

Managing softwarization in modern networking and future networks including 5G networks

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Question 1: Short statement on your view point on softwarization of networks

- What it gives
 - Flexibility
 - Customization of solutions
 - Short deployment cycles, simple upgrade
 - Makes standardization less important
 - New business landscape (network software providers)
 - Lower cost
- Problems
 - Performance
 - Security
 - Software modules integration
 - Software testing

Question 6: Why softwarization of networks is happening now?

- Management Plane – always has been programmable
- Control Plane – Intelligent Network (1989)
- Data Plane – SDR (1991), JTRS (1997)
- Some ,software based' networking concepts like active networking, mobile agents exist from more than 15 years
- Why industry has accepted softwarization now
 - Open source is accepted by the industry
 - Generic hardware is powerful

Question 5: What are the trade-offs which are associated with partial / full softwarization of networks

- Management/Control Plane can be purely based on software
- Data Plane has to use some hardware components

Is FPGA programmed using VHDL hardware or software?

Question 3: What are the models / architectures enabling softwarization of networks

- NFV (all planes)
- SDN (Control & Managament)
- SDR
- Openstack
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Question 2: What are the available key s/w tools and environment suitable for developing future network features and qualities

- No problem with generic tools
- Should we use formal specification techniques?
- Do we need testbeds for verification of software component before their deployment in real network?

Question 4. What are the key missing necessary abstractions and associated s/w tools to make softwarization of networks a reality? Are virtualisation and control separation from data planes sufficient?

- Planes separation is essential
- Virtualization helps
- What is missed
 - Distributed execution environment is highly desirable
 - ‚Software Management Framework’ is needed
 - Network programming languages

Thank you!