Empowered by Innovation NEC

Intelligence Everywhere

DC-KTN/VCE ICT Trends and Vision for 2020 Tech and Biz Challenges
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Knowledge Transfer Network ICT

Contents

- Faster connectivity, higher density, data and service management
- Enterprise IT and Networks convergence
- Physical architecture
- Access edge
- Beyond von Neuman
- Two second technologies
- Embedded intelligence led evolution
- Opportunities for research

More of the same but also …..

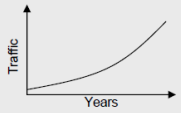
Requirements for Future Radio Access

docomo

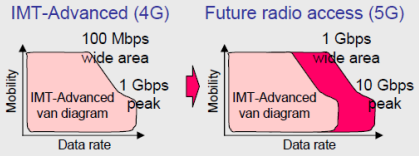
Technology requirements (1)

- Very high network capacity with significant reduction in cost per bit
- Higher spectrum efficiency and user-experienced throughput

Significant increase in traffic demand:
500 – 1000 times after 10 years
(1.86 – 2.0 times per year)



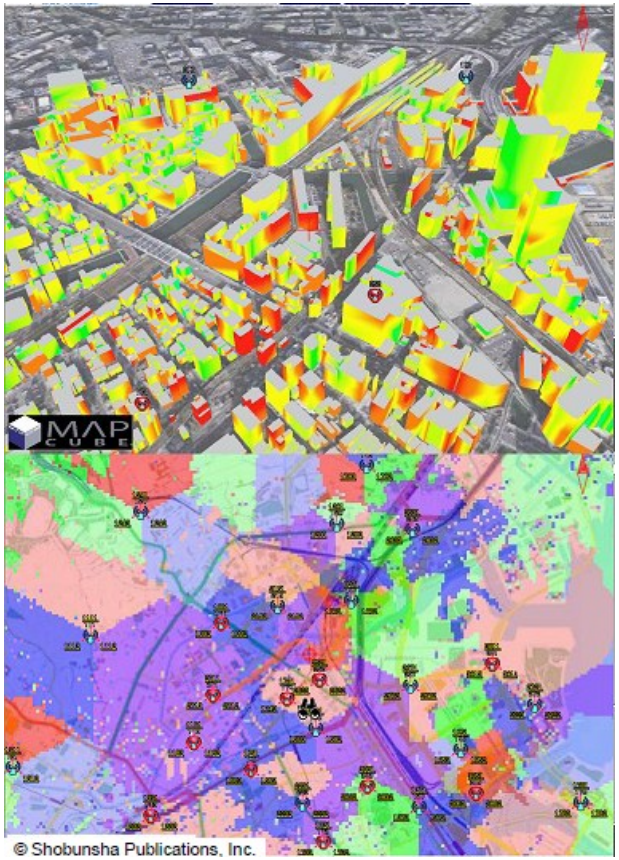
Targets 1 Gbps in wide area
(Peak data rate ~ 10 Gbps)



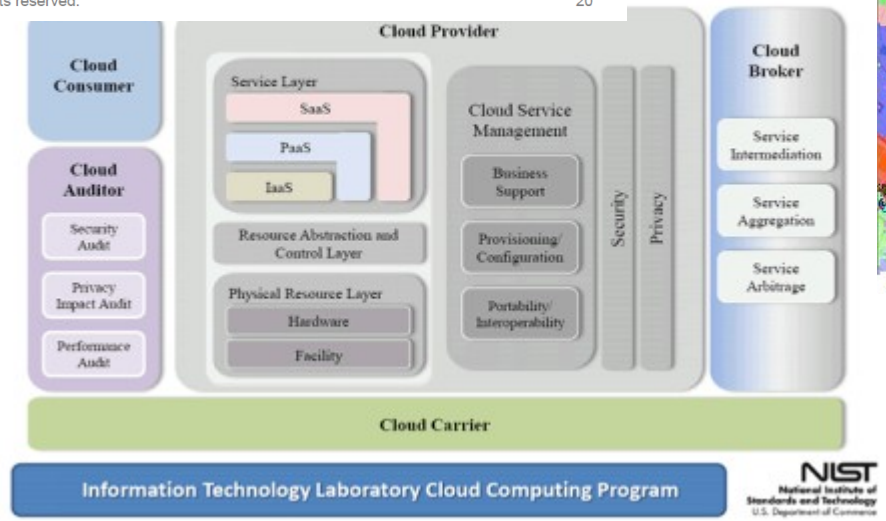
At least 10x improvement is needed

Beyond 4G access performance

SoN rich environment

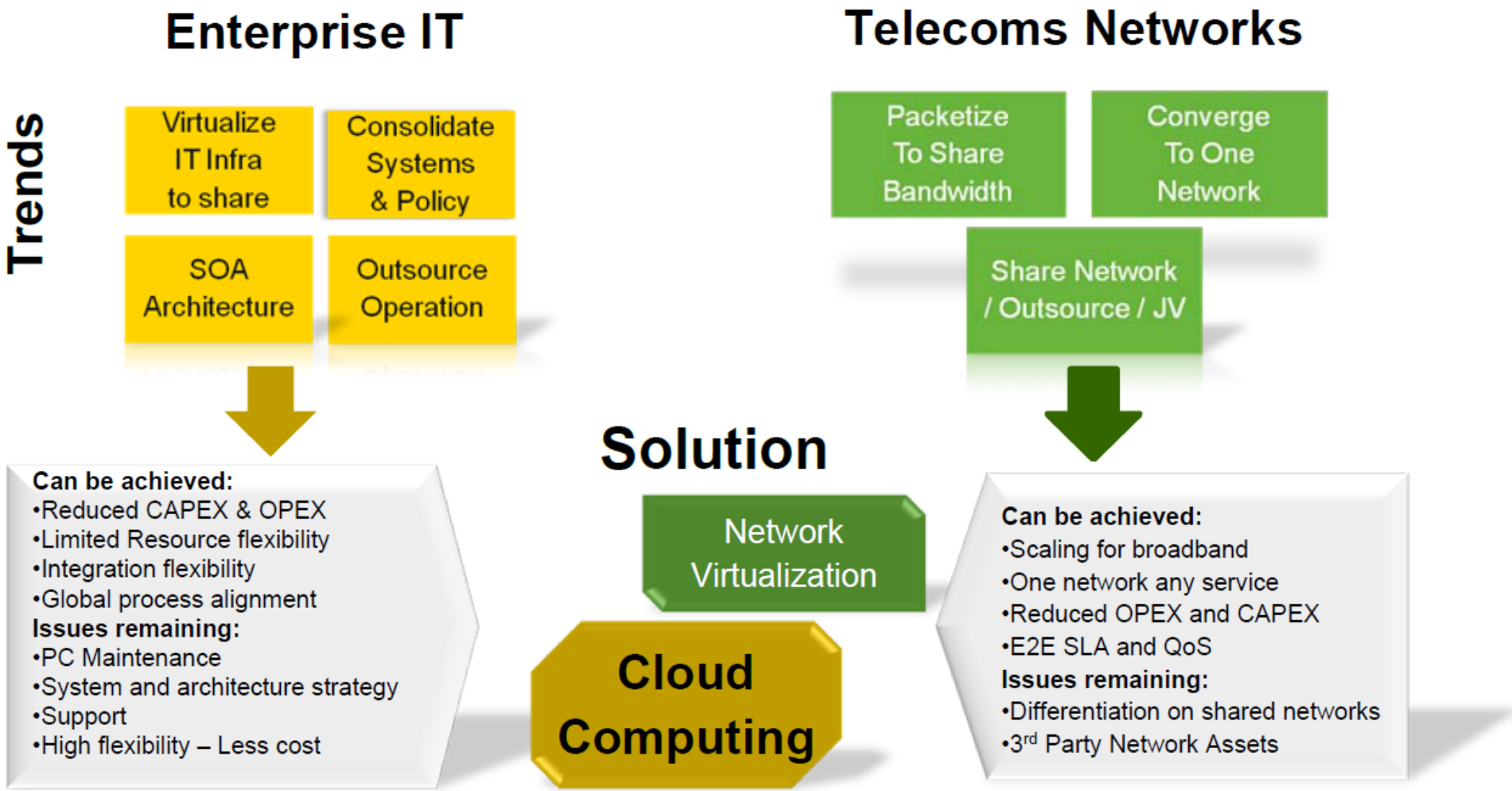


Cloud Combined Conceptual Reference

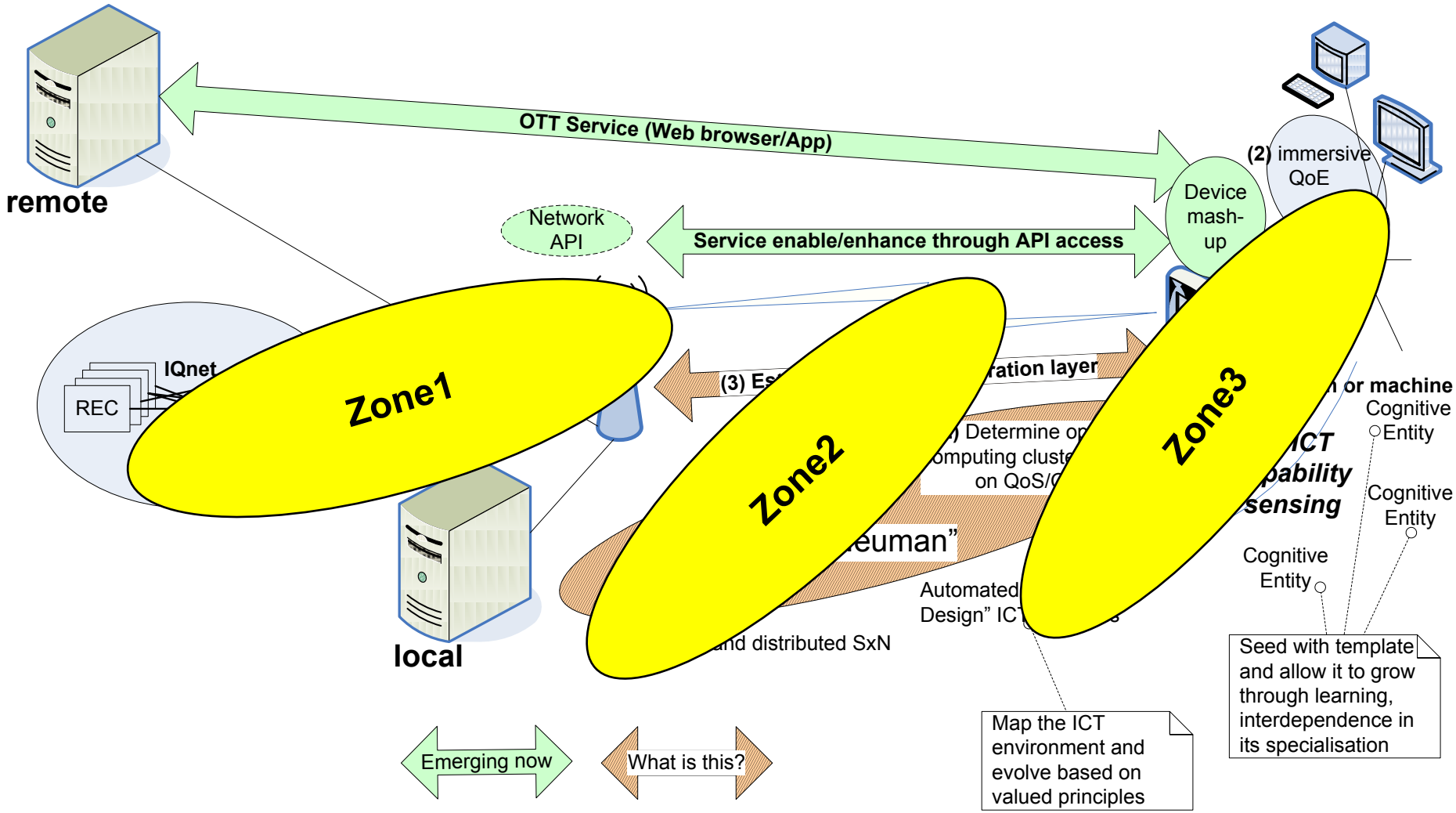


Where IT and communications combine

Health Warning: Analysts traffic estimates are trend indicative but…..
Small cells are at a potentially highly volatile convergence point

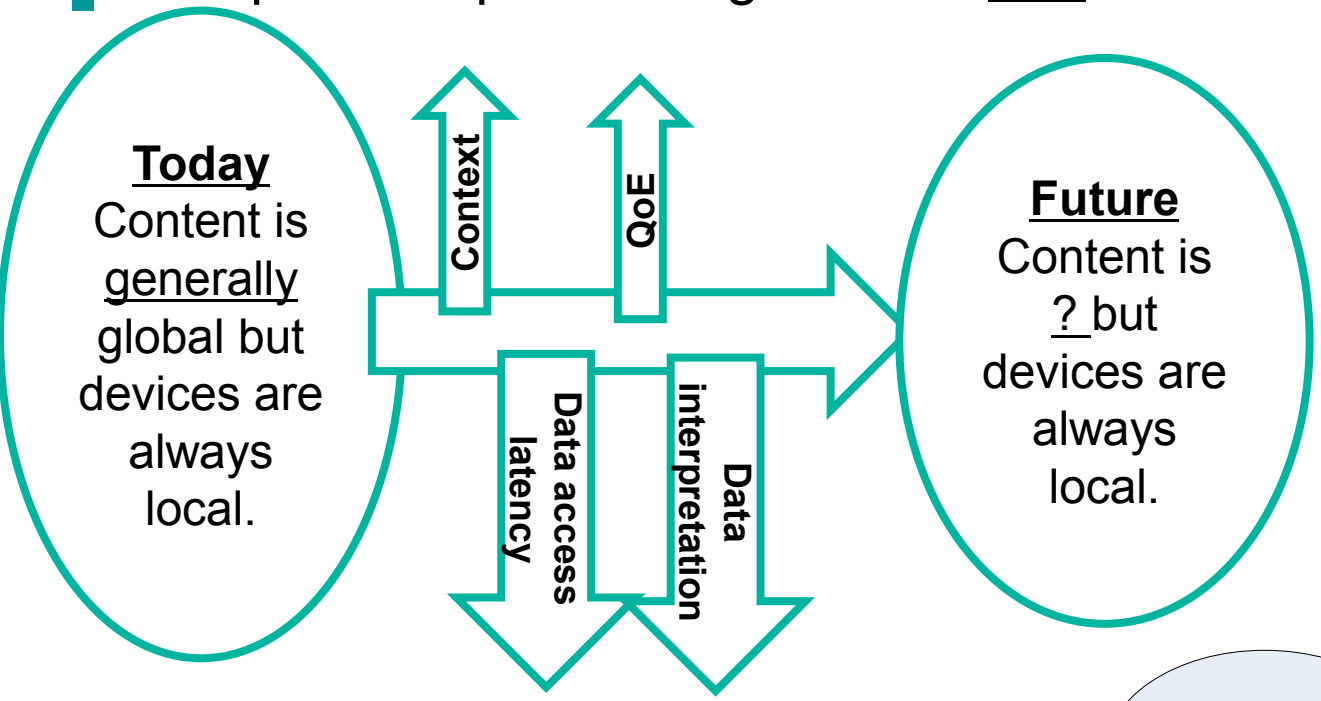


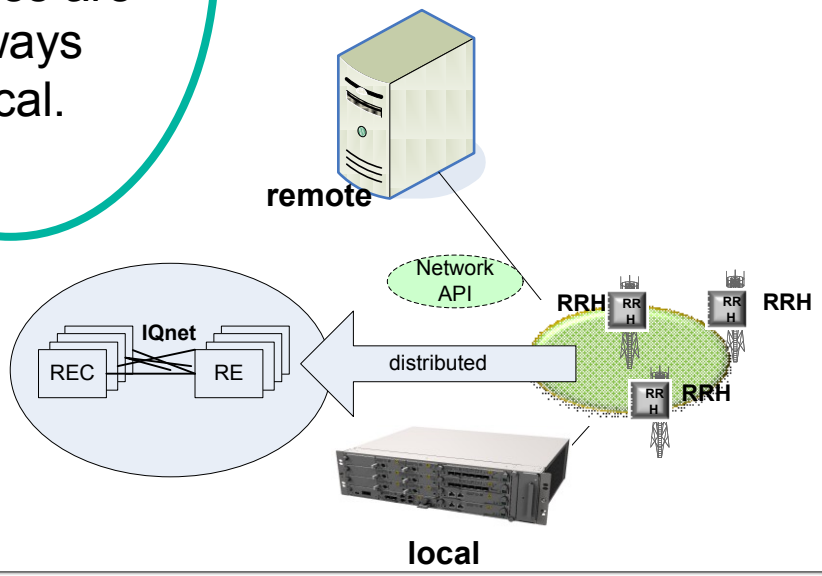
Physical Architecture



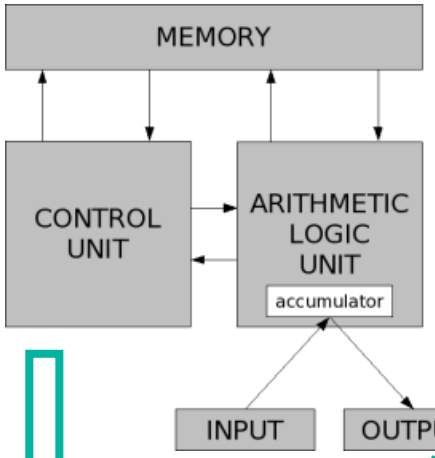
Zone1: Access edge

- Dense small cell environment to achieve area spectral efficiency.
- Fibre deployments closer to the edge continue.
- Co-operative processing of radio and other real-time data.



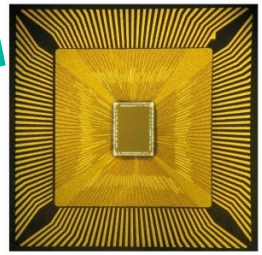


Zone2: “Beyond Von Neuman” new components

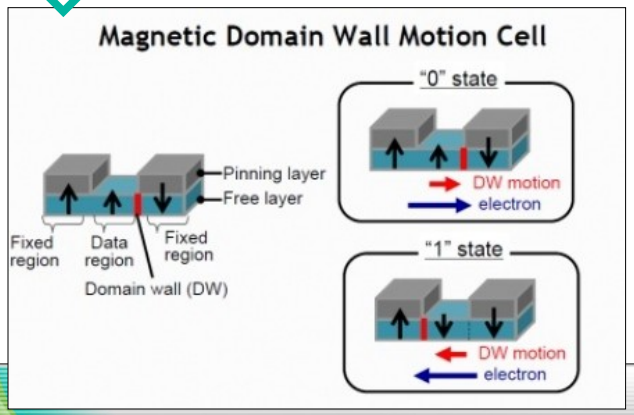


“I think the future of processing is heterogeneous multiprocessing, dedicated engines arranged in various clusters with a software layer that can understand the underlying hardware, and make sure that if it's not needed, it's shut off, it's not leaking, to preserve that battery.”

Simon Segars, EVP and head of ARM's Physical IP Division, The Register, 20th August 2011.

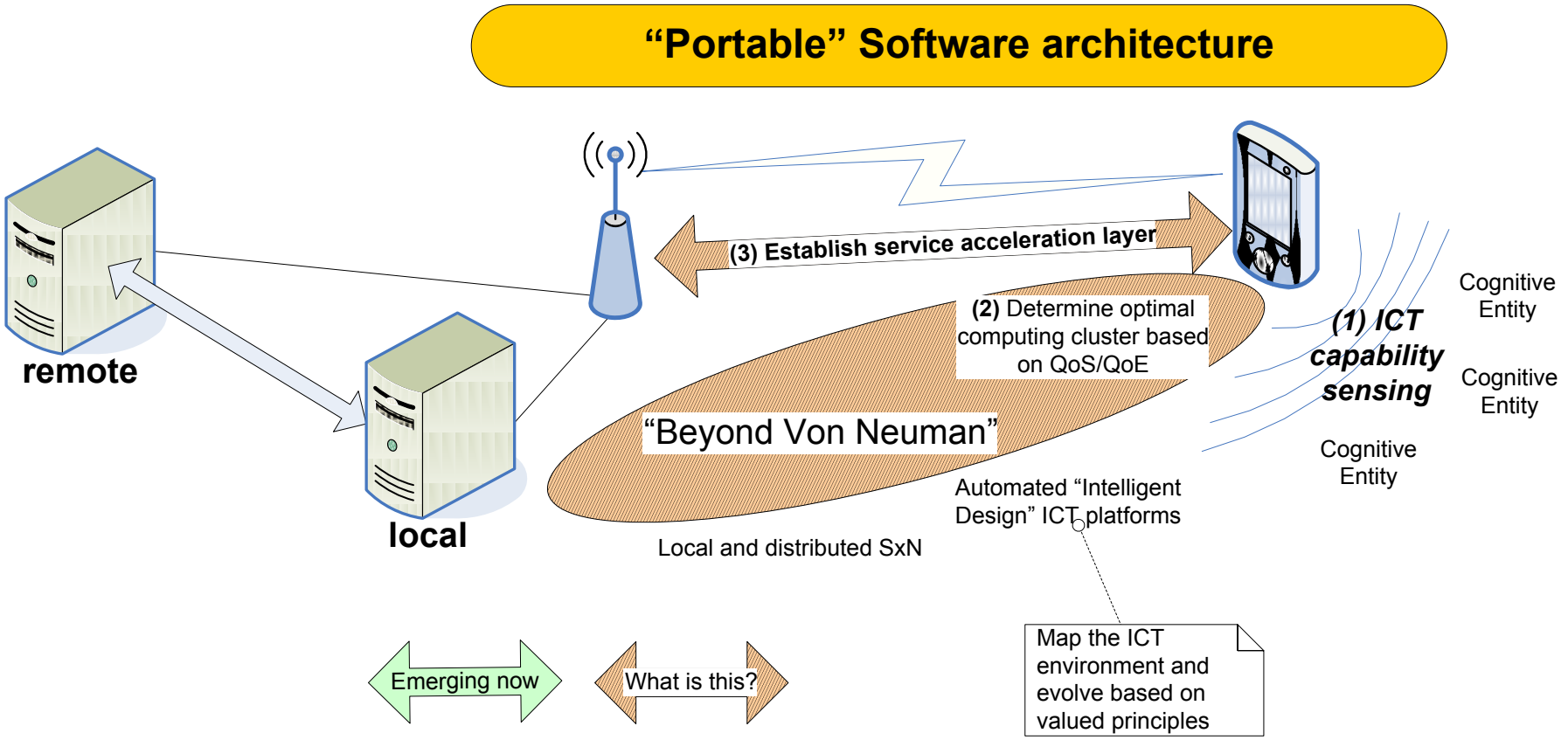


IBM's Cognitive Computing Chip, at about 3-mm wide. June 2011



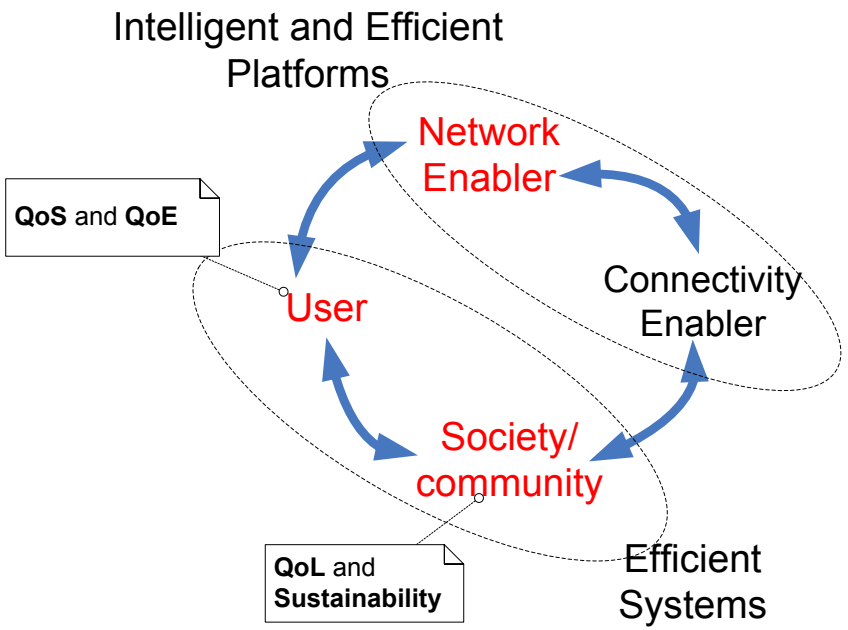
Magnetic domain wall motion cell. Source: NEC, Tohoku University.

Zone2: “Beyond Von Neuman” new components + software

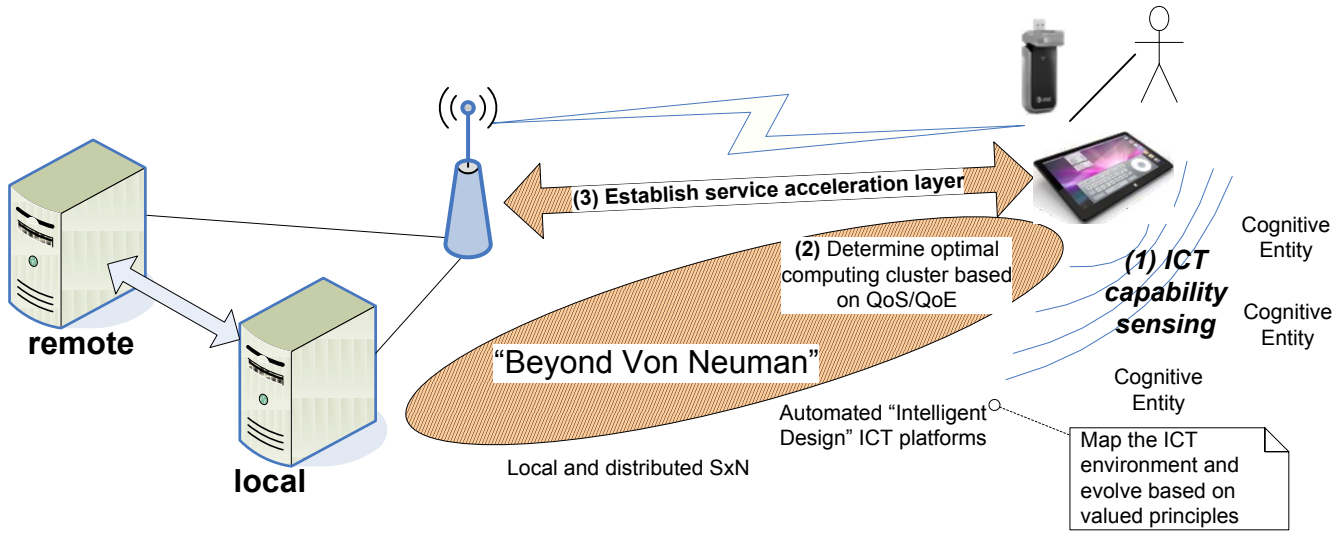


- The interplay between Intelligence and Resilience
- Management of regulatory and distribution constrained content locally
- Can we write code that is application specific and portable to a context/usage environment?

Zone3: Predictive Technologies

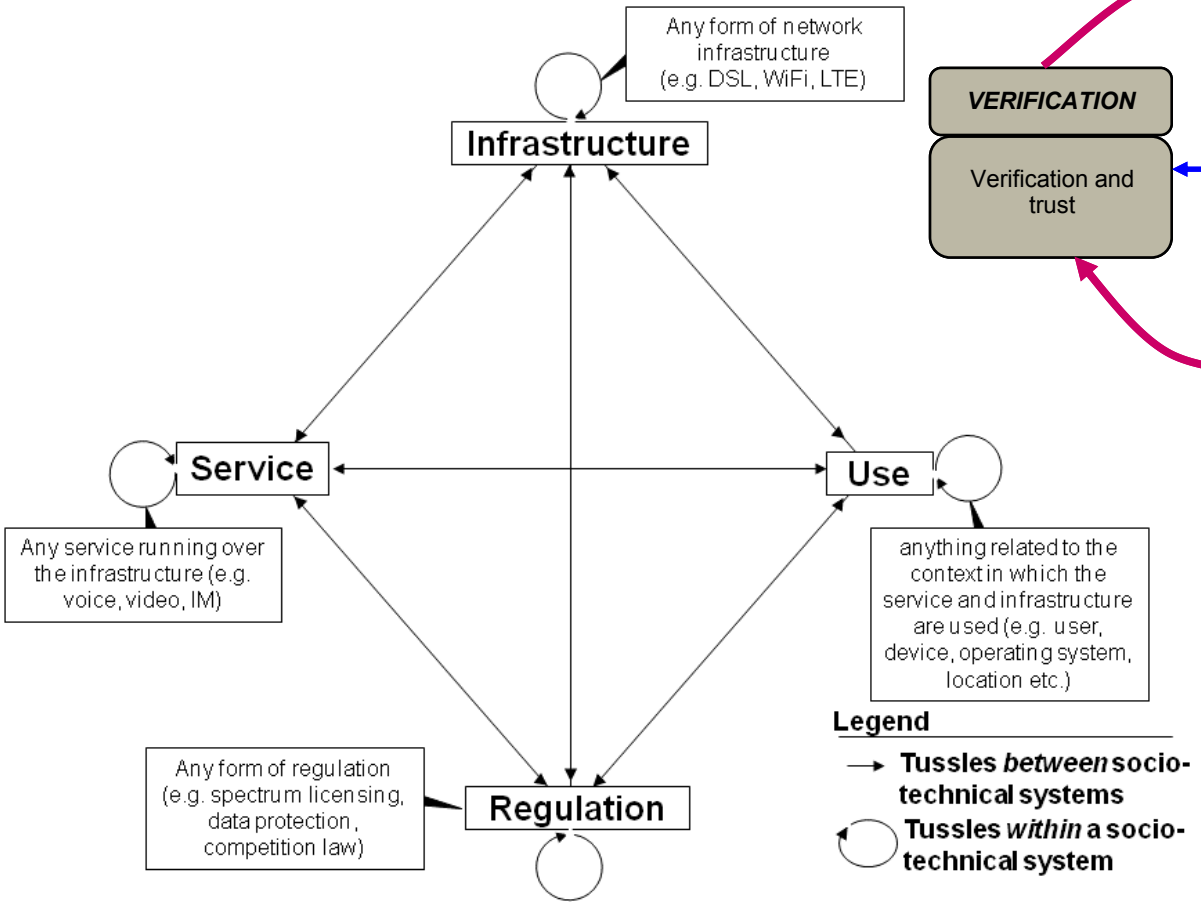


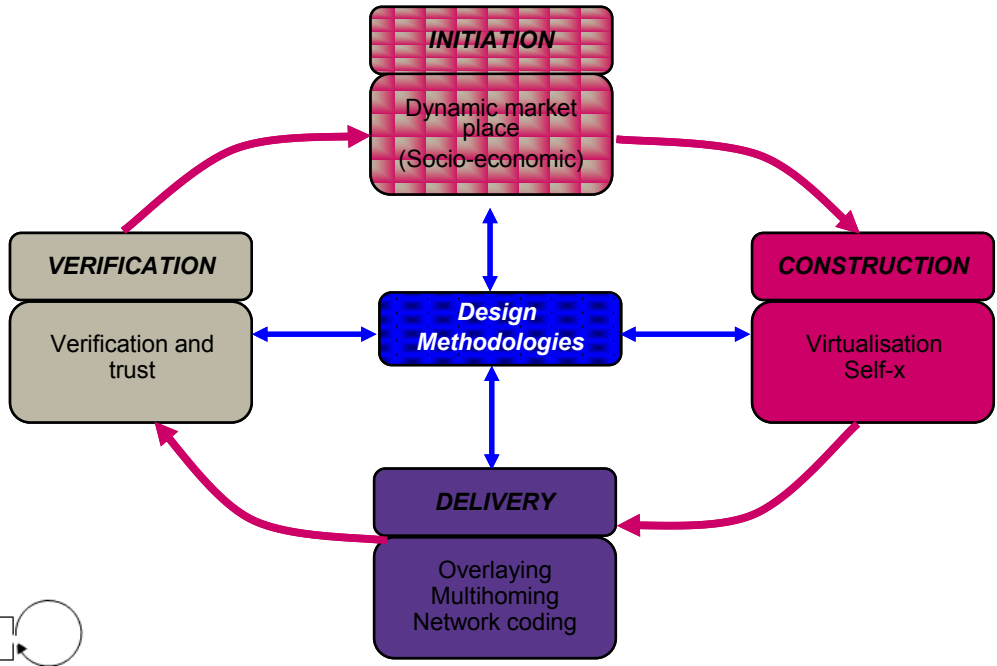
- ICT awareness of the cognitive state of the user leads to reducing the cognitive load on the user.
- Immersive environment inducing a "flow" state
- Taming the data deluge
- QoE levelling through network services



Zone3: Intelligence led evolution of ICT platforms

- Flexible Networks identified control points and tussle abstraction in the logical architecture plane.





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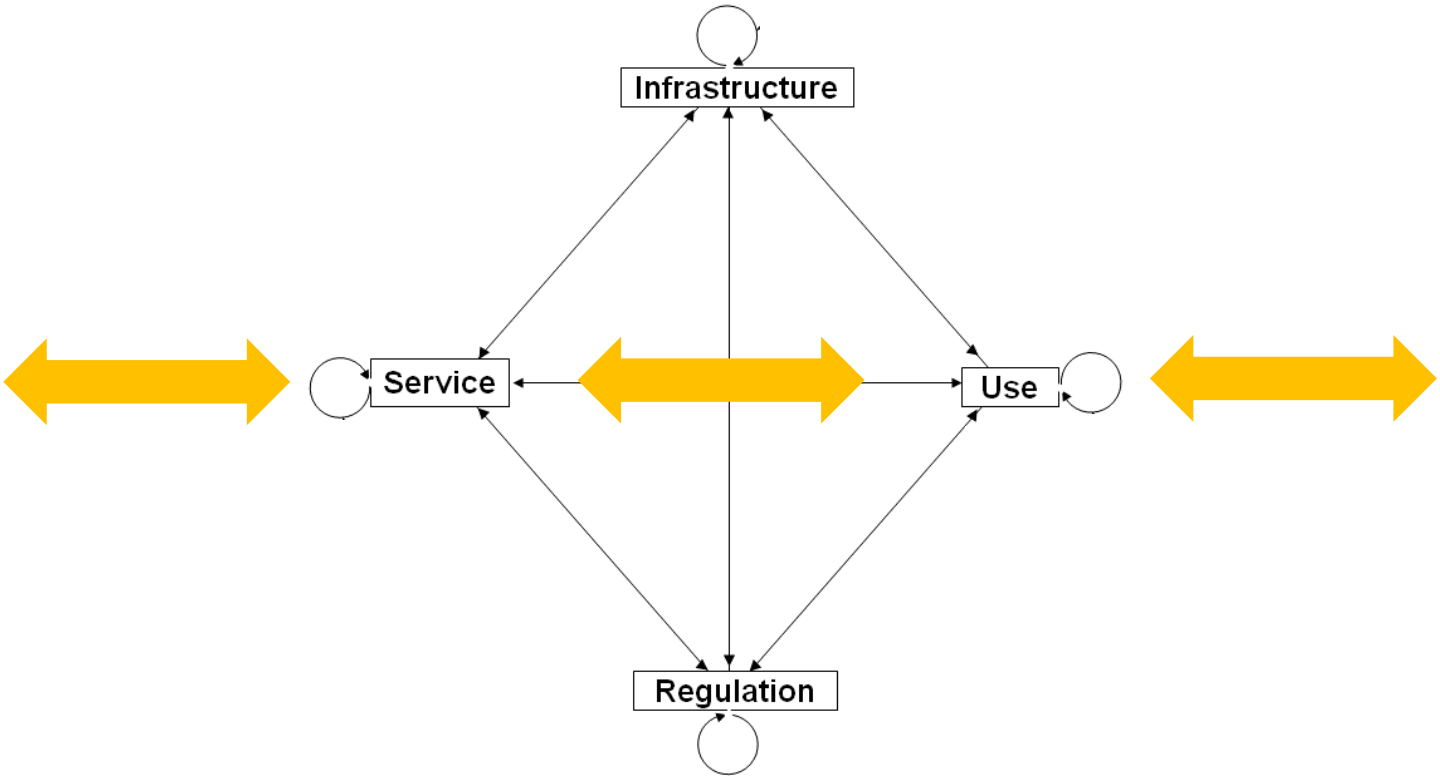
Zone3: Intelligence led evolution of ICT capability

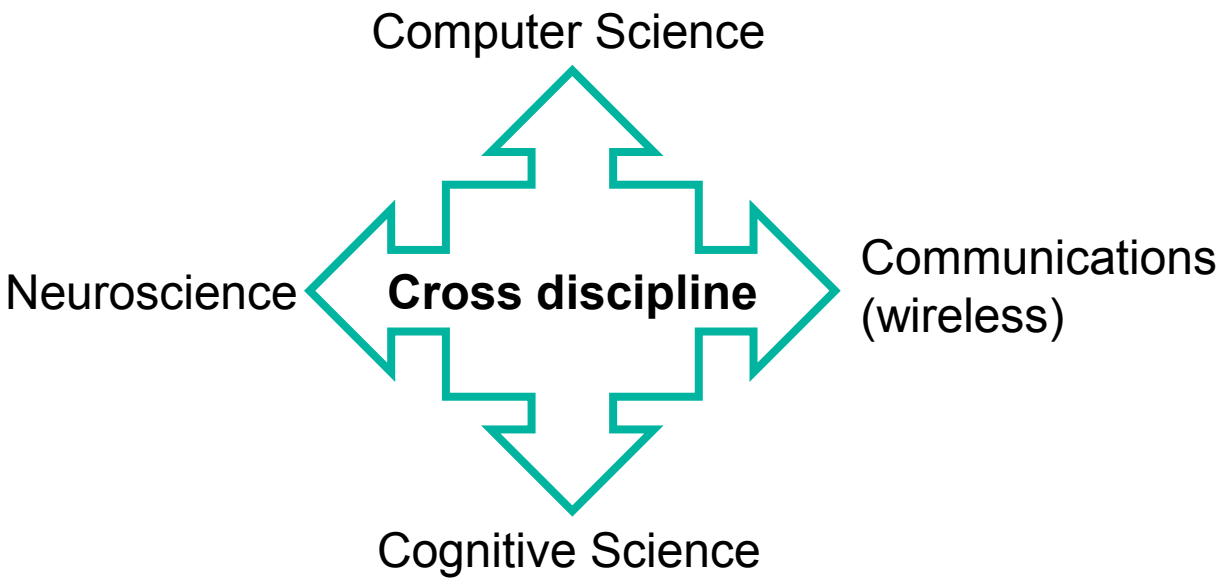
- Flex the system in the Service and Usage domains.
- Converge regulatory environments (comms and application).
- Identify approaches to enhance Infrastructure, coverage/capacity/EE optimisation (statistical learning)



Research Challenges

Themes that emerge

- Distributed Intelligence (for applications)
- Content/data centric approaches
- Resilience
- Management



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