

# **Internet Mega-Trends' Impact on the Internet's Architecture**

**IGF 2018 WS #40**

# Agenda

1. Opening/introduction
2. Presentation Jari Arkko: "Consolidation" (10 minutes)
3. Presentation Alissa Cooper: "Rising use of encryption in the Internet's core protocols" (10 minutes)
4. Presentation Maria Ines Robles: "Shift from device-centric to service-centric networking" (10 minutes)
5. Discussion (50 minutes)
6. Conclusions (10 minutes)
7. Closing

# Opening

**Format:** 90 Min

**Format description:** Interactive, informative session

**Theme:** [Technical & Operational Topics](#)

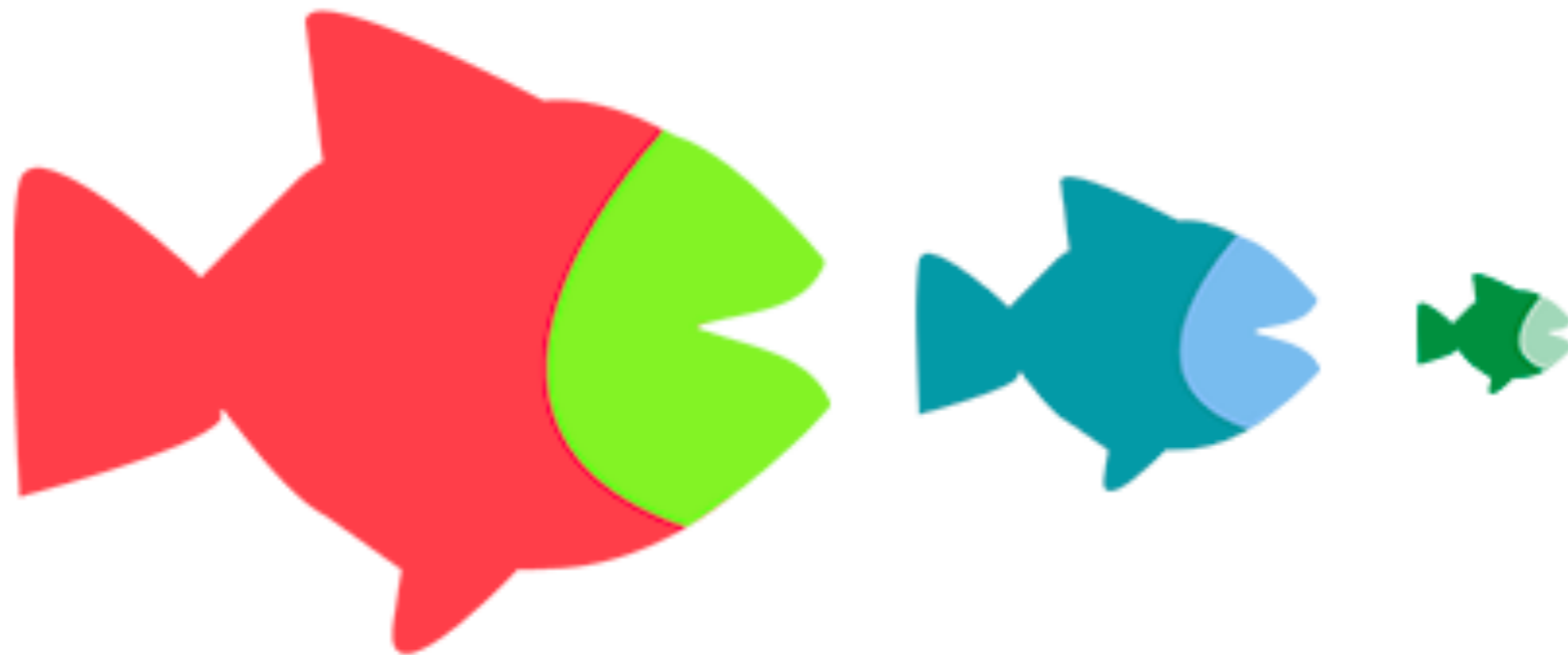
**Subtheme:** [INTERNET PROTOCOLS](#)

**Speaker 1:** [Alissa Cooper](#), Technical Community, Western European and Others Group (WEOG)

**Speaker 2:** [Jari Arkko](#), Private Sector, Western European and Others Group (WEOG)

**Speaker 3:** [Maria Ines Robles](#), Technical Community, Latin American and Caribbean Group (GRULAC)

# INTERNET MEGA-TREND: CONSOLIDATION



IGF 2018, PARIS, FRANCE

JARI ARKKO, ERICSSON RESEARCH & IAB \*

\*) Not speaking for either

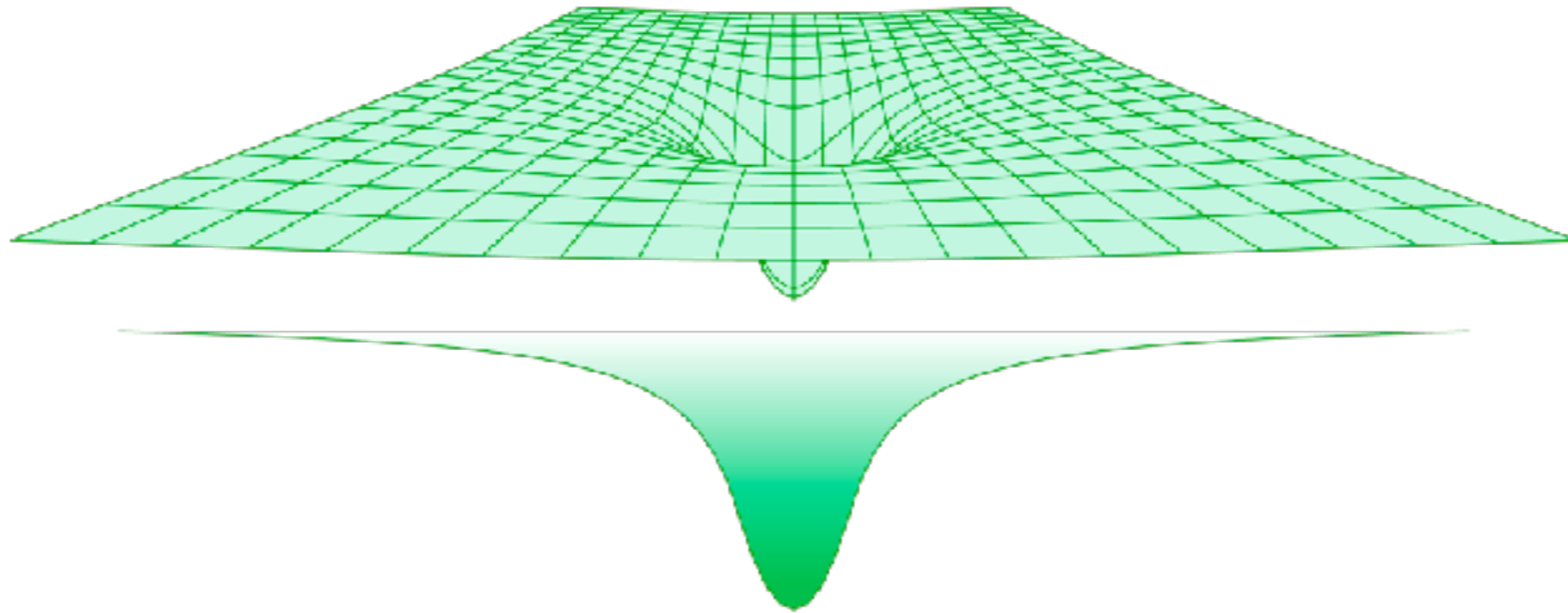
# FROM IDEAL VIEWS TO PRESENT REALITY

INTERNET IS THE ULTIMATE DISTRIBUTED PLATFORM: EQUAL OPPORTUNITY FOR THE SMALL AND THE LARGE, OPEN INTERFACES, ...

BUT IN RECENT YEARS, THE INTERNET SEEMS TO HAVE ALSO FED THE CREATION OF LARGE, CENTRALISED ENTITIES THAT PROVIDE MOST INTERNET SERVICES



# WHAT'S BEHIND THESE TRENDS? WHY CARE?



CONSOLIDATION, GROWTH OF LARGE PLAYERS, AND THE  
CENTRALISATION OF NETWORK FUNCTIONS — HAPPENING DUE TO  
MARKETS, ECONOMICS, COMPETITION, POLICY & TECHNOLOGY

WE ARE TECHNOLOGISTS, BUT UNDERSTANDING INTERNET REALITY IS  
GOOD FOR ALL OF US, EVEN WHEN A PHENOMENON CROSSES FIELDS

TRENDS MAY HAVE IMPACTS ON ASSUMPTIONS ABOUT HOW THE  
INTERNET WORKS, OR WHAT KIND OF TECHNOLOGY WE SHOULD CREATE

# FACTORS LEADING TO CONSOLIDATION



ECONOMICS



NETWORK EFFECTS



FUNDAMENTALS (E.G., SPEED OF LIGHT)



PERMISSIONLESS INNOVATION



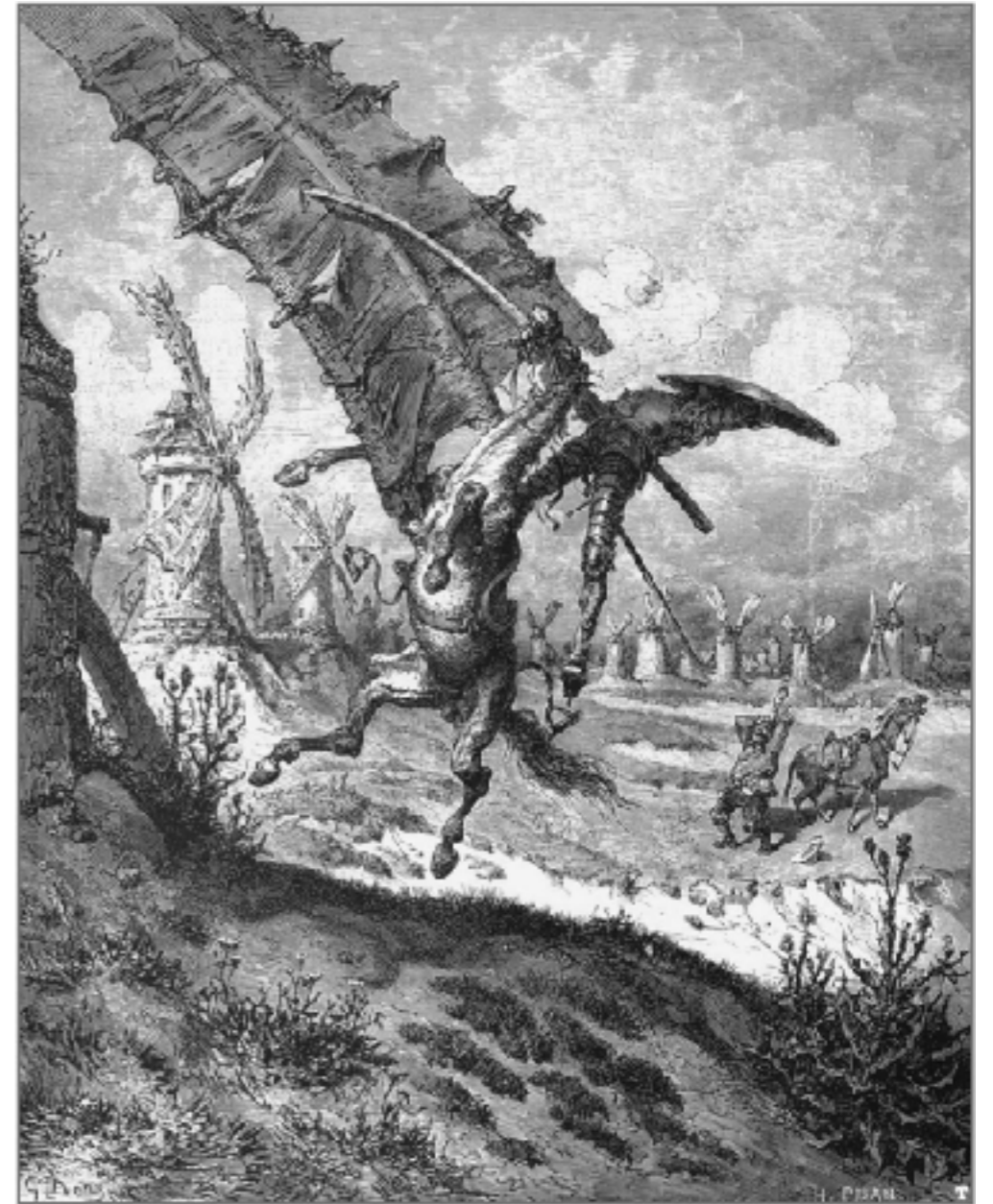
TECHNOLOGY (E.G., DDOS DEFENCE, ML)



...

# OPEN QUESTIONS

- DO WE UNDERSTAND THIS SITUATION SUFFICIENTLY WELL?
- WHAT CONSEQUENCES ARE THERE IN CONSOLIDATION?
- ARE WE DOING ENOUGH RESEARCH ON THE TOPIC?
- HOW CAN WE BETTER ADDRESS TOPICS SUCH AS THIS THAT CROSS DIFFERENT FIELDS?
- WHAT TECHNOLOGICAL TOOLS MIGHT MITIGATE THE SITUATION?





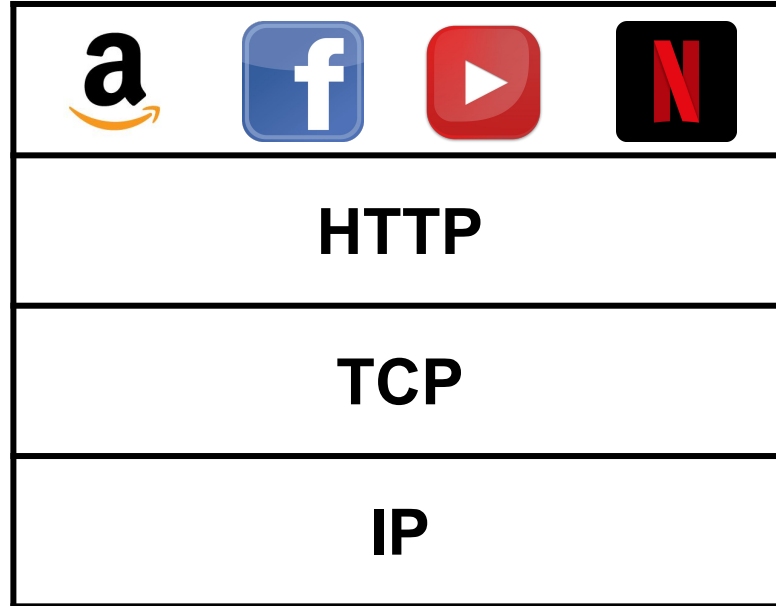
# Internet Mega-Trend: Encryption

Alissa Cooper

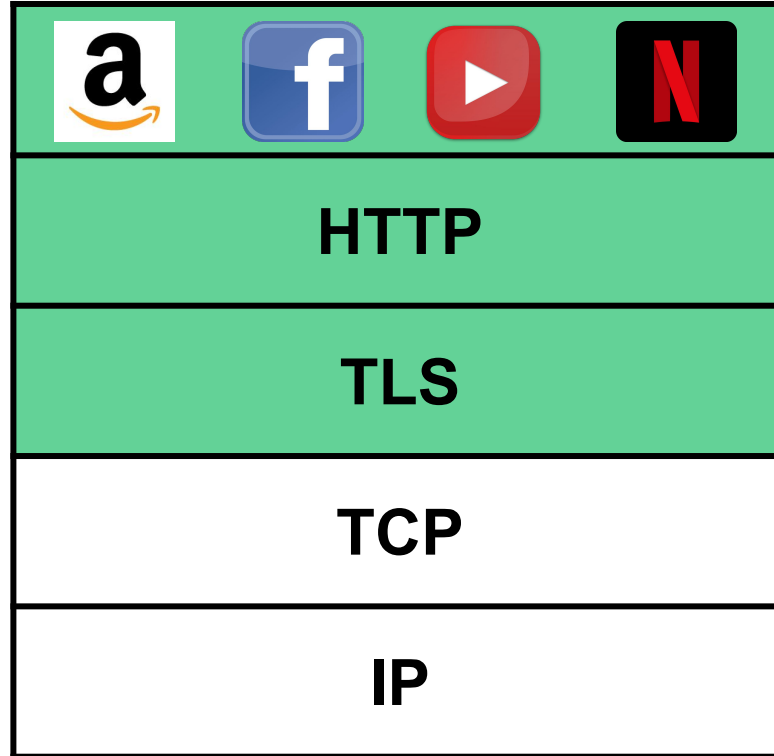
Internet Engineering Task Force (IETF) Chair



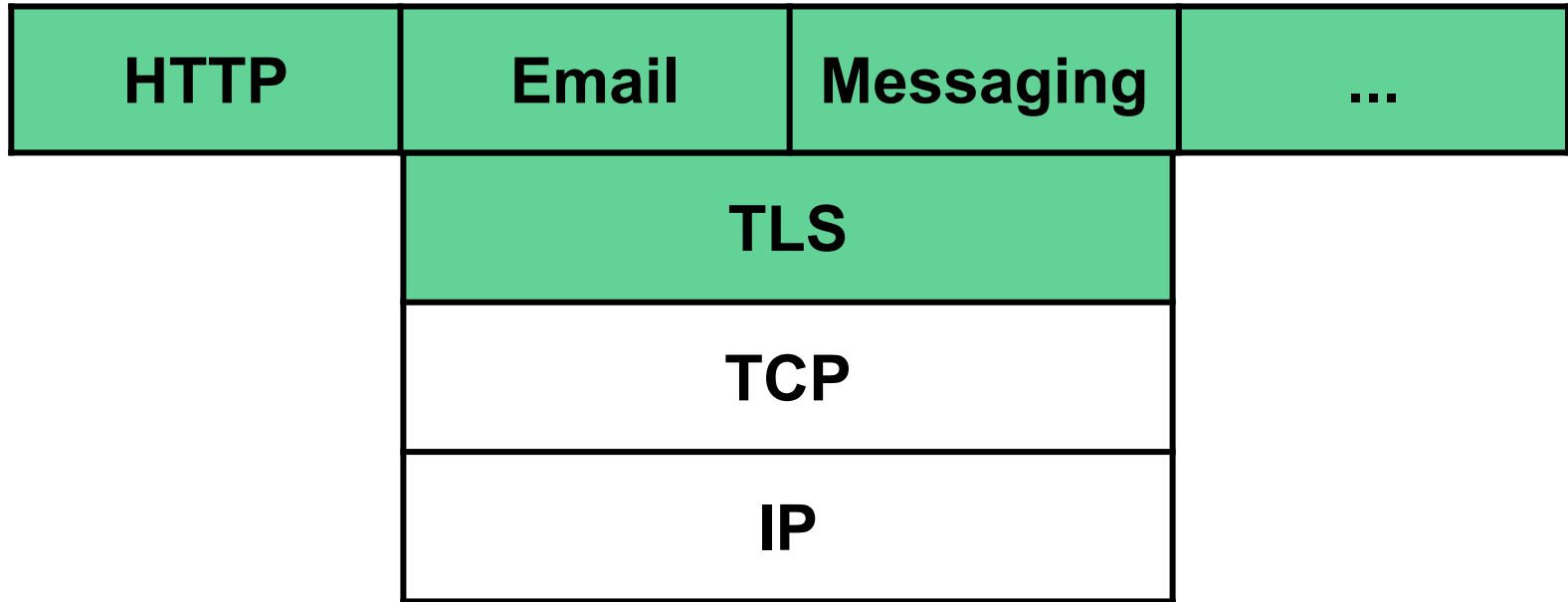
# HTTP



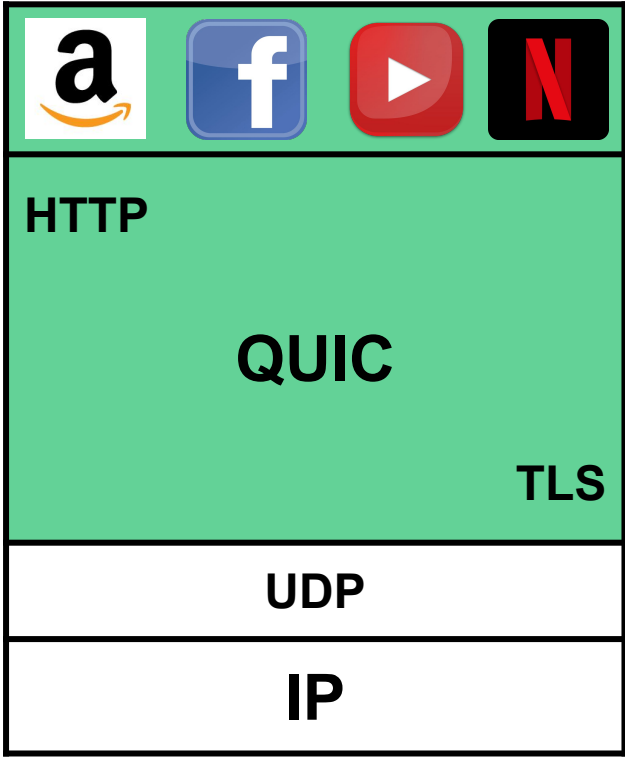
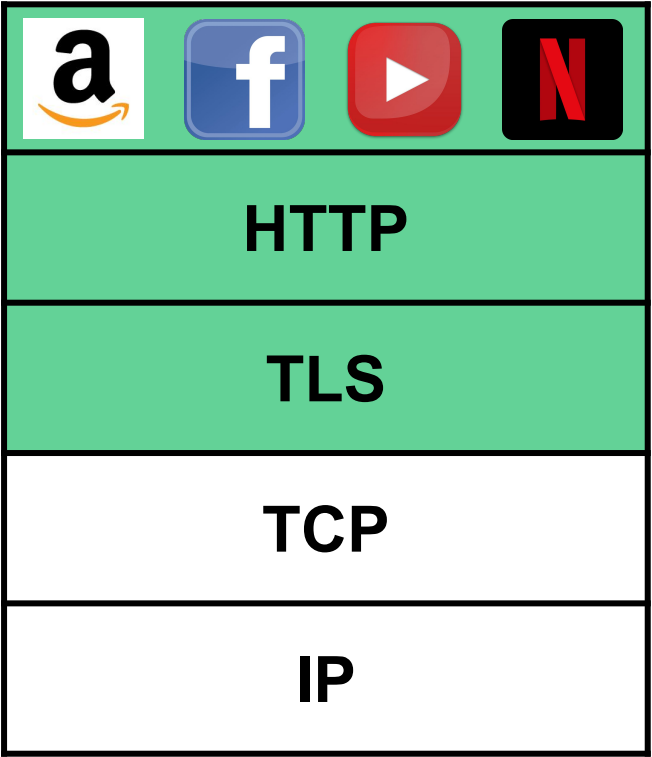
# HTTP/2



# TLS 1.3



# QUIC

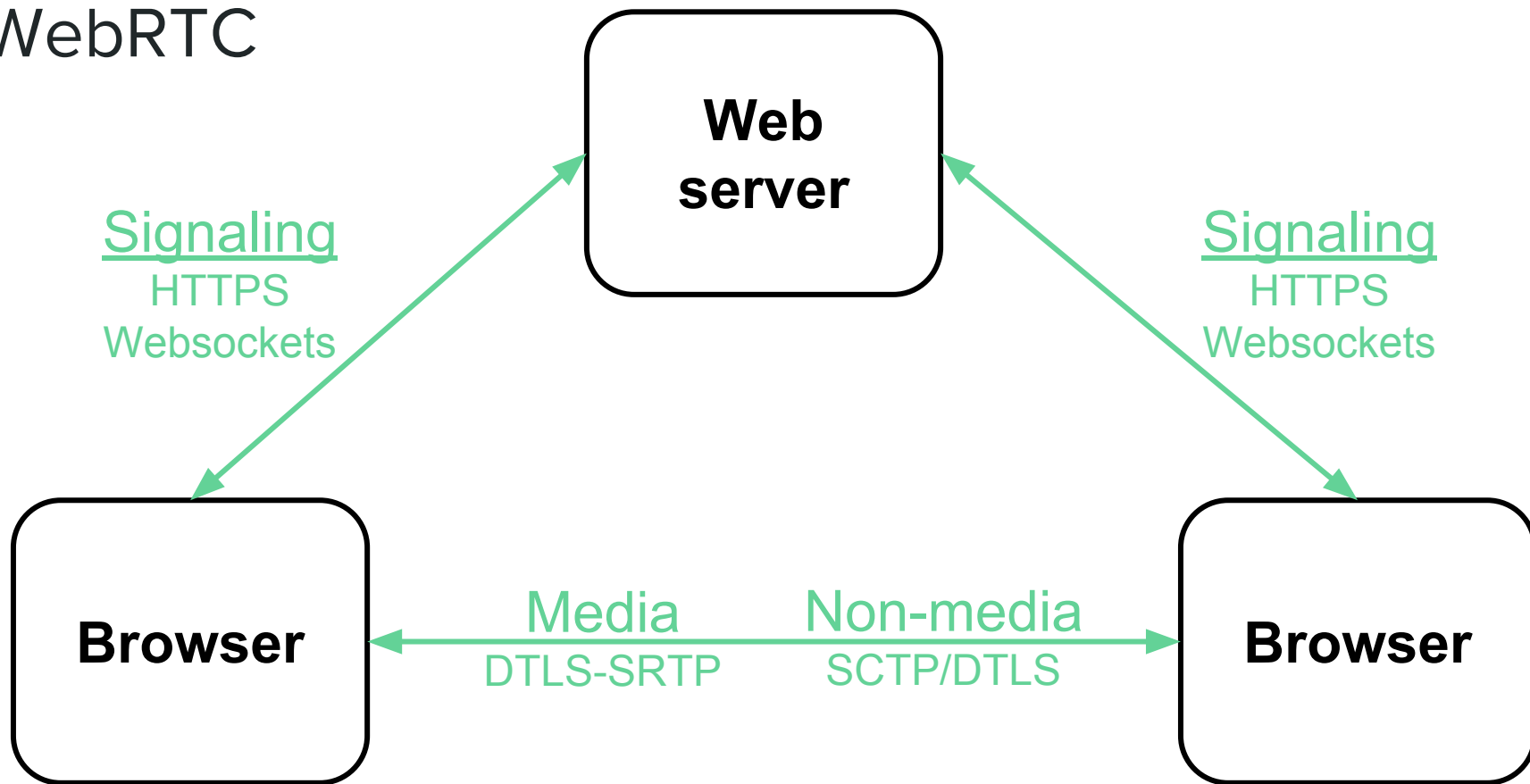


# Implications

- Tying security improvements to other features in high demand spurs adoption of encrypted protocols
- Rise of encryption yields significant security and privacy benefits
- Rise of encryption challenges network management and operations approaches accustomed to relying on unencrypted traffic
- Potential for interplay between consolidation and encryption

Back-up

# WebRTC





# Shift from **device**-centric to **service**-centric networking

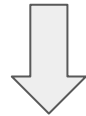
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Maria Ines Robles, [maria.robles@aalto.fi](mailto:maria.robles@aalto.fi)

Technical Community, Latin American and Caribbean Group (GRULAC)

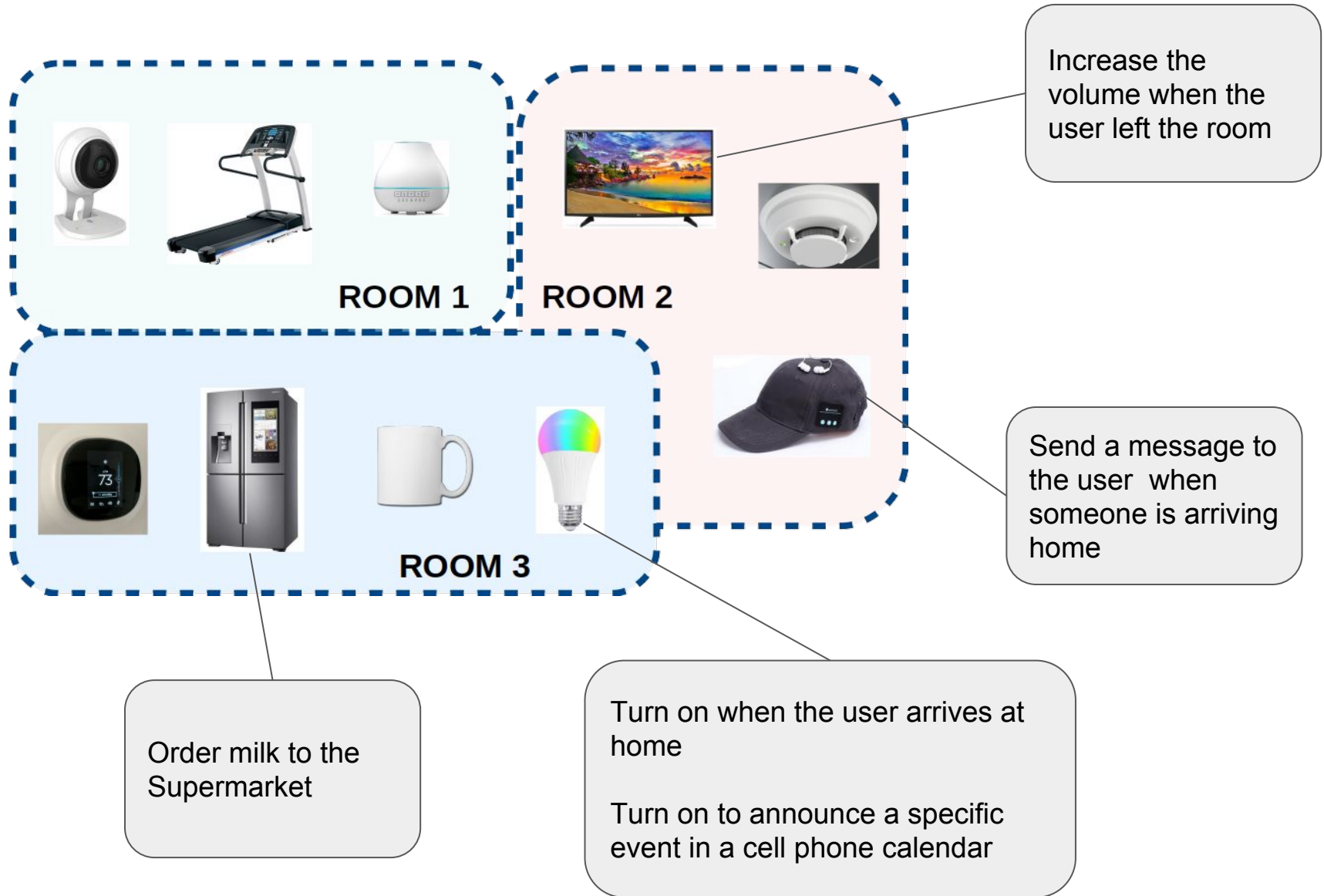
# Network engineering has become service-oriented

- Initially, the network engineering was centered on getting devices (or “hosts”) connected and ensuring the existence of paths between those hosts
- These days, network engineering has become service-oriented, focusing on giving people access to the services they need regardless of which device they are using or where they are located in the network.



**Service-Centric Networking:** a new networking architecture which aims at supporting the efficient provisioning, discovery and execution of service components distributed over the Internet combining network-level and service-level information.

# Example: Smart Home Scenario where the user and devices access to services



# Other Examples

e-Commerce applications like ticket ordering

E-banking

on-line shopping, location-based services (gas, food, travel, weather, events etc.)

file storage and retrieval,

audio/video streaming and recording,

processing of stored images and video,



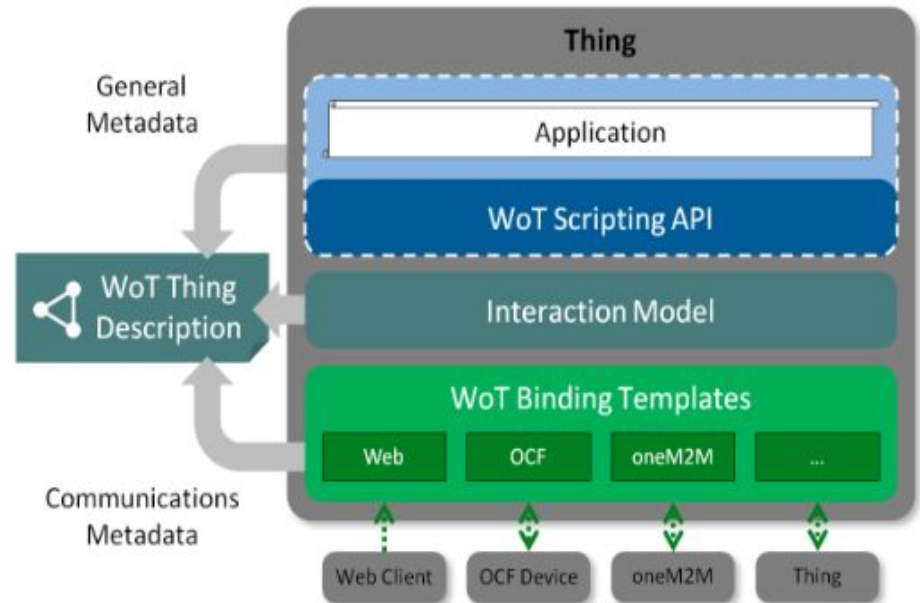
Web of Things (WoT) allows device communication independent of the underlying implementation, focusing in properties, actions and events

Thing

The WoT Thing Description

The WoT Binding Templates

The WoT Scripting API.



## Open Questions:

- How should we model a service topology? Resource Management?
- How should we model Cloud and edge computing for massive service-centric applications having service as a key design element?
- How could we perform the routing based on services?
- Business model driven network services management
- Security and Privacy guaranteed in SCN.

Open Mic