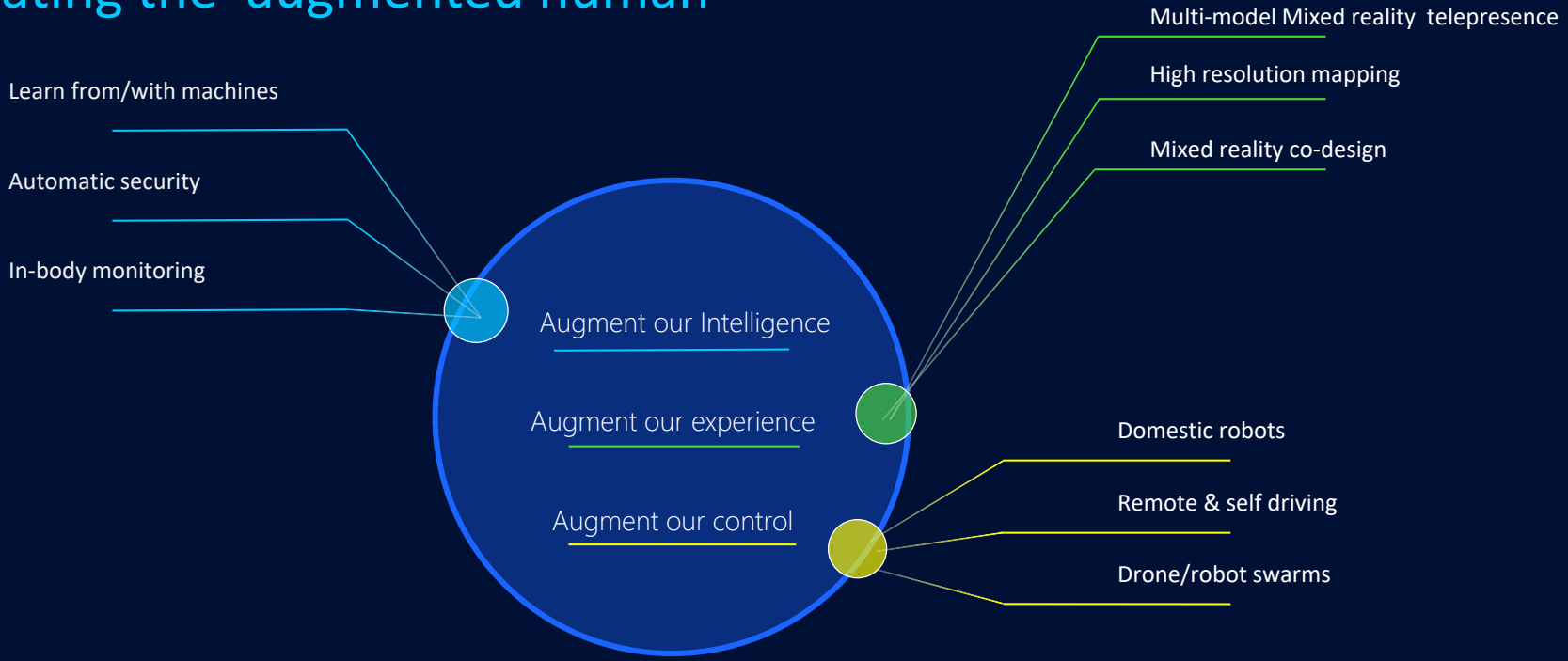
5G Evolution / 6G Architecture Vision and Enablers

Dr. Simone Redana
Head Architecture and Management Standardization & Research
Nokia Bell Labs

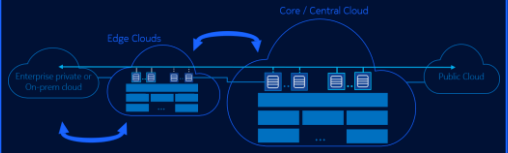
What use cases and requirements @ 2030s?
Creating the ‘augmented human’



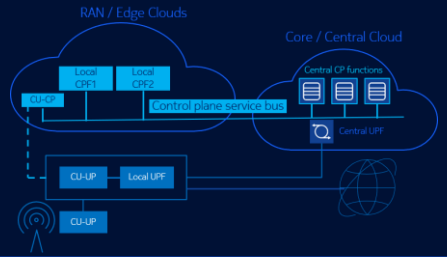
5G Evolution / 6G Architecture & Enablers

New automation, management and orchestration approaches

Het-Cloud Architecture



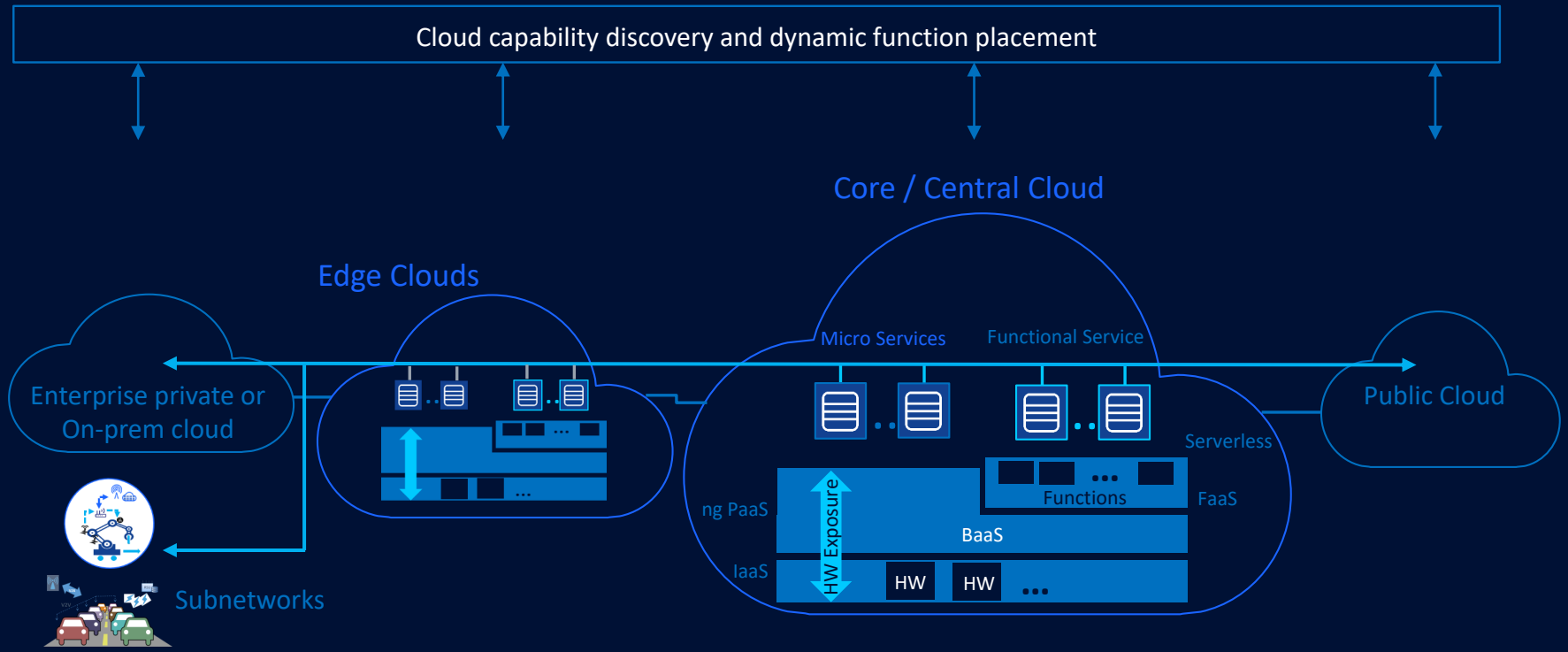
RAN-Core Convergence



Subnetworks

Het-Cloud

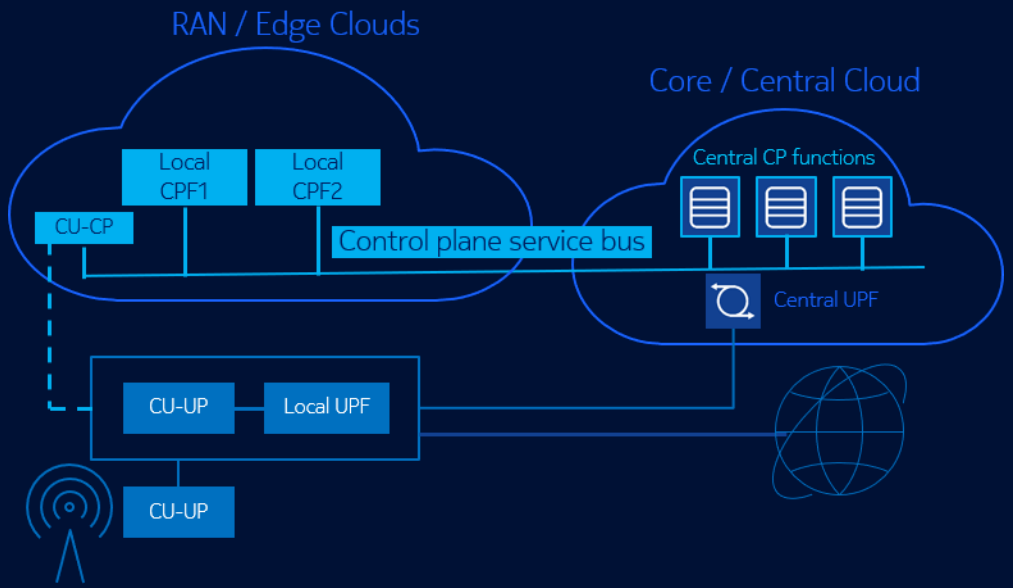
Architecture: Optimal NF execution in heterogenous cloud environment



RAN – CORE Convergence

Optimization, simplification and complexity reduction

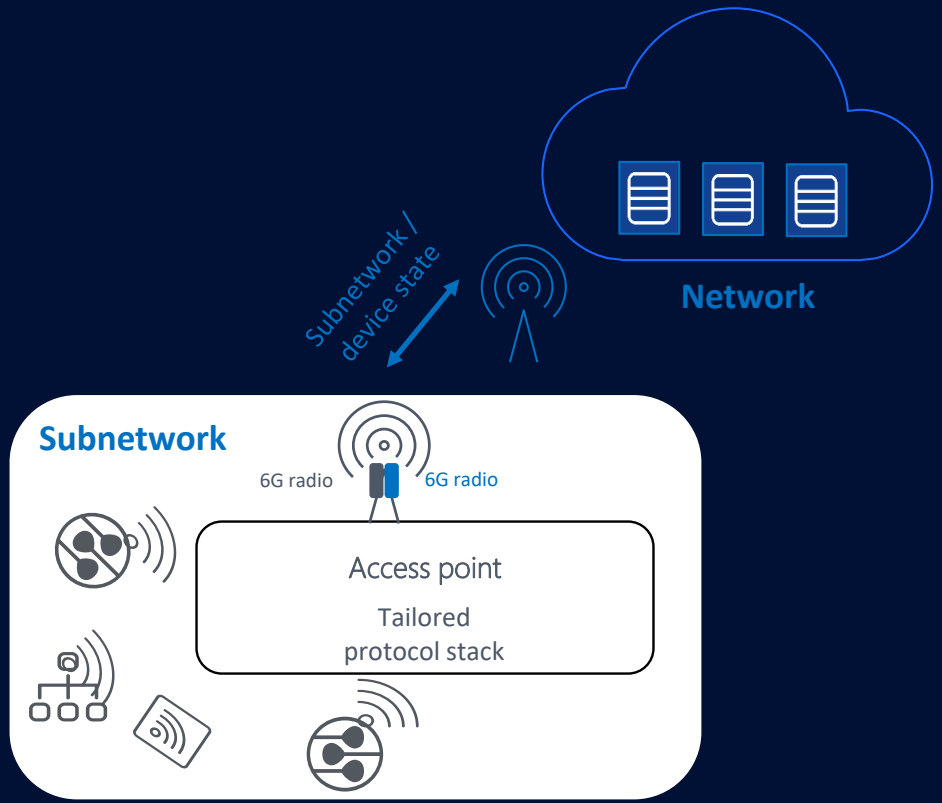
- Flexibility of function placement between RAN and CORE clouds
- Cloud like scalability of all CP functions
- Customized integration of CORE and RAN (chains of) micro services
- Creation of highly specialized RAN / CORE (e.g. per use case or slice)
- Network de-composition, removing protocols / duplications, harmonization of the protocol family, reducing signaling



Subnetwork as native architectural building block
Architectural Definition

Subnetworks:

- consist of several devices that are connected to an access point.
- are a part of a Beyond 5G / 6G network.
  - Subnetwork devices and subnetwork state are visible to network operator
  - Subnetwork state is replicated in the network
  - additional features will be enabled by a connection to the operator network, like seamless mobility, bi-directional offloading, etc.
- can have a tailored protocol stack etc., sensors, energy consumption
- can operate without continuous/seamless connectivity to a network.



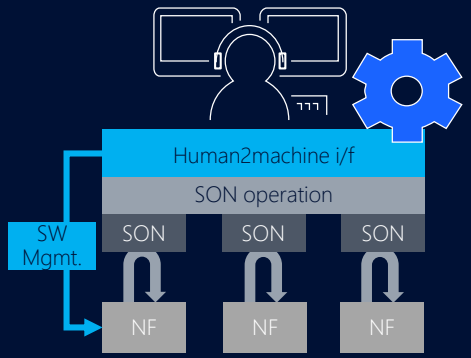
(C)NF: (Cognitive) Network Functions

Network Automation

Towards zero-touch operation: cognitive, autonomous NW configuration

LTE / early 5G Self Organizing Network

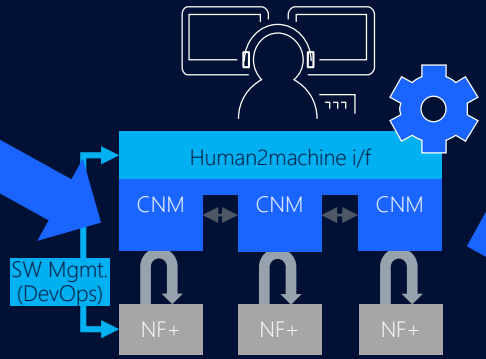
Rule-based management functions, Software Management



Rule-based network functions

5G Evolution Cognitive Network Management

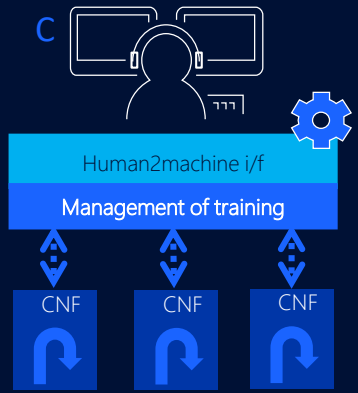
Learning management functions, Software Management (DevOps)



Rule-based / data-driven network functions

Towards 6G Cognitive Network

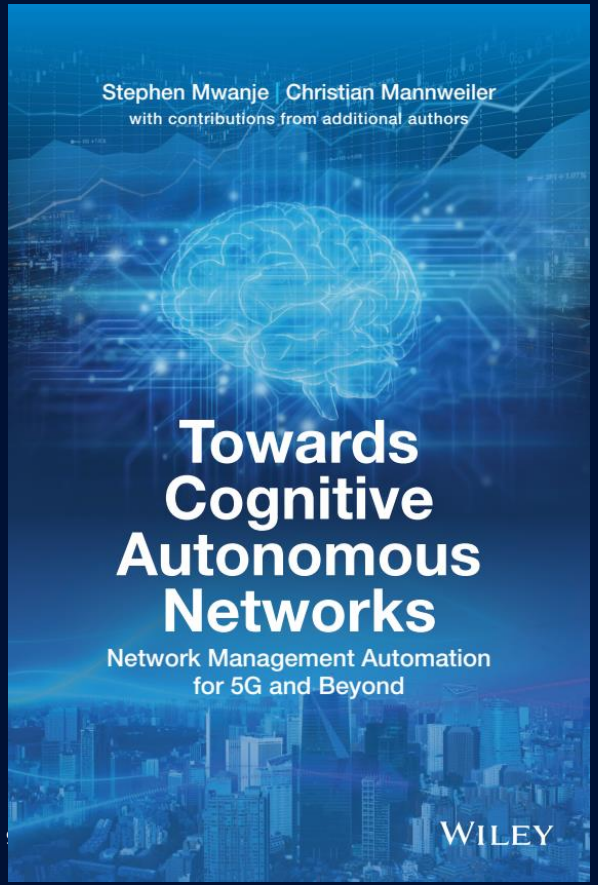
Management of training + Comprehension (C)



Learning network functions (embedded management)

Towards Cognitive Autonomous Networks

Network Management Automation for 5G and beyond



Background	Core argumentation	Solutions/Application	Open challenges
2. Network Evolution	1. Introduction	7. Cognitive Auto-Configuration	11. System Challenges of CANs
3. SON in pre-5G Networks	4. Modeling Cognition	8. Cognitive Autonomy in Optimization	12. Towards realizing CANs
	5. Classical AI for reasoning	9. Cognitive Self-Healing	
	6. ML for cognitive decision making	10. Cognitive Self-Operation	

Published October 2020

https://twitter.com/BellLabs/status/1327391927113814017

NOKIA Bell Labs