An EUREKA Celtic-plus project

SENDATE EXTEND

SENDATE-EXTEND

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VINNOVA

MARKET TRENDS

A new industry era and transformation

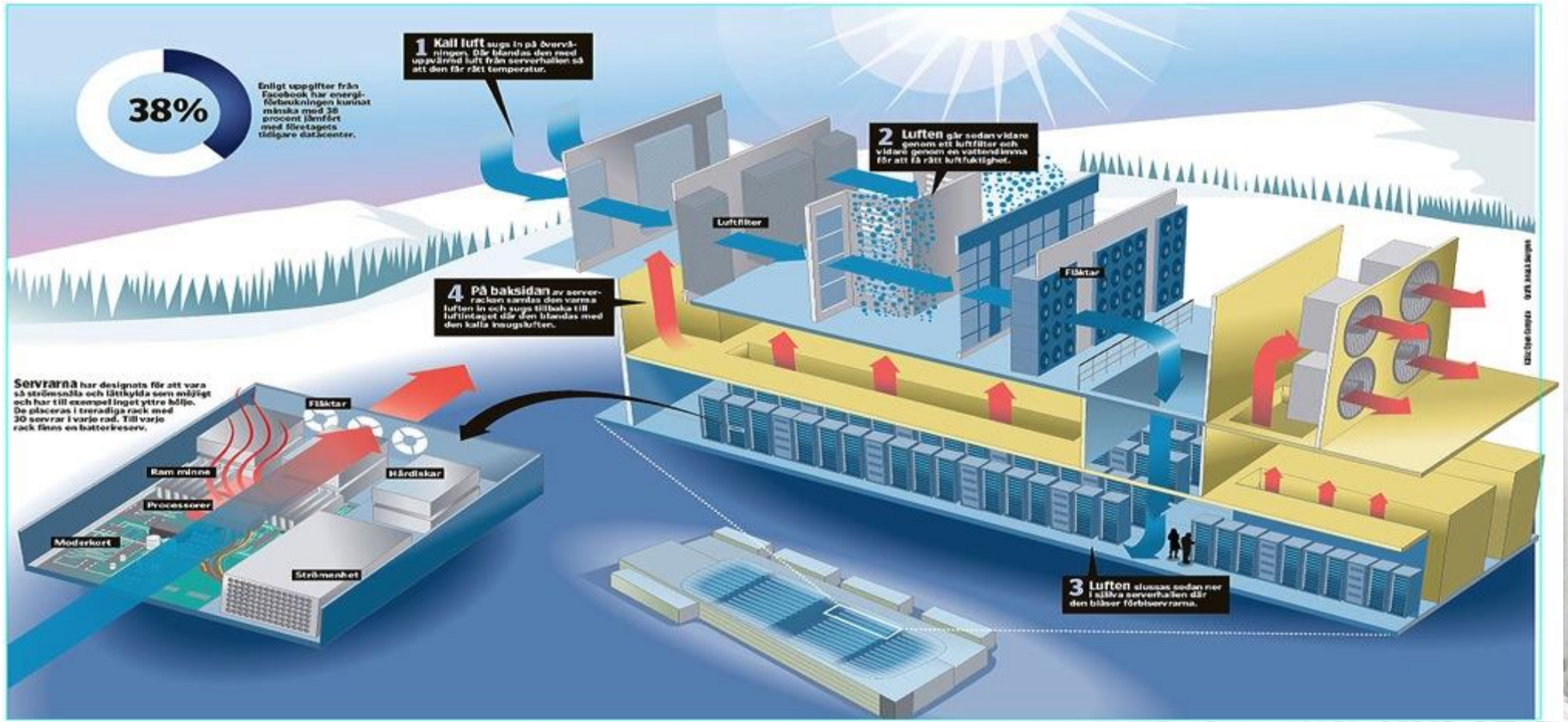
The digitalization looks like the industrialization

- Digitalization – traditional industries
- Data – great amount, owned & shared
- Things – connected and intelligent
- Communications – faster and more
- Users – active and enhanced
- Functions – More and seamless

Application characteristics

Type	Response times	Data amount	Traffic amount	Cache	DC location
Cold storage	seconds	Gigabytes	Mb/s		remote
Off-line big data crunching	seconds	Gigabytes	Gb/s		remote
Chat/IoT type communication	100th milliseconds	kilobytes	kb/s		remote
Web/app rendering	100th milliseconds	Megabytes	Mb/s	Yes	remote
Streaming	10th milliseconds	Gigabytes	Mb/s	Yes	mix
Real-time conferencing	10th milliseconds	Megabytes	Mb/s	Yes	mix
Real-time analytics	milliseconds	Megabytes	Gb/s		proximity
Transaction based/Control loops	milliseconds	kilobytes	kb/s		proximity

Mega datacenter complexity



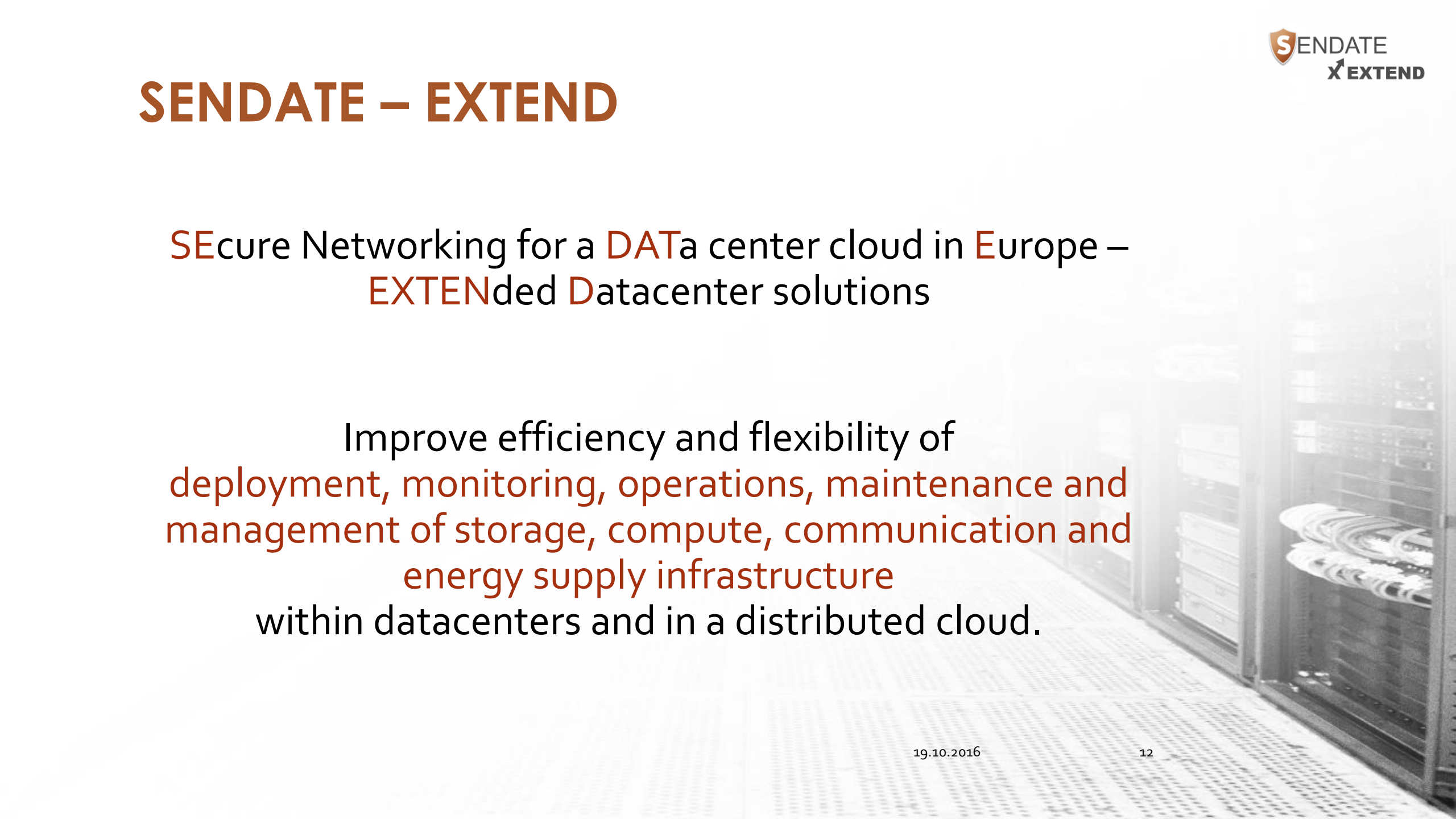
Source: Nyteknik 2012

PROJECT IDEA

SENDATE – EXTEND

SEcure Networking for a DATa center cloud in Europe – EXTENded Datacenter solutions

Improve efficiency and flexibility of deployment, monitoring, operations, maintenance and management of storage, compute, communication and energy supply infrastructure within datacenters and in a distributed cloud.

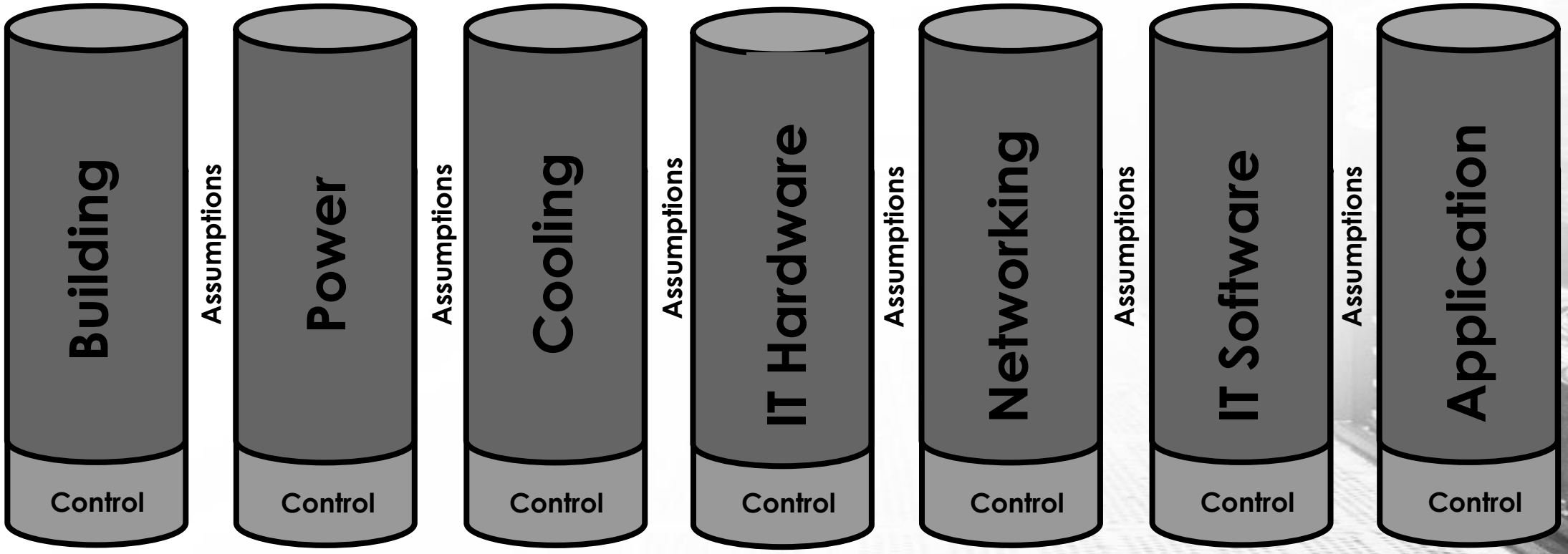


SENDATE – EXTEND

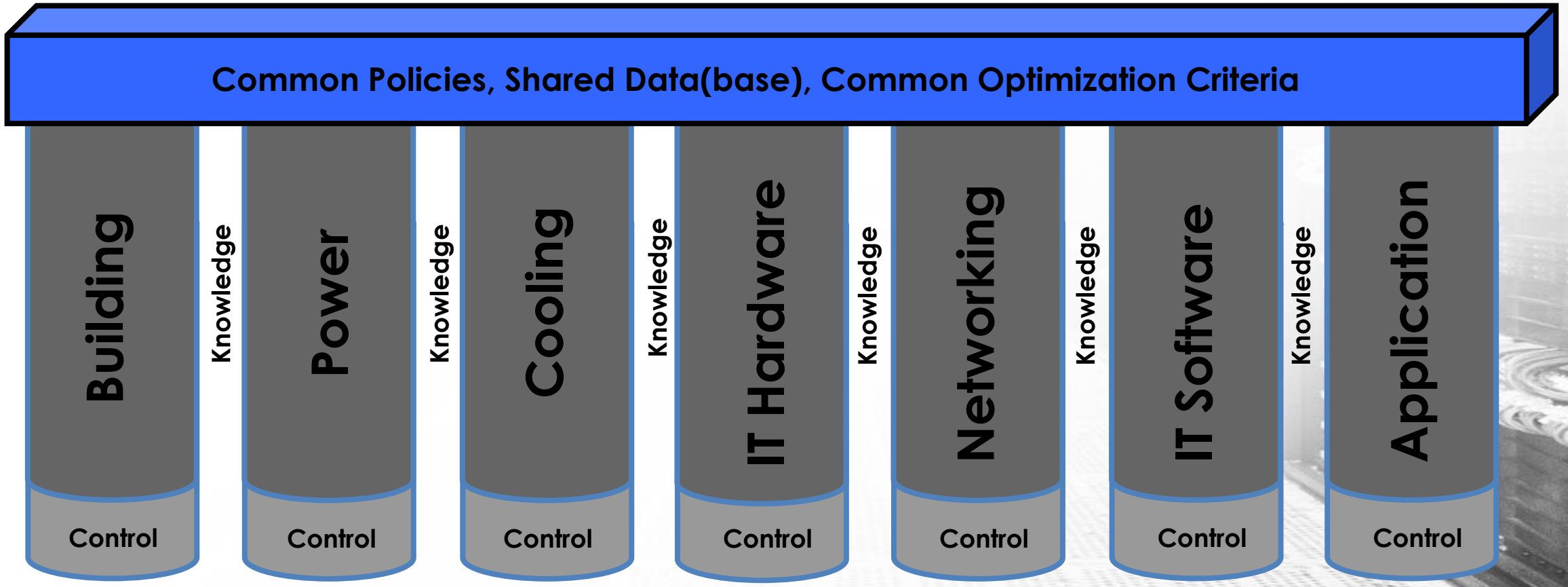
SEcure Networking for a DATa center cloud in Europe –
EXTENded Datacenter solutions

Improve efficiency and flexibility of
operating all different parts
within datacenters and in a distributed cloud.

EXTEND – Holistic Datacenter Automation

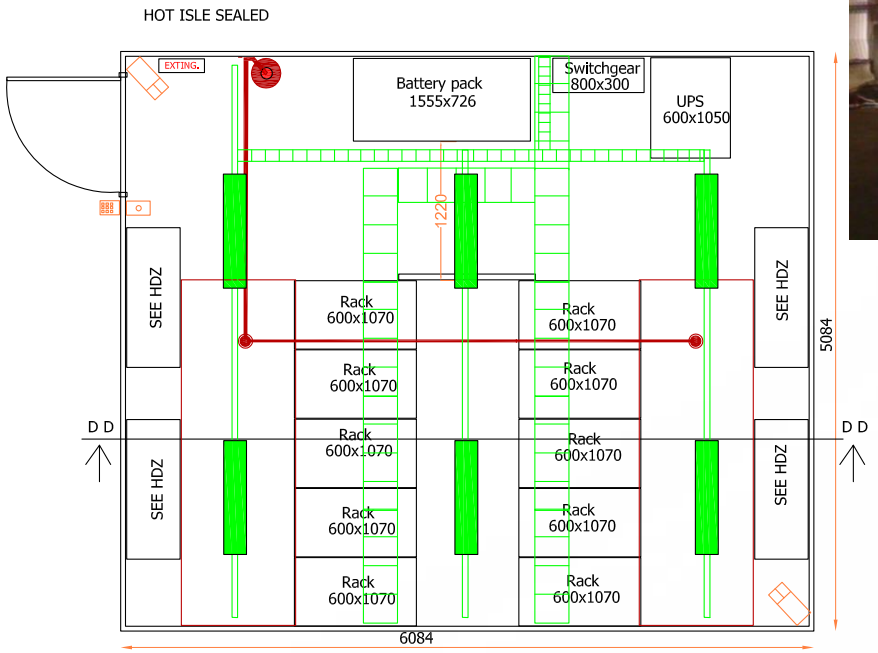


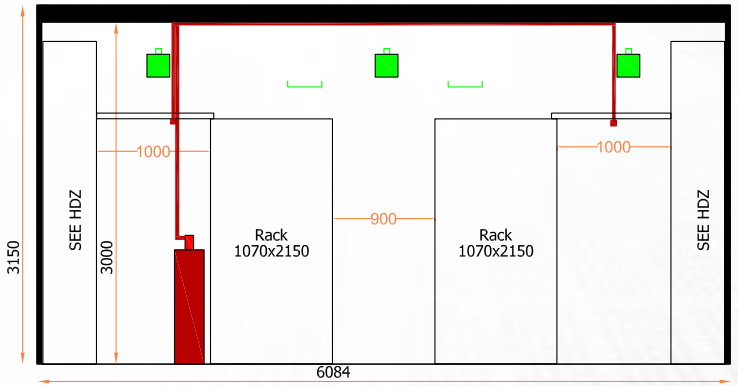
EXTEND – Holistic Datacenter Automation



SICS ICE – A PROJECT RESOURCE

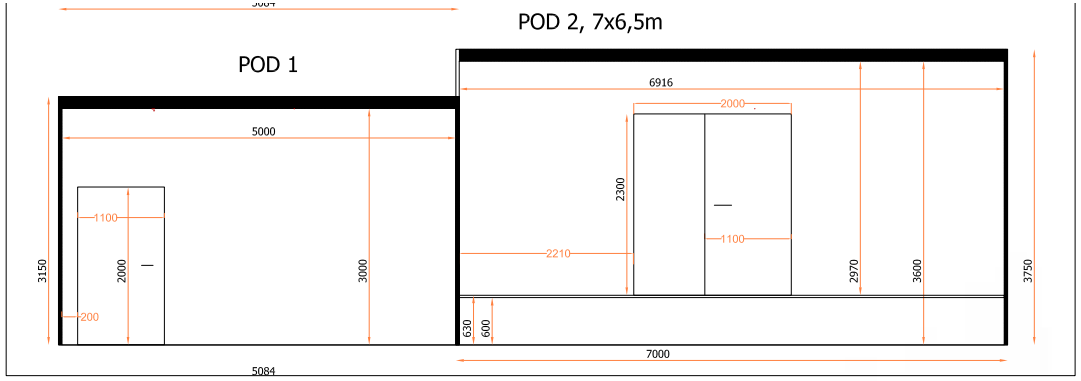
SICS-ICE Room-in-room module 1

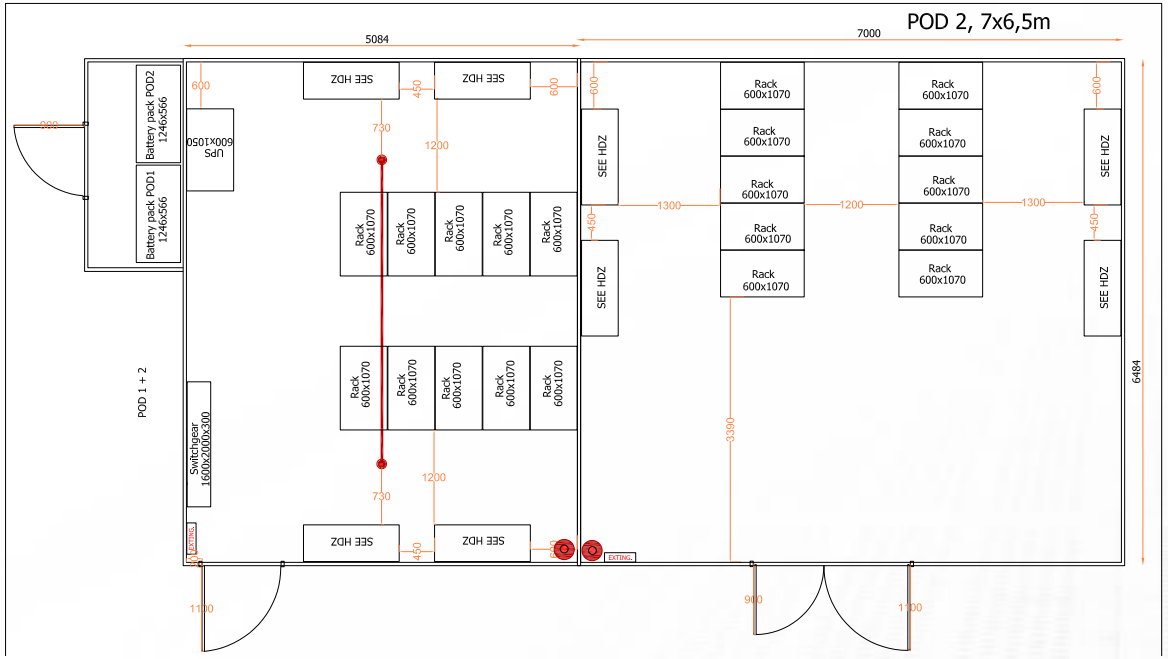


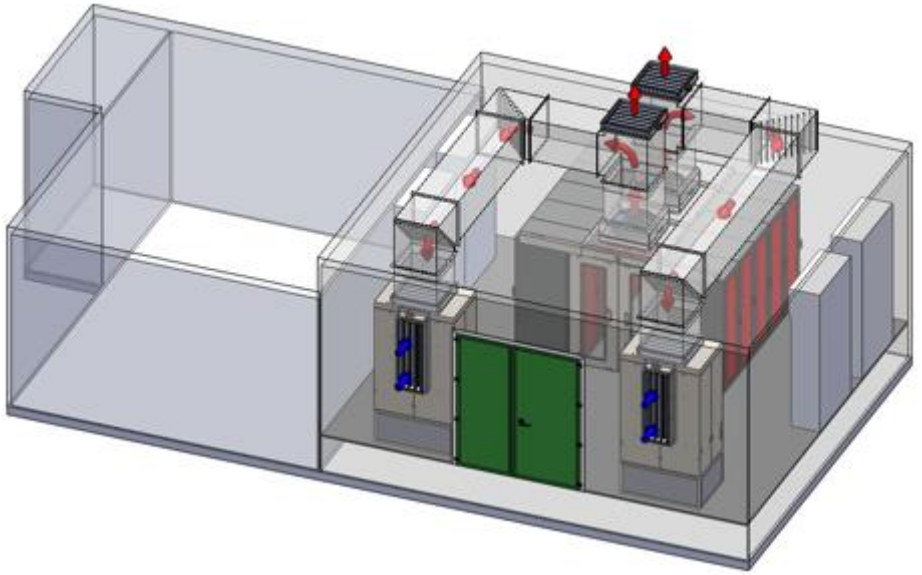


In operation since January 2016. 500 GB of metrics data now

SICS-ICE room-in-room module 2



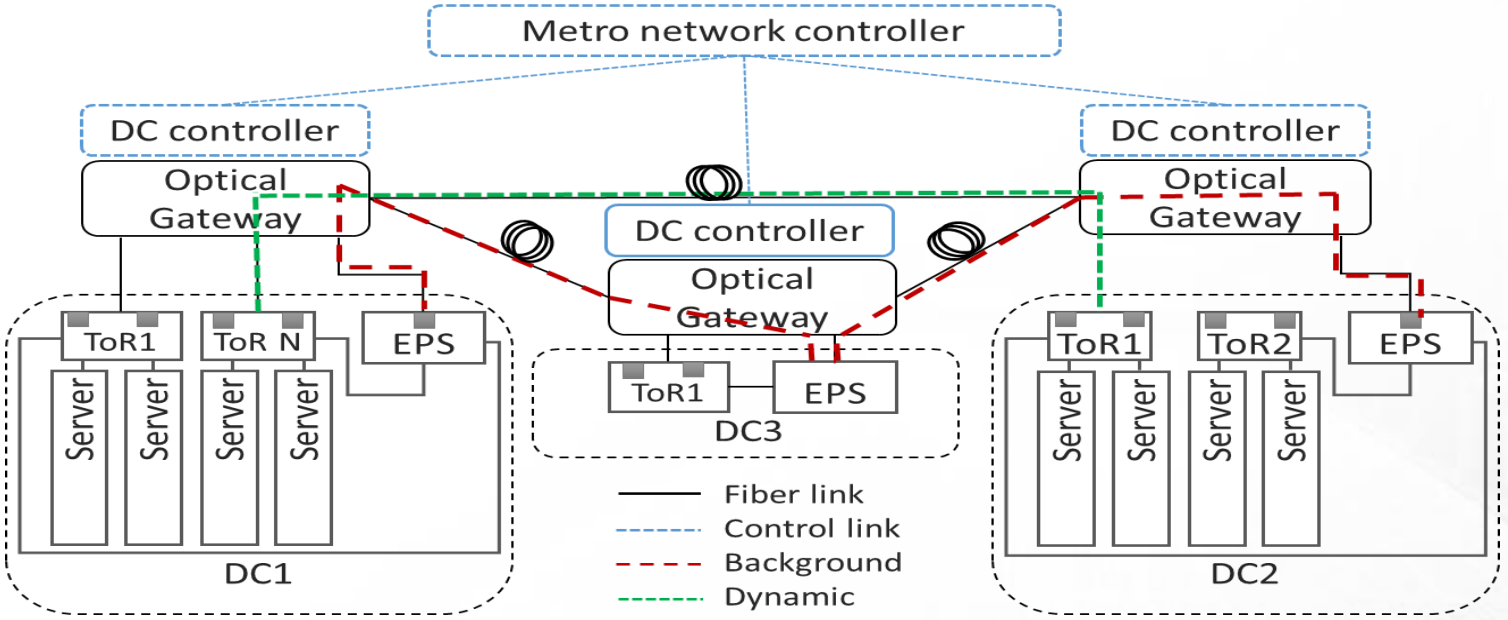




Under construction.
Ready for use January 2017

A FEW USE-CASES

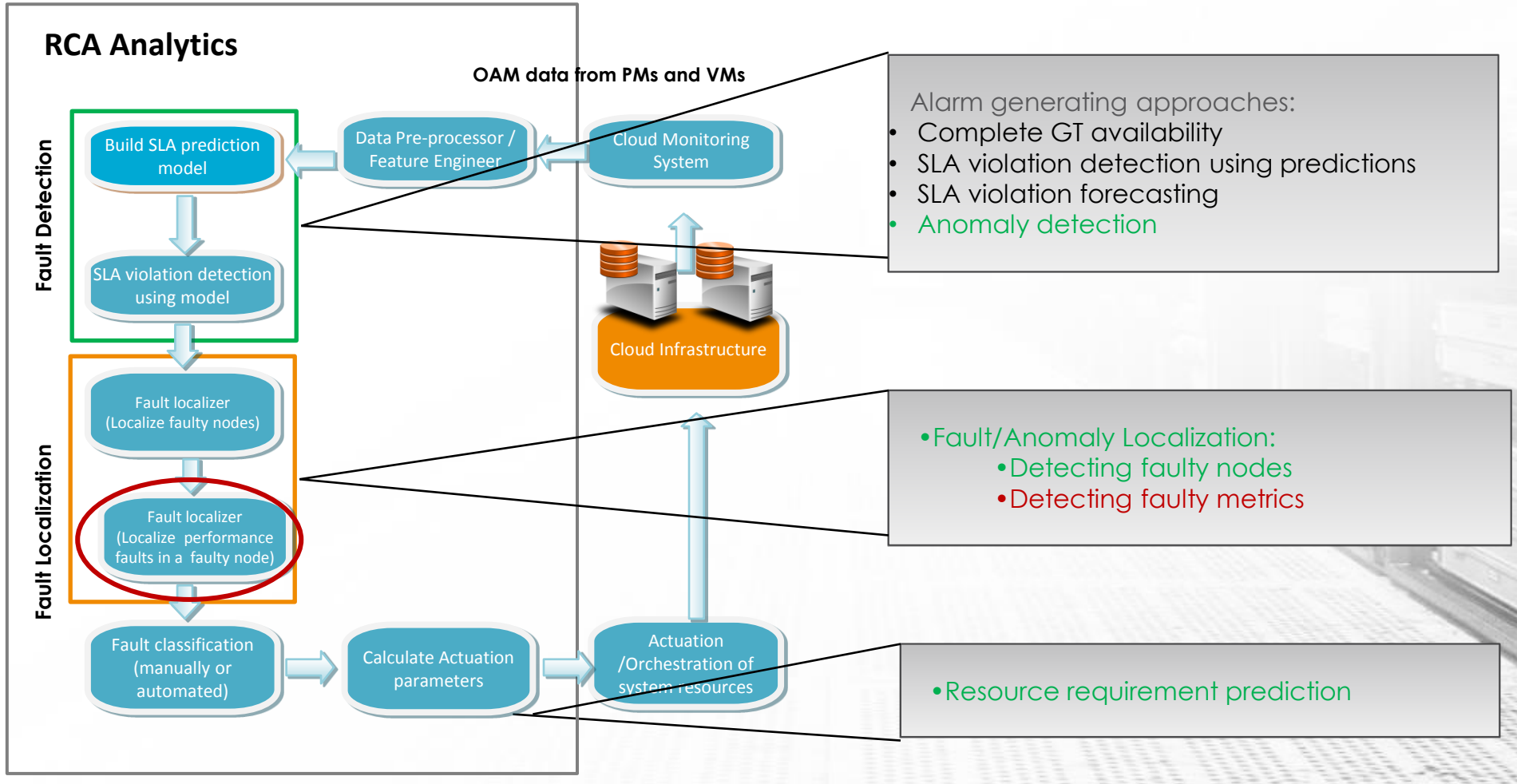
Converged architecture for geographically distributed metro DCs



The architecture enables to dynamically establish lightpath between racks in different DCs

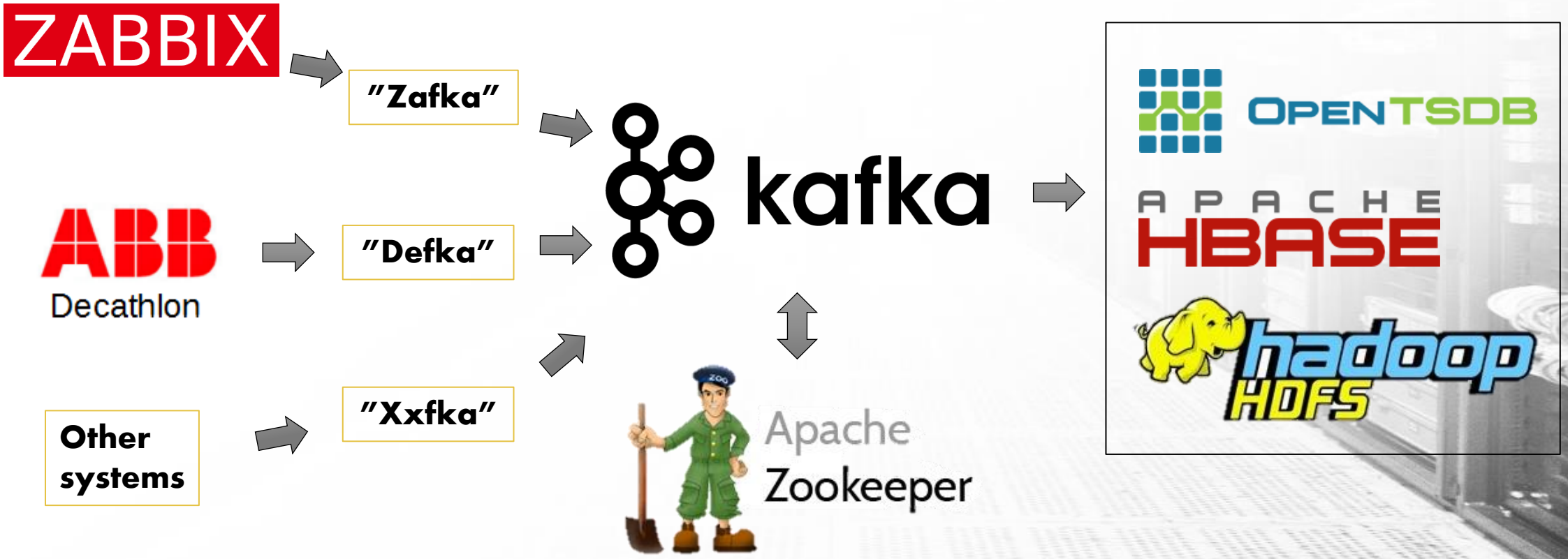
- Impact of various abstraction policies (for the intra- and inter-DC resources) on the provisioning of ToR to ToR connectivity
- Protection and restoration strategies of provisioned cloud services based on the concept of VM migration

Root Cause Analytics based on metric correlation



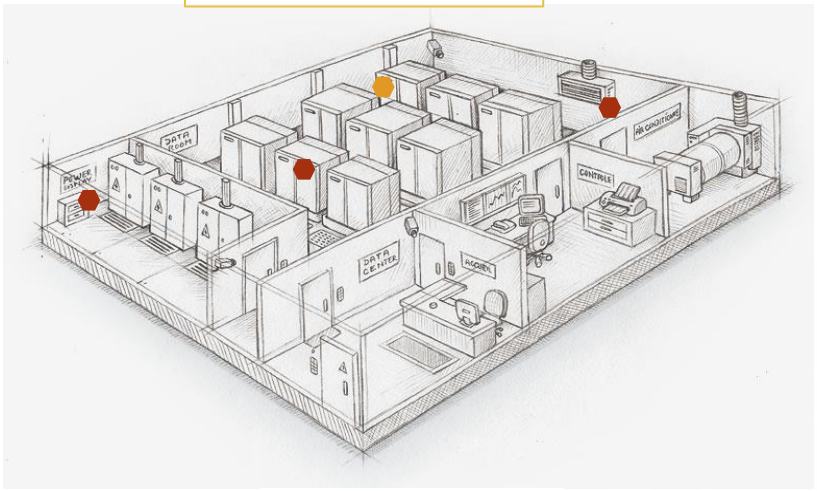
Source Ericsson

Metrics "backbone"



Maintenance application

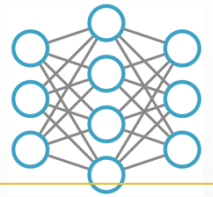
Data collection



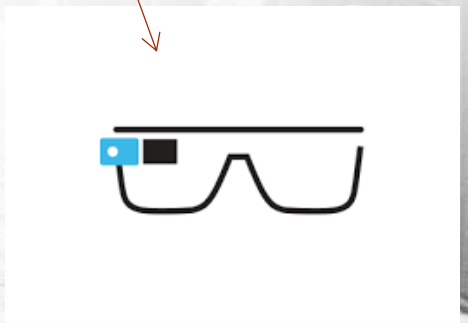
Asset positioning

Metrics database

Asset management



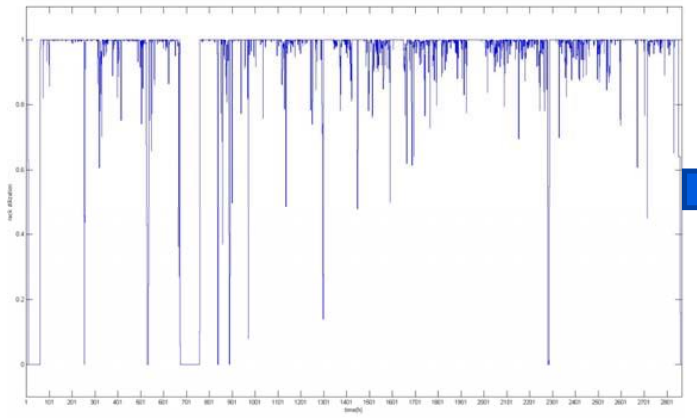
Failure detection



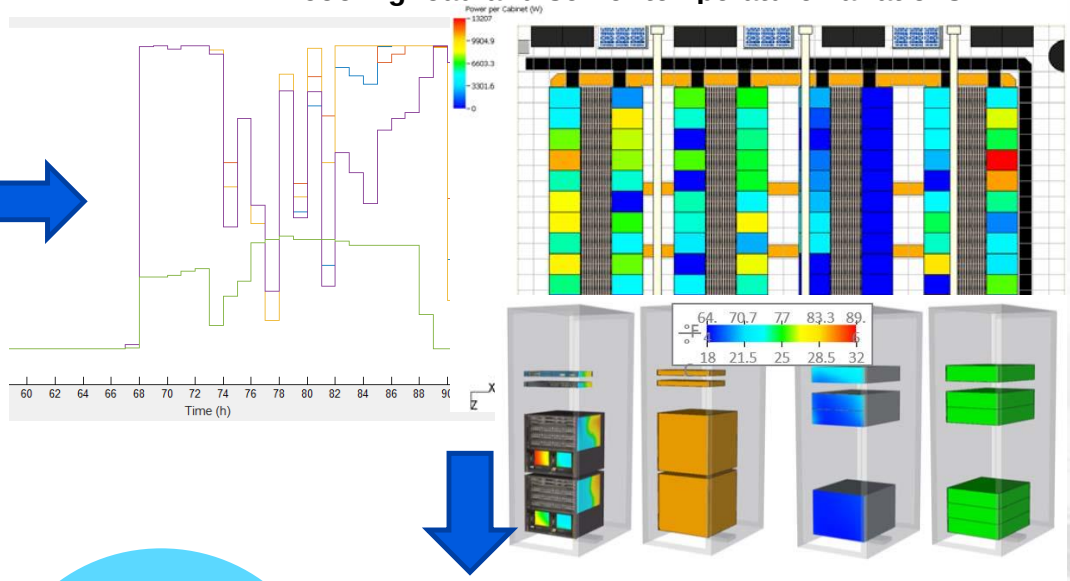
Light-weight application

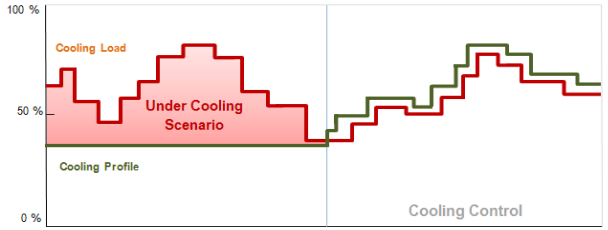
IT load vs Cooling

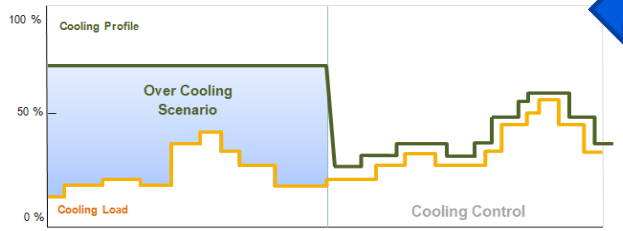
IT load scheduling analysis over a period to find IT load pattern



IT load analysis over 48 hours to present IT load, cooling load and server temperature variations







Dynamic cooling control in zone-level or rack-level

Simulate a number of cooling strategies
- Dynamic cooling, flow, T
- IT load shifting
- Distributed air flow
- Shutter flow control

A tool to provide relations among CRAHs and individual racks and a degree of influence

© ABB Group

Source ABB

PROJECT FACTS

Project partners

Large enterprises

ERICSSON

ABB

Swegon

Medium enterprises

metria

EITECH

Small enterprises

netrounds

BnearIT

ARCTOS LABS

Academia

LULEÅ TEKNISKA UNIVERSITET

KTH VETENSKAP OCH KONST

SWEDISH ICT SICS

Financial support

VATTENFALL

LULEÅ KOMMUN

Project budget

Effort and Budget	Total	2016	2017	2018	2019 and later
Project budget (kEUR)	5 429	1 488	1 881	1 667	393
Effort in Person Years (PY)	30,8	7,7	10,3	10,3	2,6

Celtic-Plus
Smart Connected World

supported by

Federal Ministry of Education and Research

DGE
DIRECTION GÉNÉRALE DES ENTREPRISES

Tekes

VINNOVA