Evaluating the impact of SDN on CapEx and OpEx
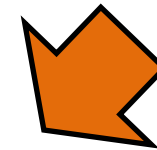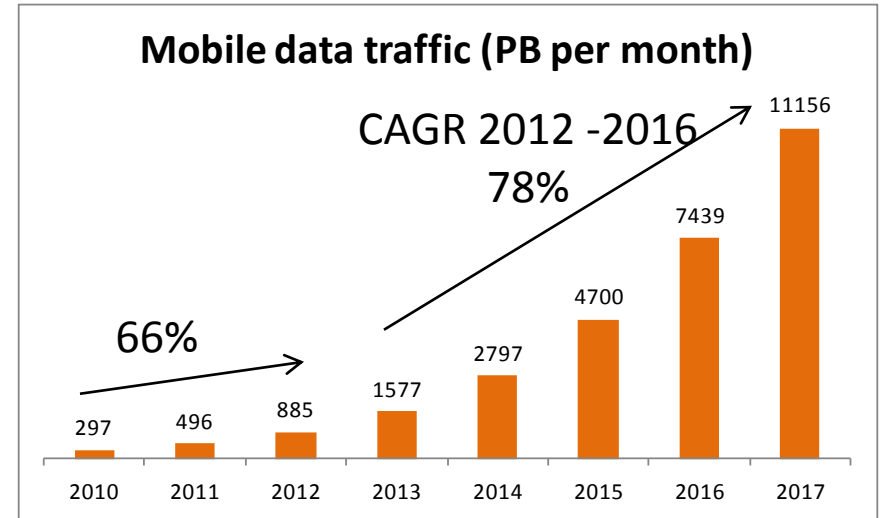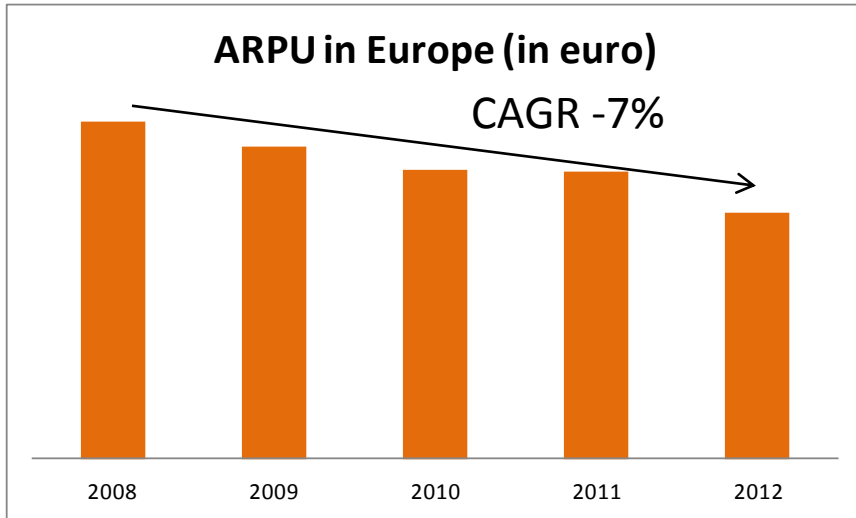
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Motivation

ARPU in Europe (in euro)

CAGR -7%

2008	2009	2010	2011	2012

Mobile data traffic (PB per month)

CAGR 2012 -2016 78%

66%

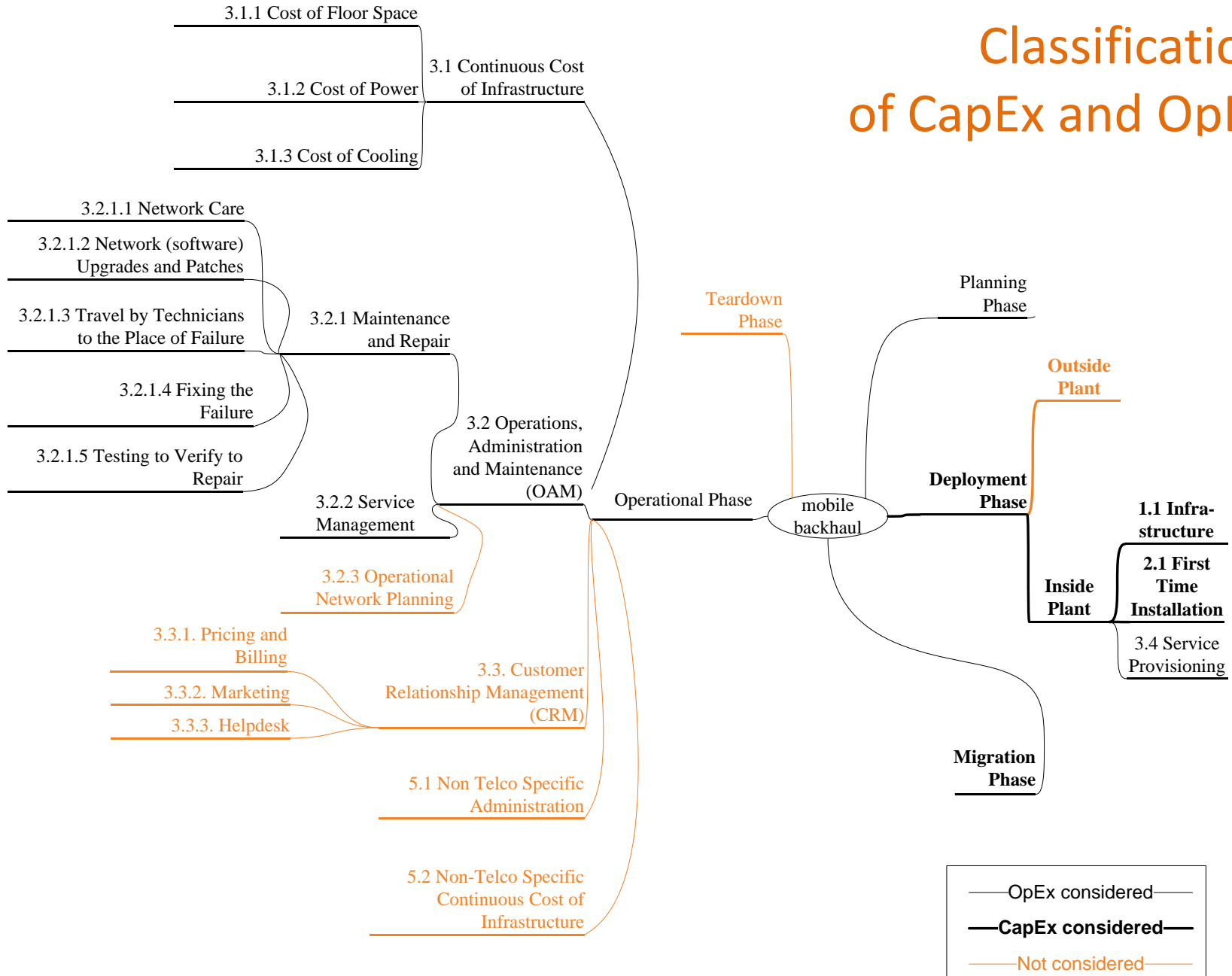| 297	496	885	1577	2797	4700	7439	11156
2010	2011	2012	2013	2014	2015	2016	2017

Decreasing margin

Try to reduce cost

Approach

- Classification of CapEx and OpEx

- Qualitative analysis of CapEx

- Qualitative analysis of OpEx

Classification of CapEx and OpEx

- 3.1.1 Cost of Floor Space
- 3.1.2 Cost of Power
- 3.1.3 Cost of Cooling

3.1 Continuous Cost of Infrastructure

- 3.2.1.1 Network Care
- 3.2.1.2 Network (software) Upgrades and Patches
- 3.2.1.3 Travel by Technicians to the Place of Failure
- 3.2.1.4 Fixing the Failure
- 3.2.1.5 Testing to Verify to Repair

3.2.1 Maintenance and Repair

3.2.2 Service Management

3.2.3 Operational Network Planning

3.2 Operations, Administration and Maintenance (OAM)

- 3.3.1. Pricing and Billing
- 3.3.2. Marketing
- 3.3.3. Helpdesk

3.3. Customer Relationship Management (CRM)

5.1 Non Telco Specific Administration

5.2 Non-Telco Specific Continuous Cost of Infrastructure

Operational Phase

Teardown Phase

Planning Phase

mobile backhaul

Deployment Phase

Outside Plant

Inside Plant

1.1 Infra-structure

2.1 First Time Installation

3.4 Service Provisioning

Migration Phase

Legend:
- ——— OpEx considered ———
- —— **CapEx considered** ——
- ——— Not considered ———

Approach

- Classification of CapEx and OpEx

- Qualitative analysis of CapEx

- Qualitative analysis of OpEx

Qualitative analysis Capex

- CapEx reduction promised
  - reduced vendor lock-in and use of commodity hardware can reduce the purchase cost of hardware
  - reduced cost of software because a single controller can steer multiple devices
  - higher utilization rates of network because SDN can be used to implement effective traffic steering and open the network for other operators via network virtualization

Summary of CapEx study

- The majority of CapEx savings can be attributed to the savings at the access and aggregation network but SDN focuses mainly on the core network
  - the core is only a fraction of the total cost

- Transforming telco central offices into an SDN environment is going to cost
  - central offices weren't build to house datacenter equipment
  - implementing a change takes time and money

- Capex savings can only be reached in the long term

Approach

- Classification of CapEx and OpEx

- Qualitative analysis of CapEx

- Qualitative analysis of OpeX

Qualitative analysis OpEx

- OpEx reduction promised
    - lower energy cost as there is no more energy consumption by the control plane and better traffic steering
    - lower maintenance and repair cost because SDN creates a single cohesive structure and better testing possibilities ahead of rollout
    - cost of service provisioning and management can be lowered because SDN enables automated configuration of the network
    - the effects on network planning and first time installation are unclear, due to immaturity of SDN a cost increase can be expected

Summary of OpEx study

- Initially OpEx will rise in order to get the infrastructure to work.

- In the long run OpEx can be reduced. Main benefits can be found at the network operations center:
  - the cost of operational processes such as service provisioning and service management can be reduced

- Environmental cost (energy consumption) has not been increased nor reduced.

- More applications become available to reduce OpEx (e.g. optimize energy usage)

Software Defined Networking

1. Capital expenditures can be reduced when carrier grade SDN and network applications become available

2. Operational expenditures reductions can be found in areas related to the network operations center such as service provisioning and service management

Thank You

http://www.ibcn.intec.ugent.be/content/techno-economics

References

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- The Mobile Economy 2013, A.T. Kearney Report (2013)

- S. Verbrugge, et. al.; Methodology and input availability parameters for calculating OpEx and CapEx costs for realistic network scenarios

- Split Architecture Carrier Grade Networks, http://www.fp7-sparc.eu/