reimagining Service Delivery

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# Delivery to a physical address

Limitations

- Requires a CPE and cable pass – installation, activation, updates, inventory mgmt, theft/damage

- Limited visibility behind CPE – what devices are connected, what do they need, are they misbehaving, troubleshooting

- Rigid billing relationship – tied to the address/CPE, no multi-payer support, less dynamic

- Shared CPE – not possible to share CPE (reduce cost)

- Home-centric connectivity – consumers expect connectivity to their devices, not just the home

Opening new revenue opportunities

Evolving the service delivery model

- Establish secure relationship to each device, not just the household

- Flexibility in OSS/BSS (multiple payers)

- Custom network services (device-focused)

- Opens new revenue models
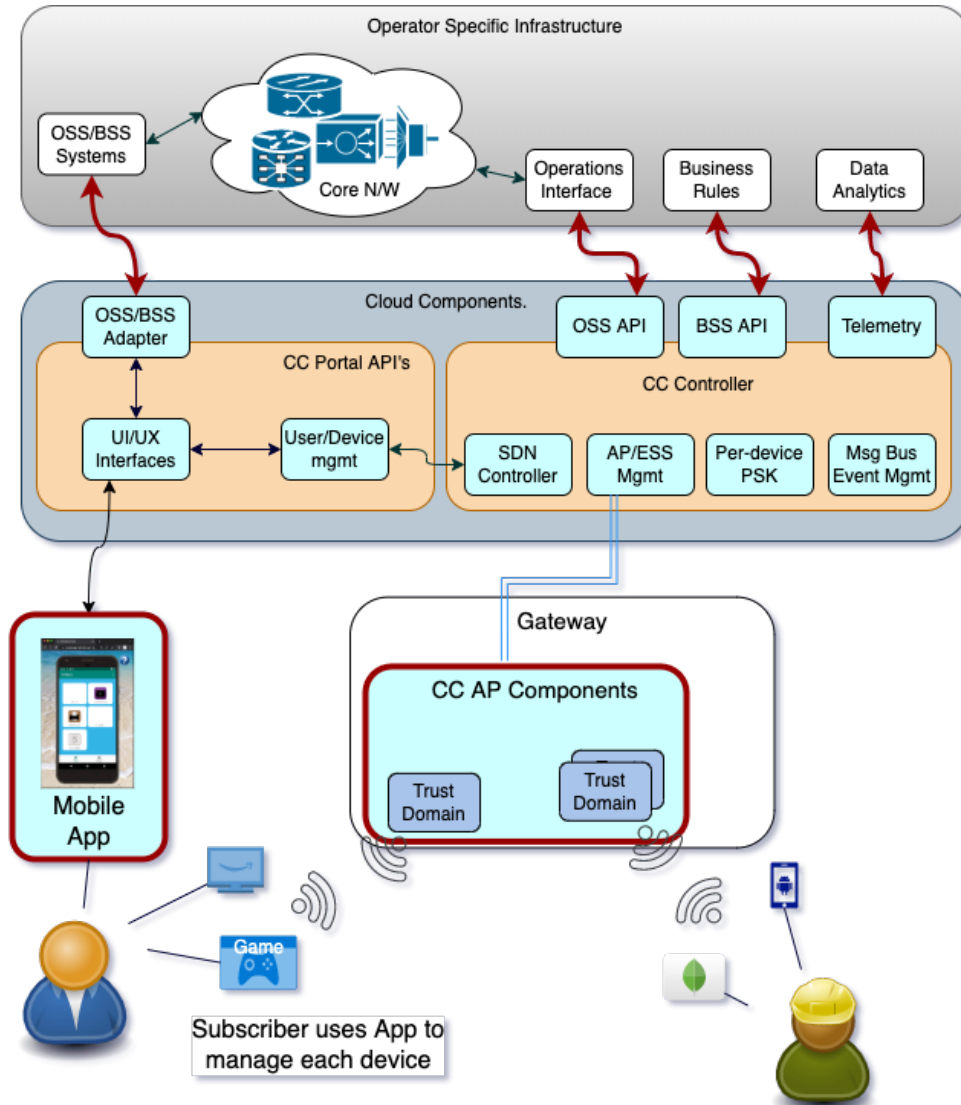
CC components

- CC Controller
  - API's for ap and ap-group mgmt., service mgmt., device mgmt., credential mgmt., policy mgmt.
- CC Portal
  - API's for UI/UX
  - API's for user auth and mgmt.
  - API's for BSS
- CC AP components (Reference Impl)
  - Create/manage trust domains
  - Manage micronets, device auth
- Mobile App (Reference Impl)
  - UI for user, service, device mgmt

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Custom Connectivity for digital divide

The architecture supports various use-cases.

We chose the digital divide use-case due to its unique applicability and impact.

High density low-ARPU markets

Target market

- High density housing communities (cinder blocks, metal roofs)
- Daily wage/gig economy workers, unbanked
- No fixed home address in certain neighborhoods
- "monthly" subscription does not match their lifestyle

COVID-19 impact

- Severely disadvantaged during the pandemic (especially children)
- Cellular data service available but does not scale

Challenge presented to us – solve for this because it's the right thing to do.

Data point*

- Analysis from Deloitte has shown that a 10-percentage-point increase of broadband penetration in 2016 would have resulted in more than 806,000 additional jobs in 2019, or an average annual increase of 269,000 jobs.

- On an annualized basis, this roughly indicates a **10% increase in broadband penetration will drive a 13% increase in jobs** (non-farm payroll).Moreover, it was found that there is a strong correlation between broadband availability and jobs and GDP growth.

- A 10-percentage-point increase of broadband access in 2014 would have resulted in more than 875,000 additional US jobs and $186B more in economic output in 2019. On an annualized basis, this roughly equates to a 10% increase in broadband availability will drive a 0.9% growth in economic output (GDP growth)

- The analysis also showed that higher broadband speeds drive noticeable improvements in job growth, albeit with diminishing returns. As an example, the **gain in jobs from 50 to 100 Mbps is more than the gain in jobs from 100 to 150 Mbps**.

*Source: Deloitte "Broadband For All" April 2021
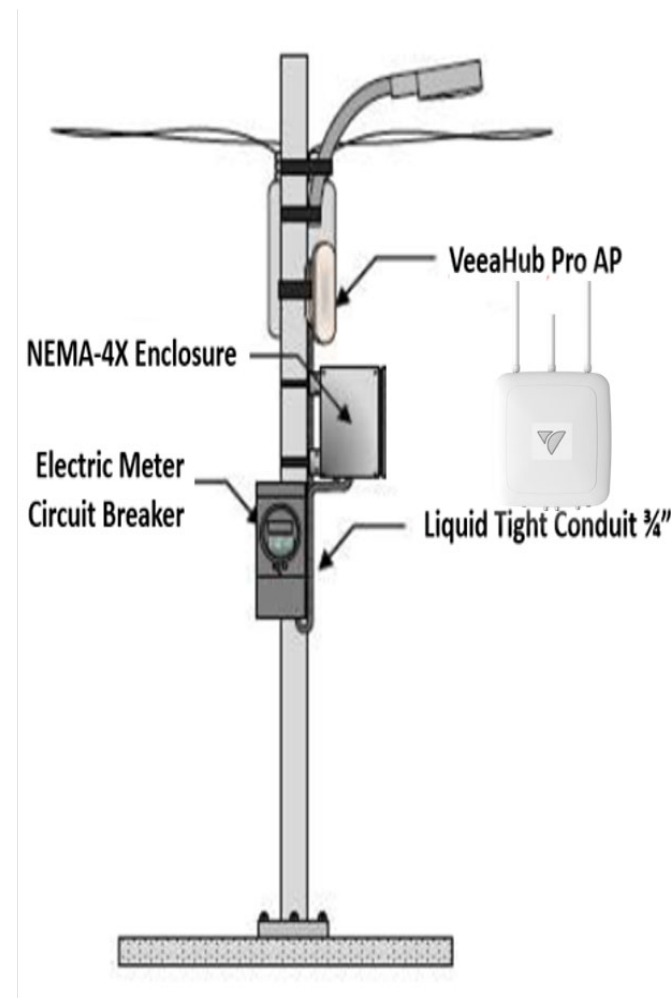
Goals for the trial

- Use outdoor pole-mounted Wi-Fi – no CPE

- Backhaul using Wi-Fi mesh and GPON

- Leverage existing payment system

- Per-device bandwidth caps

- Allow user to instantly subscribe to service that is
  - Low cost
  - No contracts
  - User driven (digital-only experience)
  - Secure (per-device creds)

- Home-subscription equivalent
  - Secure and operational "home network"
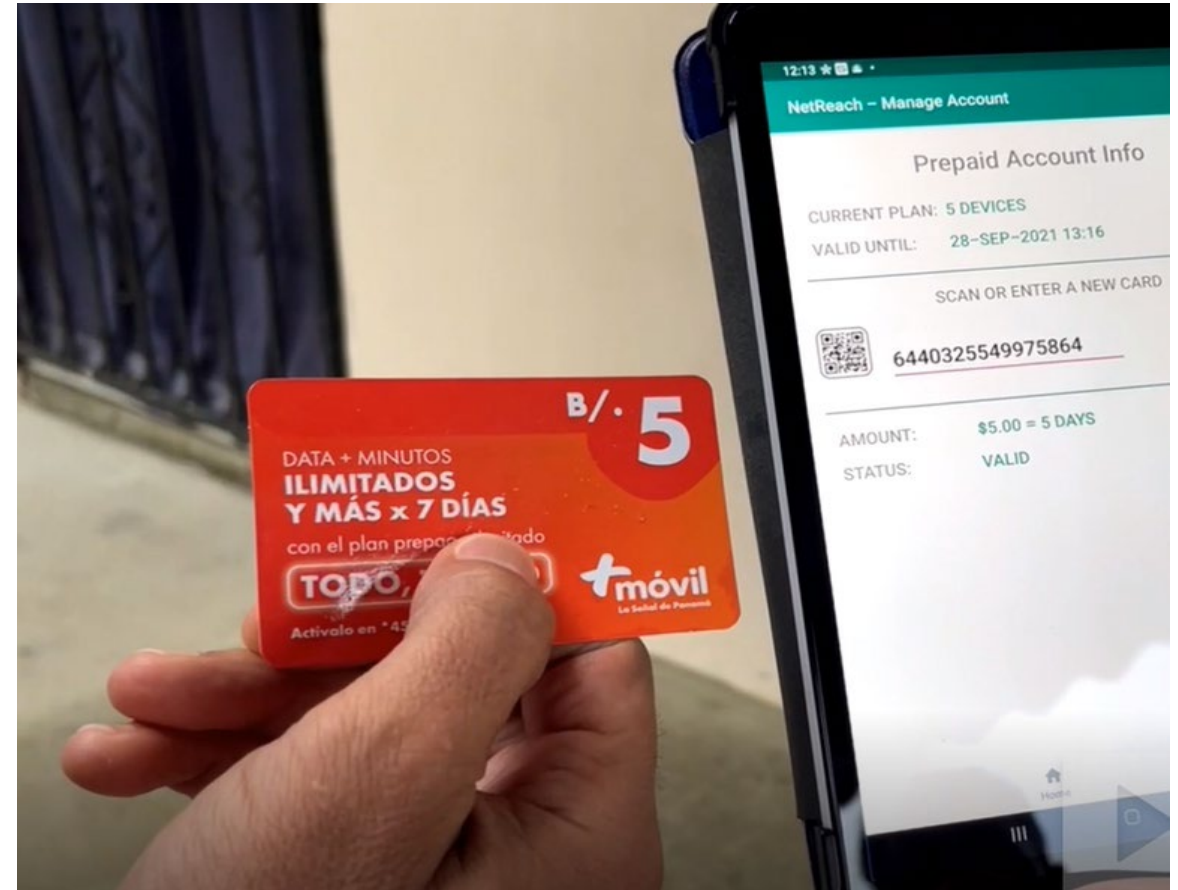 - Devices can cast, print, file-share, etc

Using Veea's secure platform

- CableLabs, LLA and Veea collaboration
  - From proof-of-concept to field-trial product within months (Q1-Q3 2021)
- CC framework implemented on outdoor Veea Units (pole mounted)
  - Outside-in Wi-Fi coverage
  - Support for IPTV
  - Still operational in the field-trial
  - Support for in-home extenders (as needed)

NEMA-4X Enclosure

VeeaHub Pro AP

Electric Meter
Circuit Breaker

Liquid Tight Conduit ¾"

Fiber connection to the pole

User Journey

User purchases a scratch card	• Cost covers n devices for d days
Mobile account creation/login	• Existing mobile plan users use same account
User scans voucher in app	• Activates the card and plan
User adds new device in app	• App shows SSID to connect to and password to use
User enters SSID/Password in device	• Device connects

Field Trial Success

- Pole-mounted Wi-Fi delivered 25+ Mbps (capped)
  - Multiple cider-block walls, metal roofing
- Existing payment system worked well
- Life altering for users
  - From unreached to part of today's economy
  - Khan Academy courses
  - Chromebook connectivity at home
  - IP television allowed for dropping linear satellite service
- New customer relationships
  - Using the app established new users

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So what's next for Custom Connectivity

Digital divide use-case proved out the architecture.

Based on discussions with members

Interest in MDU

MDU growth

- Operators report an increase in MDU market segment
  - Green field/new builds
  - Existing MDU's (increased demand)
- Different configurations
  - Fully managed
  - Mixed-mode
  - Group of independent units

MDU challenges

- Putting dedicated device in each unit is costly
- Causes beacon pollution and overlapping channels, reducing air-time performance
- Cost of labor
  - Leverage digital-only interaction for instant service activation
- Outage monitoring and redundancy

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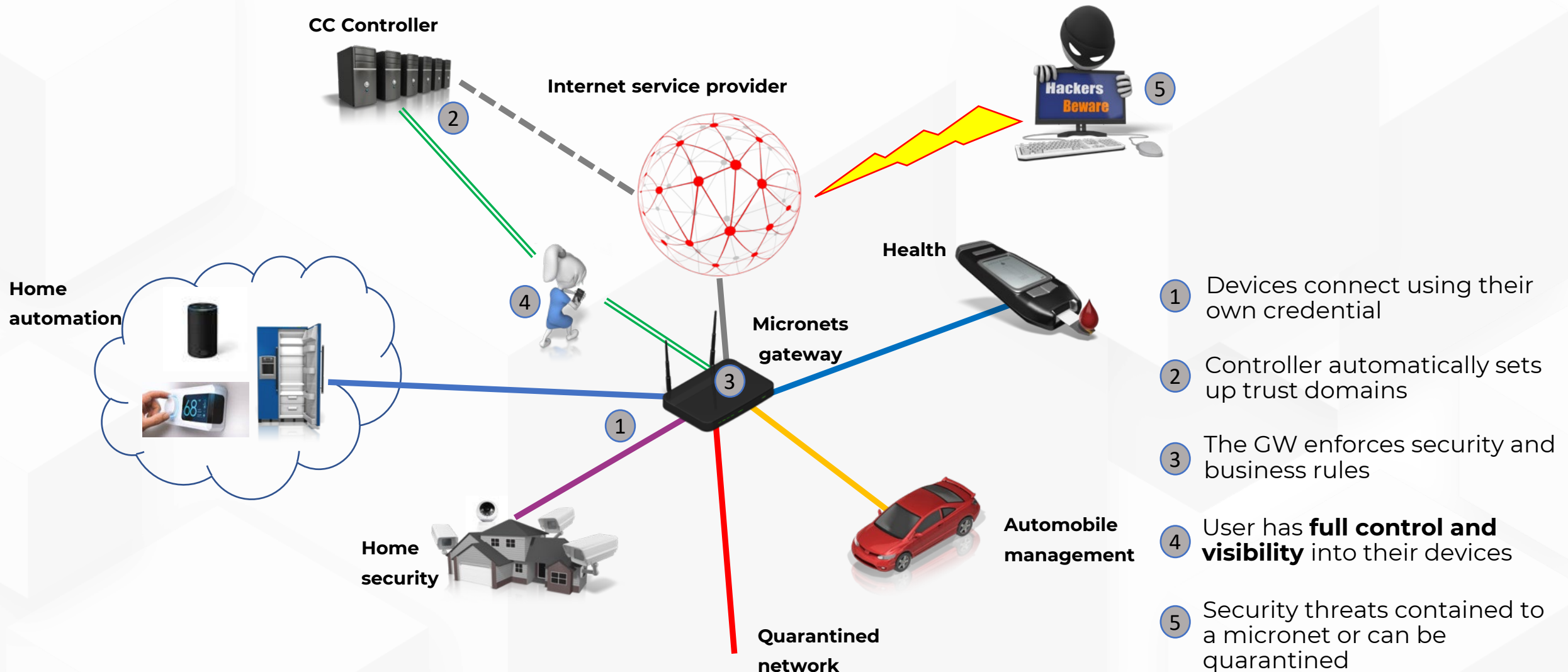## How does this relate to securing the user experience

Its all about network visibility and device identity

The IoT explosion

- Exponential increase in the number of connected devices

- These devices connect primarily over Wi-Fi
  - Using shared password…..

- Compromise of one device, compromises the entire network

- Certain "bad" devices get compromised within 24 hours of connecting
  - Shodan (ikettle)

- Operators and users have no easy way to pin-point compromised device(s)

- This is a problem we are facing
  - And continues to grow

Custom Connectivity "micro" segmentation

CC Controller

Internet service provider

Hackers Beware

Home automation

Health

Micronets gateway

Home security

Quarantined network

Automobile management

1. Devices connect using their own credential
2. Controller automatically sets up trust domains
3. The GW enforces security and business rules
4. User has **full control and visibility** into their devices
5. Security threats contained to a micronet or can be quarantined

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Thank You!

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