Napatech A/S

Company Presentation
January 9, 2018

Henrik Brill Jensen, CEO

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Napatech in Short

- Napatech provides reconfigurable SmartNIC solutions based on hardware and software that help IT organizations reimagine their business by harnessing the cost, performance and innovation benefits enjoyed by hyper-scale cloud service providers

- Napatech pioneered the use of reconfigurable FPGA-based acceleration hardware and software for networking and security applications. The use of FGPA technology is now broadening with the industry adoption of reconfigurable computing solutions and FPGA-based SmartNICs

- The shift towards cloud computing, 5G mobile and IOT has created a pervasive need for reconfigurable computing solutions across a wide range of new users, in high-growth applications and services; serving as the catalyst for the next phase of Napatech growth

What is a SmartNIC?

- A SmartNIC is a product built around a very-flexible, high-speed, computing chip like a Field-Programmable Gate Array (FPGA)

- Unlike conventional technology, a SmartNIC is software reconfigurable – delivering hardware performance at the speed of software innovation

Major trends in networking and communications

Cloud
Computing

5G
Mobile

Internet of
Things

By 2020

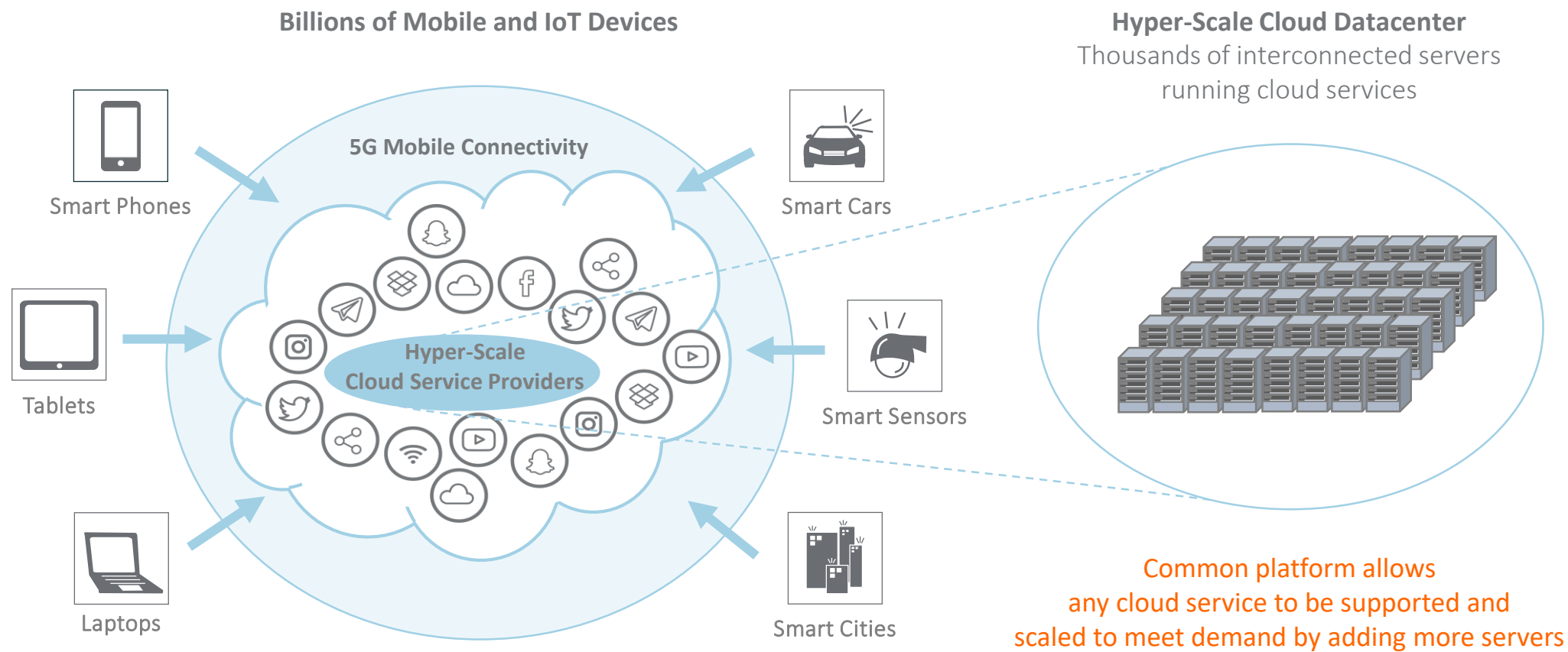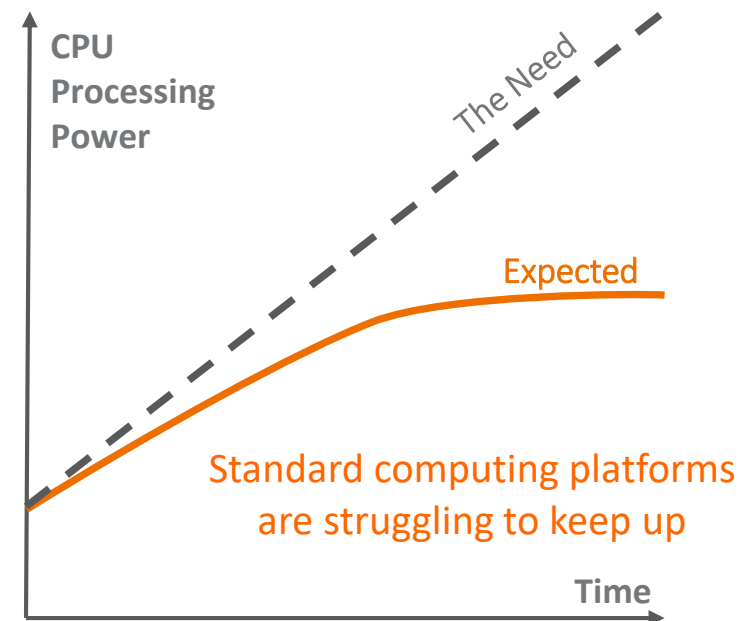| 4 BILLION Connected People	25 MILLION Applications	25 BILLION Embedded Systems	50 BILLION Devices and Sensors	50 TRILLION Gbps of Data

Source: IDC

Hyper-Scale Cloud Data Centers
Common Platform Ensures Scalability to Meet Demand

Billions of Mobile and IoT Devices

Hyper-Scale Cloud Datacenter
Thousands of interconnected servers
running cloud services

5G Mobile Connectivity

Smart Phones

Smart Cars

**Hyper-Scale
Cloud Service Providers**

Tablets

Smart Sensors

Laptops

Smart Cities

Common platform allows
any cloud service to be supported and
scaled to meet demand by adding more servers

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Standard Computing Platform
Basis for Hyper-Scale Today But Struggling To Keep Up

Central Processing Unit (CPU)
Processes all the data for cloud services

Needs to divide time and resources
between many different tasks

Network Interface Card (NIC)
Only delivers data to and from the CPU

CPU
Processing
Power

The Need

Expected

Standard computing platforms
are struggling to keep up

Time

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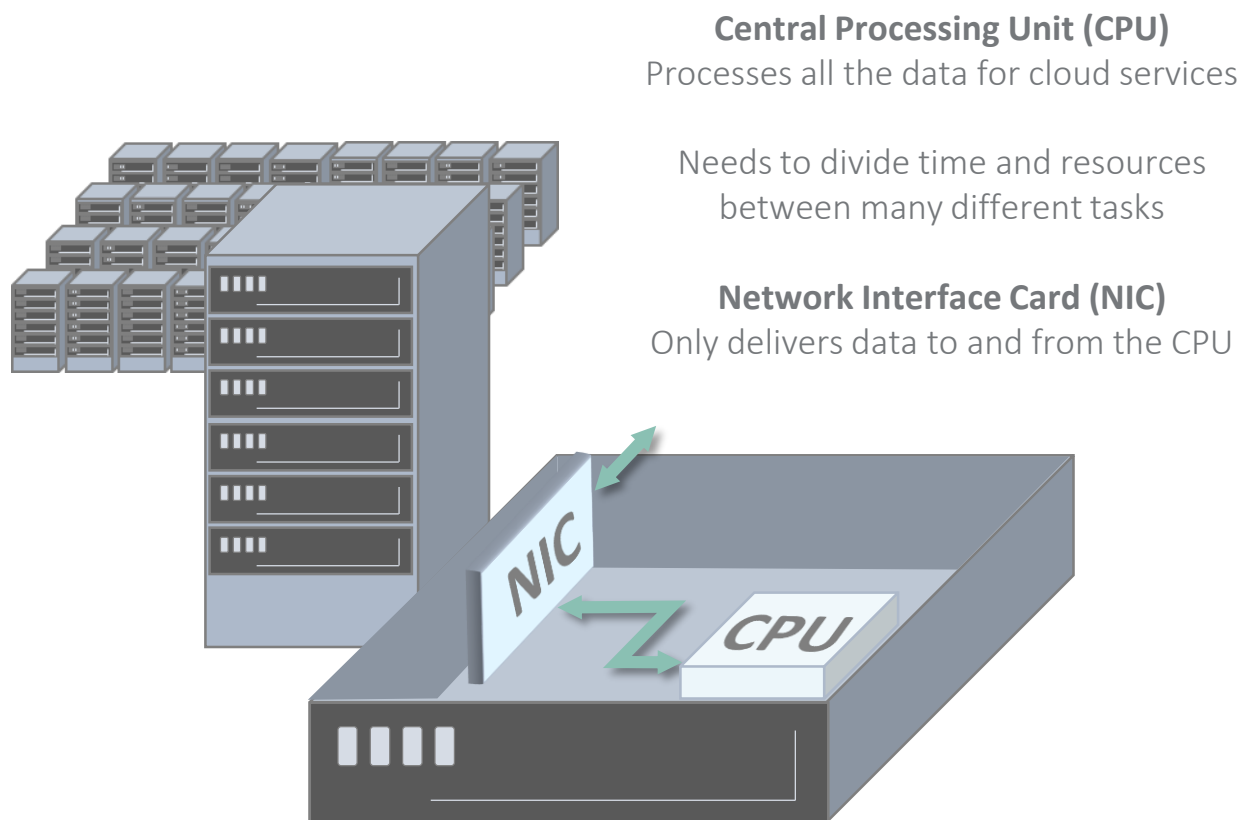
Reconfigurable Computing Platform
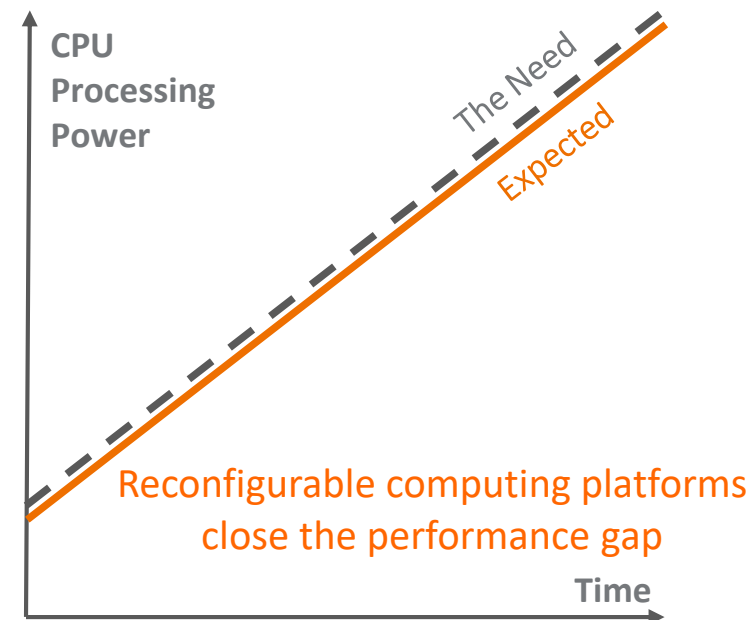# FPGA's Provide The Additional Processing Power
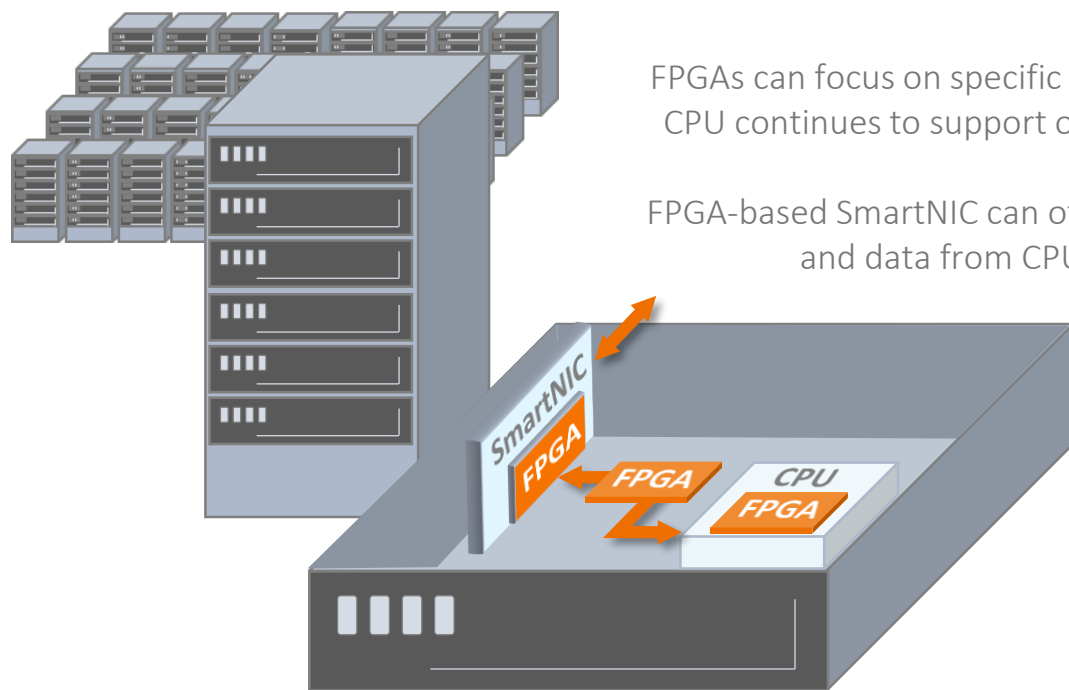
Reconfigurable Computing Platform

Combination of CPU and FPGA processes all the data for cloud services

FPGAs can focus on specific tasks while CPU continues to support other tasks

FPGA-based SmartNIC can offload tasks and data from CPU

SmartNIC

FPGA

FPGA

CPU

FPGA

CPU Processing Power

The Need

Expected

Reconfigurable computing platforms close the performance gap

Time

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Reconfigurable Computing Solutions by FPGA
Driven by Largest Cloud Service and Solution Providers

Microsoft improves Azure latency by deploying custom NICs

The hardware will help offload SDN demand for extra flexibility

WRITTEN BY
Clare Hopping

News

24 Aug, 2015

Microsoft has started deploying custom network interface controller (NIC) hardware in its Azure datacentres to help offload the burden of software-defined networking (SDN).

The tech giant's SmartNIC hardware uses the same Field Programmable Gate Array (FPGA) technology developed for Bing, which it claims allows for extra flexibility, reprogramming it to offload the server CPU's virtual switch, used to route traffic between virtual machines.

This offers up better latency and frees up processing power for other operations where it's needed more urgently, according to Redmond.

Microsoft networking development engineer Albert Greenberg explained that a key part of the SmartNIC's inner workings are that it's adaptable to changes that may happen in the future, making it an even more attractive option for things like SDN, where the future is unpredictable.

"No one knows what SDN capabilities will be needed a year from now. Our FPGA-based SmartNIC allows us to reprogram the hardware to meet new needs, as they appear — reprogramming, not redeploying hardware," he said in a blog post.

DEC 13, 2016 @ 01:30 PM   17,318 👁

Amazon's Xilinx FPGA Cloud: Why This May Be A Significant Milestone

POST WRITTEN BY
Karl Fre
Karl Freund

Intel Begins Shipping Xeon Chips With FPGA Accelerators

By: Jeff Burt | April 13, 2016

| (0) comments

Combining the Intel server chips with Altera's FPGAs will improve the performance-per-watt of systems running the two by 70 percent, officials say.

Intel has begun shipping a development module that features the company's latest Xeon E5 server processors and programmable chips that will help customers drive performance while holding down power consumption.

The multichip platform is pairing the 14-nanometer Xeon E5-2600 v4 "Broadwell" processors—launched late in March—with the Arria10 field-programmable gate arrays

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Intel FPGAs Power Acceleration-as-a-Service for Alibaba Cloud
October 12, 2017

Oct. 12, 2017 — Intel today announced that Intel field programmable gate arrays (FPGAs) are now powering the Acceleration-as-a-Service of Alibaba Cloud, the cloud computing arm of Alibaba Group. The acceleration service, which can be launched from the Alibaba Cloud website, enables customers to develop and deploy accelerator solutions in the cloud for Artificial Intelligence inference, video streaming analytics, database acceleration and other fields where intense computing is required.

The Acceleration-as-a-Service with Intel FPGAs, also known as Alibaba Cloud's F1 Instance, provides users access to cloud acceleration in a pay-as-you go model, with no need for upfront hardware investments.

Microsoft Azure
Configurable cloud architecture based on FPGAs

intel FPGA
Intel acquires Altera FPGA for record $16.7B

amazon web services
Amazon introduces FPGA-as-a-Service

Alibaba Cloud
Alibaba introduces FPGA-as-a-Service

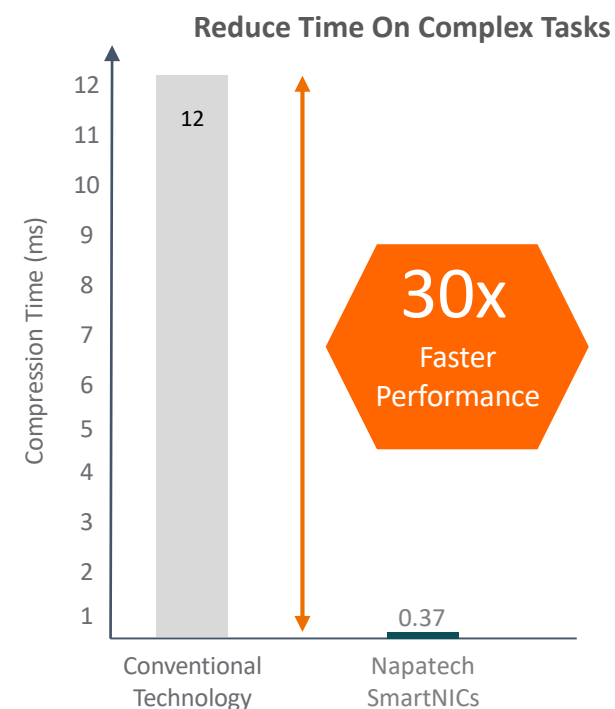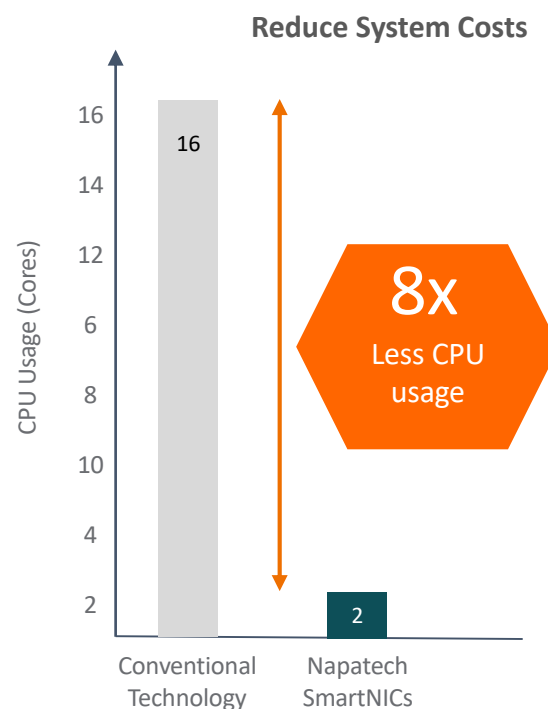**napatech**

Napatech Reconfigurable Computing Solution
It's all about the software

- The power of FPGA technology is that it can be reconfigured by software on-the-fly to support a new task at any given point in time

- Reconfiguring the computing platform enables fast response in the hyper-scale datacenter to unexpected demands and performance challenges

- Napatech FPGA-based SmartNIC today enable standard servers to become reconfigurable computing platforms

- Our strategy is to ensure that Napatech FPGA software can be applied to FPGAs in any future reconfigurable computing platform design delivered by the server industry

Napatech Reconfigurable Computing Solutions

FPGA Software

FPGA SmartNIC Hardware

SmartNIC FPGA   FPGA   CPU FPGA
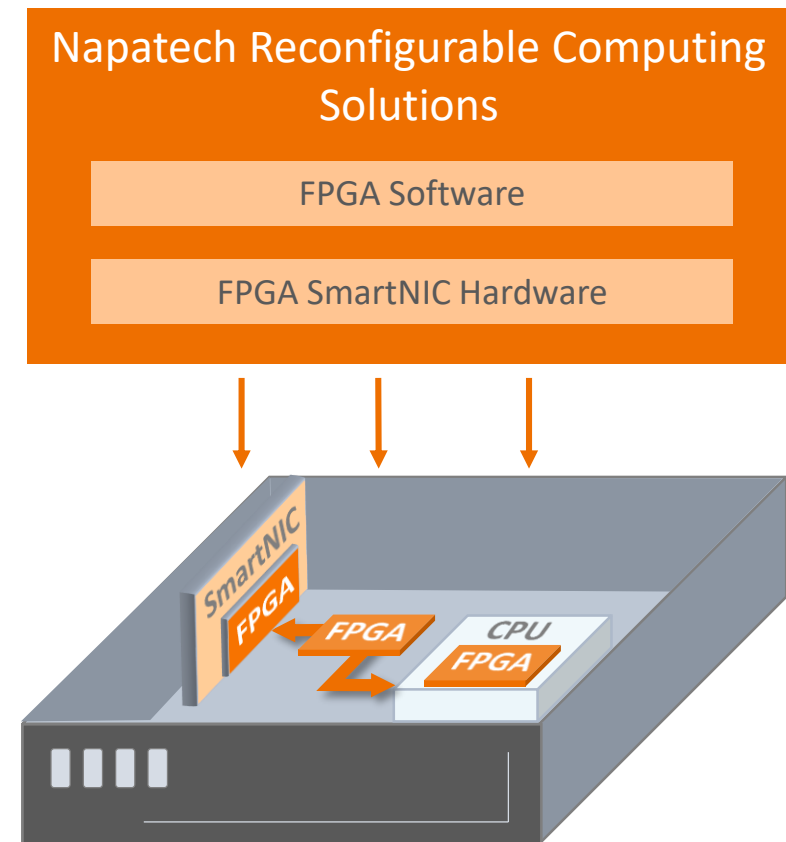
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Napatech SmartNIC Solutions
When conventional technology fails to perform

Get More Out Of Every System

OVS Port-to-Port Roundtrip Throughput MPPS

7x Capacity Improvement

- Conventional Technology: 5
- Napatech SmartNICs: 37,2

Reduce System Costs

CPU Usage (Cores)

8x Less CPU usage

- Conventional Technology: 16
- Napatech SmartNICs: 2

Reduce Time On Complex Tasks

Compression Time (ms)

30x Faster Performance

- Conventional Technology: 12
- Napatech SmartNICs: 0.37

Napatech SmartNIC Solutions return expensive and valuable processing resources
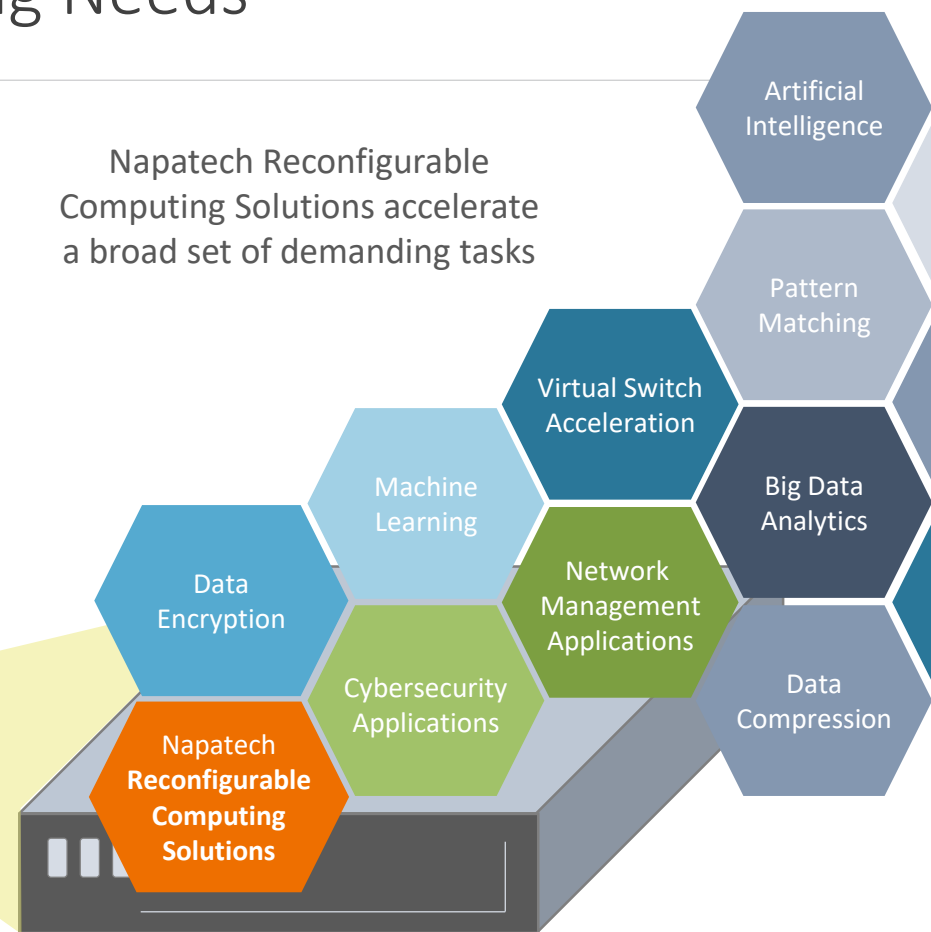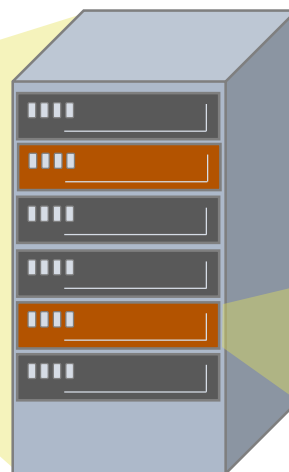to the applications and services for which they were originally intended

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Napatech Growth Strategy
Powering Many Reconfigurable Computing Needs

Reconfigurable computing platforms deployed to keep up with growth in cloud services, mobile and IoT devices

Reconfigurable Computing Solutions are required for each Reconfigurable Computing Platform

Napatech Reconfigurable Computing Solutions accelerate a broad set of demanding tasks

Artificial Intelligence

Pattern Matching

Virtual Switch Acceleration

Big Data Analytics

Machine Learning

Data Encryption

Network Management Applications

Data Compression

Cybersecurity Applications

Napatech **Reconfigurable Computing Solutions**

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Growth Strategy Secured by Strong Technology, Organization Capabilities and New Emerging Market Needs

PROVEN SUCCESS

FPGA SmartNICs

MORE APPLICATIONS

Virtual Switching   Cybersecurity   Analytics

NEW MARKETS

30x	81x	33x	18x	30x
Machine Learning *Inference* CNN: Image	Machine Learning *Inference* LSTM: Speech	Data Analytics *SQL* Query	Video Processing *Transcode*	Storage *Compression*

Source: Xilinx

Pioneered the use of FPGAs to accelerate networking and security applications in ***Networking Appliances***

Improving ***Data Center Servers*** based on broad set of FPGA software for leading IT applications, supported on a wide array of hardware

Cloud, Premise and Hybrid software solutions for FPGA acceleration in an expanding set of server use cases

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Q&A Session

Napatech   OSLO BØRS

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