

#### Innovation at Cisco ET&I - Emerging Technologies and Innovation

Pablo García (<u>pgarcia@cisco.com</u>)

#### Outline

- My background
- Cisco Innovation Team
- Cisco products, technology and projects
- Two tech deep dives
  - Project ART
  - Project Bodyguard



Dr. Pablo García PhD. Embedded Systems













## Emerging Technologies and Incubation

Foster a healthy innovation ecosystem with startups, partners, and customers through Co-Innovation

#### Engineering team (~300 ppl)



#### **Rethink Incubation**

- Rapid Ideation, Validation and Incubation
- Land ventures that drive 10x impact to our customers



#### Tech/Innovation Leadership

- Co-Innovate w/Partners, Customer, Ecosystem
- University/Research Partnerships



#### Talent

• Flash teams, come together for the venture



00

#### APPDYNAMICS

**=** 

廊

=

.

Ð

×







#### Cisco



- ASA Firewall
- FirePower
- Umbrella
- Stealthwatch
- Talos
- ...



#### Cisco Research



(16) Element Directional Antenna Array (Digitally Switched) for Location tracking

#### **BLE Element**

(4) Omni-Directional Elements (Digitally Switched) for 24x7 Monitoring & Analytics DNA Assurance





quantum computing

111111

CISCO.

039

Silicon One™

Q202L ©Cisco 2020







#### INTERNET ACCESS FOR HUMANITARIAN PROJECTS

## Project Deep Dive #1: ART Advanced Roaming for Things

#### HetNets & Roaming



Things (single or multiple radios, static or mobile)

#### AGVs roaming across spectrum (indoor/outdoor for IIoT)



#### LoRa Frequencies Worldwide





#### LoRa roaming shortcomings

J. Stokking, CTO & Co-founder of The Things Industries/Tech Lead of The Things Network, "5 x Why LoRaWAN Roaming Is Not A Solution," June 10, 2019:

https://www.linkedin.com/pulse/5-x-why-lorawan-roaming-dead-arrival-johan-stokking/

- Main Issues:
  - 1. LoRaWAN Roaming requires blind trust in roaming parties or hubs
  - 2. LoRaWAN Roaming requires many-to-many contracts
  - 3. LoRaWAN Roaming requires each party to operate a LoRaWAN network server
  - 4. LoRaWAN Roaming hubs centralize authority
  - 5. LoRaWAN Roaming does not support separating payload from metadata

The model proposed can overcome some of these issues



#### Passive Roaming in LoRa

Source: LoRaWAN Backend Interfaces Specification, LoRa Alliance



- Roaming in LoRa requires many-to-many contracts
  (LoRaWAN Roaming is peer-to-peer)
  - Today, there are more than 110 commercial LoRaWAN networks at various stages of deployment across more than 55 countries worldwide; and, according to Semtech Corporation, the number of LoRa end nodes is approximately 100 million<sup>1</sup>.
  - Full mesh implies each operator needs to maintain around 110 contracts (i.e., almost 6,000 p2p contracts in total).

<sup>1</sup> Source: "LORAWAN AND NB-IOT: COMPETITORS OR COMPLEMENTARY?", ABI research, June 2019

#### LoRaWAN Roaming architecture



#### Packet transmission using Passive Roaming



# Controlled communications across spectrum in the fabric

- Example where traffic is forwarded though the IoT SIGs after Passive Roaming process is completed
- Applies both to LoRaWAN R.1.0 & 1.1

#### Roaming Scenario (multiple administrative domains)



#### Roaming Scenario (multiple administrative domains)





#### Roaming Scenario (multiple administrative domains)



#### ART's HW Lab





## Project Deep Dive #2: Bodyguard Continuous Multi-factor Authentication

#### Introducing Bodyguard leveraging Continuous Multi-Factor Authentication CMFA

Bodyguard uses CMFA to establish a user **identity posture** leveraging biometric, behavioral and contextual factors.

Factors originating from **different sources** such as the network, phone, laptop and tablet therefore **augmenting** the **security** as not relying on a single factor robustness.

A combination of factors enabling the establishment of **multiple trust level** accesses (not only access – no access).

Factors being continuously monitored enabling a **dynamic** access control adaptation to the user posture.

Offering an **Identity Posture aaS** for enterprise, service provider or cloud services with simple administration features.



# Bodyguard is a fusion of factors to create a continuous identity posture



#### Integrations

# S E C U R I T Y



Continuous Authentication.



🖯 Duo Security		×
	Device:	×
	Choose an authentication method	
	Duo Push	Send Me a Push
Powered by Duo Security		
	ارچ) Call Me	Call Me
	Passcode	Enter a Passcode
Pushed a login request to your device		Cancel

Challenges



# **OneVisage**<sup>®</sup>



#### Wide Multi Channel Presentation Attack (WMCA) - DataSet



Color

Infrared

Thermal







### Productization



# **CISCO** The bridge to possible