

Recap:

Mobile internet has been spreading in an exponential rate where Smartphones are playing the major role. Smartphones create 35 times more data than conventional mobile phones, therefore a vast amount of data has been produced, moreover total amount of data is getting double within every two years. Everything is becoming wireless, use of base stations, gateways, routers and switches are growing. Due to these trends we are observing some challenges for example, we are now in shortage of frequency, in busy network latency is increasing, consumption of energy for data communication (currently 2-3% of total energy) in western countries are also increasing. Network operators are already starting to face problems with overlapping of different wireless access technologies. Many research groups are involved in future internet research to invent some solution for how to increase robustness and fault tolerance of systems? Researchers suggest that more efficient error correction and recovery techniques, better network architecture, and more intelligent management and use of network resources can make it possible. Different Key performance indicators (KPI) can be used to manage and monitor the network for example bit rate, SNR, RSSI and offered load. Current research directions and topics are based on Network architectures, Cognitive networking, Network virtualization, Autonomous network, Cognitive radio.

Researchers at VTT suggest that future networks will be full of complexity what may require virtualization and highly heterogeneous support. To create a platform that utilizes real-time information from different sources VTT has been working since 2007. Bayesian Networks, Fuzzy logic, K-means clustering, Q-learning, PCA and SOM based algorithms are on focus. Three measurement tools have been invented, first one is Qosmet what is used for passive performance measurements and monitoring purpose, it measures one-way quality of service performance from application's point of view in the selected network path while second tool Moset is being used for measuring active performance, for Moset several instances are installed into network for multipoint measurement. Third one Mobiilimittari is a mobile phone application for measuring end-user's wireless broadband speed. Ad hoc and mesh networking is another field of research at VTT. Different aspects of Self-organizing Wireless Mesh Network (WMN) for cellular backhauling has been discussed in the presentation. Hierarchical and interleaved WMN clouds can support to cover a wider geographical area, each cloud size is 20 – 30 base station sites, but up to 200 base stations can be supported, clouds can be connected through millimeter-wave point-to-point radios because that support very high capacity connections. Each WMN cloud is connected to the external transport network via one or more WMN gateways. For Cloudified control, service and network virtualisation, Software Defined Mobile Network is proposed. By using mesh network, mobile robot can collect live data automatically from such an environment that do not have network infrastructure. 5GHz Wi-Fi and B.A.T.M.A.N. protocol is suggested for this operation.

Problem

Topic of the presentation was very advance therefore the figures what represent the structure of different networking techniques require at least brief description. Very promising issue Software defined mobile network was presented very shortly.

Perception

To face the future challenges very nice initiatives are being taken what is very much appreciated. VTT's approach to support self-awareness and cognitive features of networks reveals what we need to do for multi-operator multi-technology based networks. Big list of KPIs for measuring network performance has given us some new ideas. If we could test or use their developed measurement tools (Qosmet, Mose, Mobiilimittari) or know where to get more information about those tools that would have been very useful.

Deepening

Software-Defined Networking (SDN) is the way to gain network agility required by increasingly dynamic environments¹. It's a new approach to networking that decouple the conventional device-bound, vertically integrated network stack to give us facility of network automation, flexibility, programmability, self-service innovation, and more granular network control of the incoming and outgoing network traffic. Numerous benefits can be archived including on-demand provisioning, automated load balancing, streamlined physical infrastructure and the ability to scale network resources in lockstep with application and data needs.

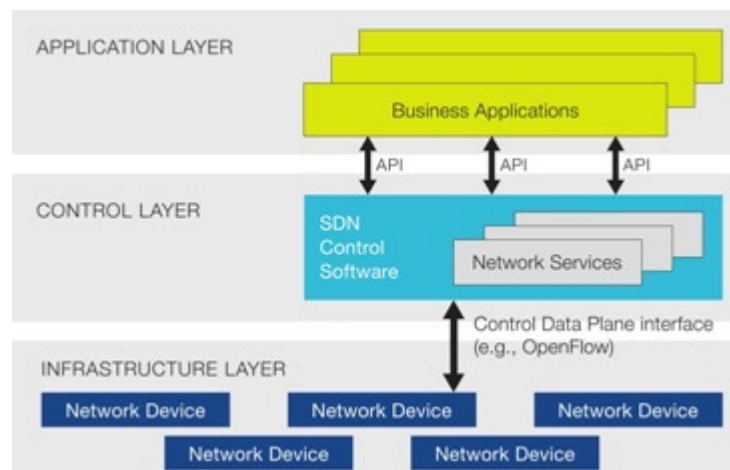


Figure1: SDN Architecture

If we carefully look at the SDN architecture, it has mainly three layer (Application, control and infrastructure). All hardware devices are laying down at infrastructure layer. Control layer give the access of different application through APIs, what reduce complexity of newly added application. The control plane is a single, abstracted entry point for network administrators. SND also support devices from different vendors .

Reference

1. http://www.webopedia.com/TERM/S/software_defined_networking.html

Khandker, Syed Ibrahim

WISE