Power efficiency SDN application

Abstract:

The current architecture of telecom and data networks is based on the IP protocol stack, where the routing is made by distributed *hop by hop* decisions over single *data packets*.

This approach is beginning to show some limits in terms of performance, flexibility and scalability due to the exponential growth of data traffic that we have been experiencing for some years. The requirements on the different traffic types range from high throughput to low latency, from high user density to high availability, from low power consumption to high reliability. The fulfillment of such a wide variety of requirements asks for a quite different network architecture, where adaptively is fundamental.

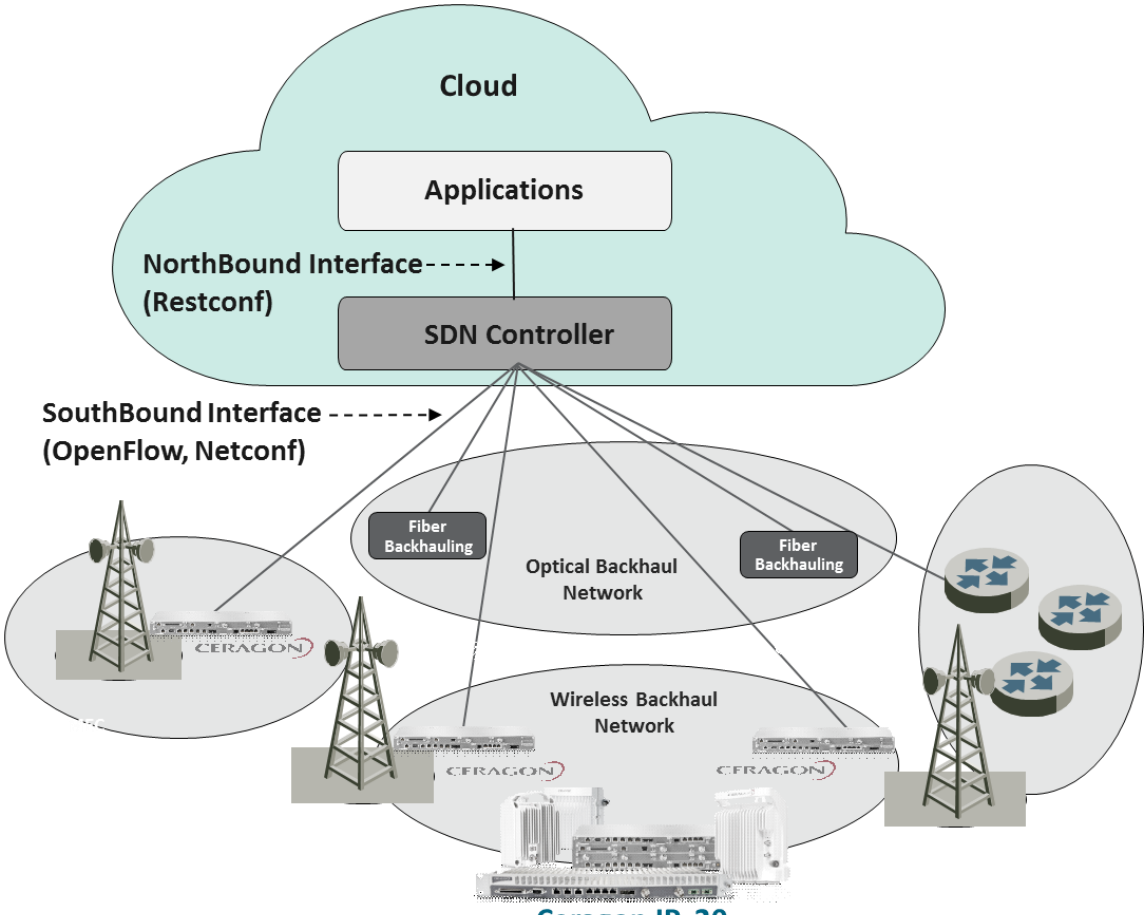
In order to answer to this necessity several approaches have been proposed in the recent years, having in common the focus on the programmability offered by software:

- Cloud networking
- Network Functions Virtualization (NFV)
- Software Defined Networking (SDN)

In particular Software Defined Networking is an approach to networking based on the following principles:

- The separation of the data plane from the control plane
- The logical centralization of the control function

The main concept is to have network elements with just forwarding functions, with on top a central controller which is able, on one side, to expose an abstracted view of the network resources to the applications and, on the other side, to allow an automated implementation of services independent from the physical details of the network.



Ceragon IP-20

Goals:

Implement Power efficiency SDN application on top of ODL (Open Day Light) SDN controller.

Multi carrier Adaptive Bandwidth Control (ABC), is technology that creates logical bundles of multiple links. The idea is similar to Link Aggregation (LAG), optimized for wireless backhaul applications. See

https://www.youtube.com/watch?v=zBVL1Ac9xJU

Our topology will be an ABC group with two radio links. During off-peak time one link can successfully transmit the service throughput, and the second link can be muted without affecting the traffic.

The application will repetitively sample Performance Management (PM) counters, using an existing Information YANG Model developed by the Open Networking Foundation (ONF).

https://github.com/OpenNetworkingFoundation/CENTENNIAL/tree/master/03-WTP-PoC/models

- When sampled PMs are below the calculated threshold, the application will mute one of the links in the radio group.
- When sampled PMs are above the calculated threshold, the application will unmute both radio links

Ceragon will provide:

- Ubuntu VM with ODL controller installed
- Ubuntu VM with mediator which is a Mediation layer between the SDN controller and the Network Elements (NEs). This mediator can be used for development, instead of using NEs.

According to SDN use cases value analysis done by VODAFONE in 2016-11-29, efficient power consumption can save 36% on energy, and is considered as P1 (top priority).

Requirements:

Internet Networking Course, Java

Guided by:

CERAGON