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Efficient IT with Software Definition

A Real World Example

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The HAHN Group

...combines a network of specialized companies for

Industrial automation and robotic solutions

...is **globally present**

...employs **1.500 people** and

... has **27 IT-locations.**

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Divisions

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Assembly & Test

Automotive

Consumer

Medical

Med Tech

Electronics

HAHN AUTOMATION

DFT maschinenbau gmbh

Invotec

Material Handling

WEMO

waldorf technik

GeKu

Robotics

HAHN ROBOTICS

HAHN ROBSHARE

rethink robotics

Process Technologies

KITOV SYSTEMS

WALTHER SYSTEMTECHNIK

HAHN DIGITAL

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Top IAS companies worldwide

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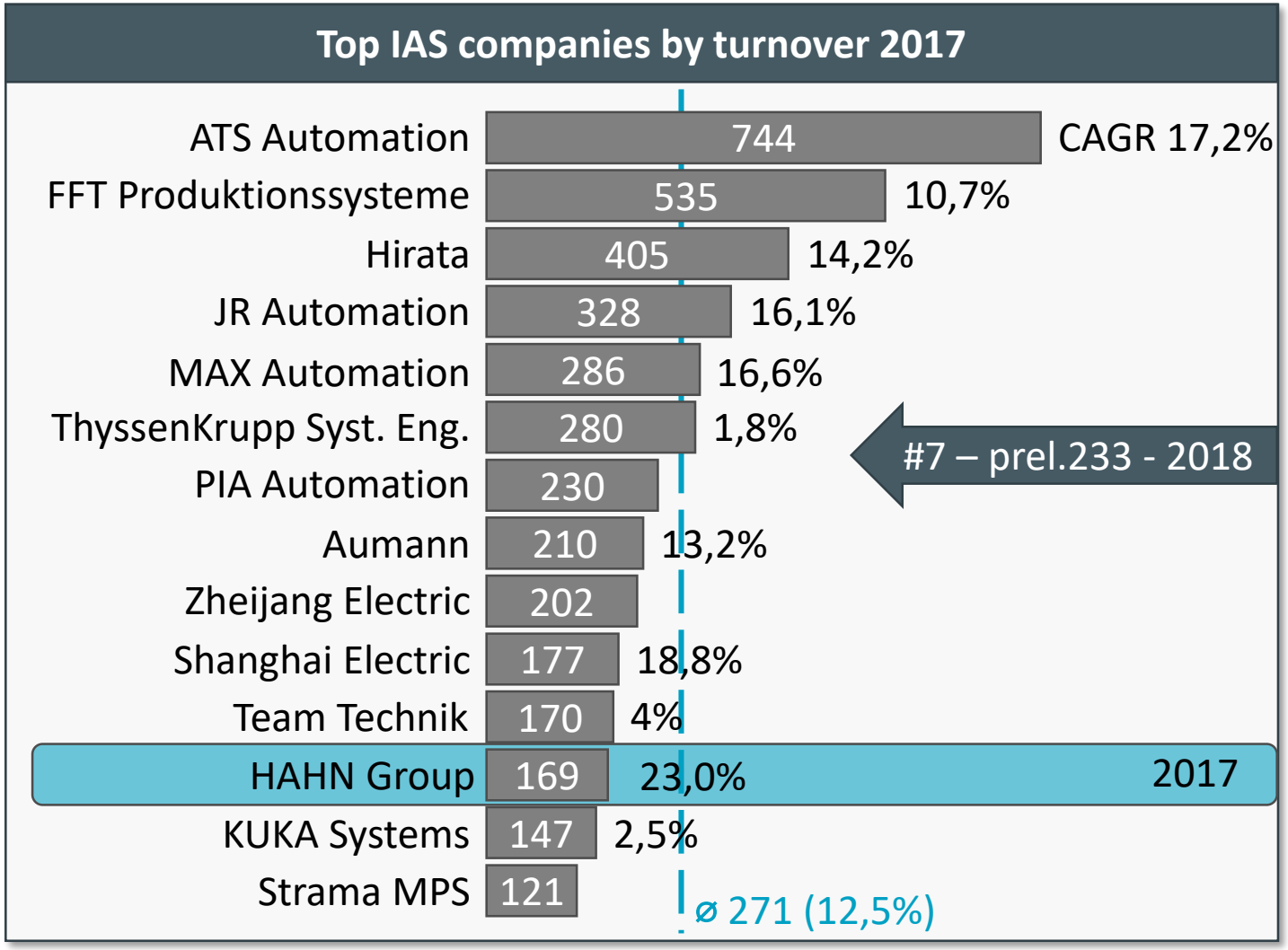
#12 in turnover

The HAHN Group is the **fastest growing integrated assembly solutions** company worldwide with

23% growth

Prel. 33% growth 2018



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Taking the Challenge

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Business IT Requirements

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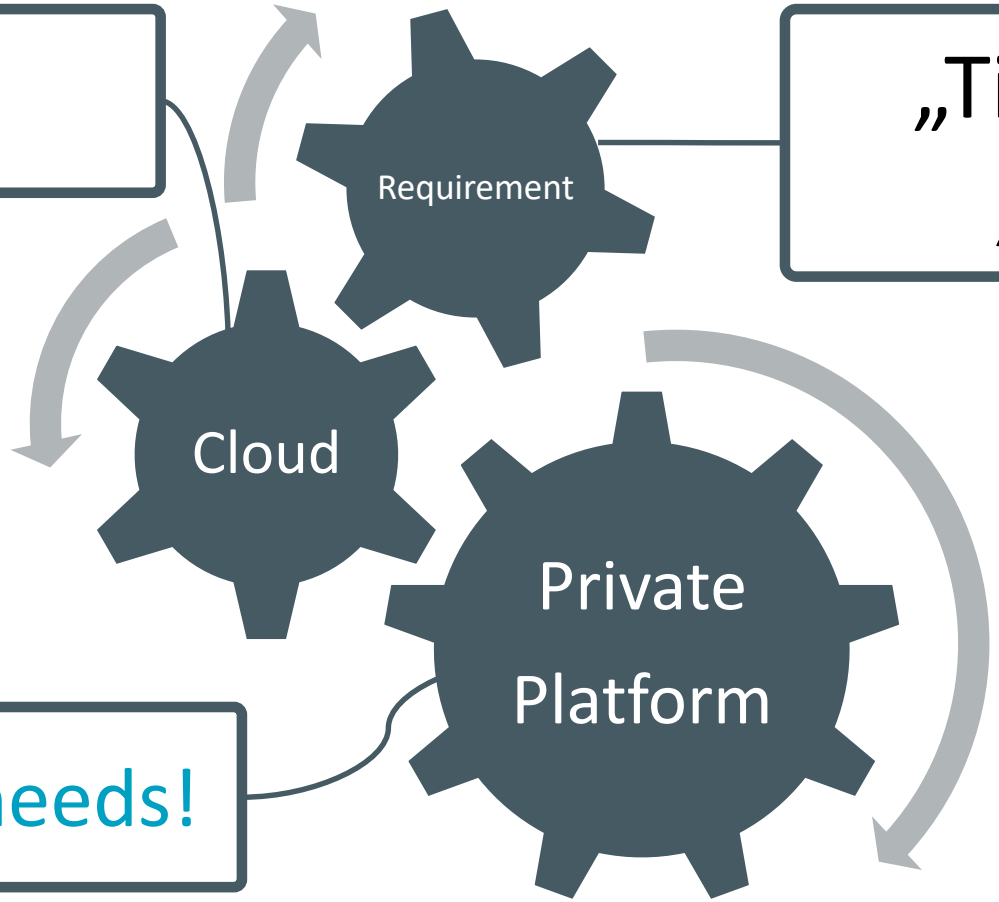
What is driving the IT Operations Environment?

Flexible Cheap Fast

„Time to Market“
„Time to App“?



Standardize on YOUR needs!

Who Deals With ?

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?

End to End Process Monitoring

Network Virtualization

Server Virtualization

Ansible

Storage Virtualization

Client Virtualization

Software Packaging and Distribution

Stateless Server Concepts

Hyperconverged Systems

Container

Automated Provisioning

Resource Pooling

Machine Learning in IT

Increasing Infrastructure Cost

Site Reliability Engineering

Business Enablement IT Services

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Translate business requirements in permanent IT processes

Application platform for business growth

True usage assessment

statistics, business plans and market research

Automatisation efforts on volume tasks

Eliminate step cost

Application Services

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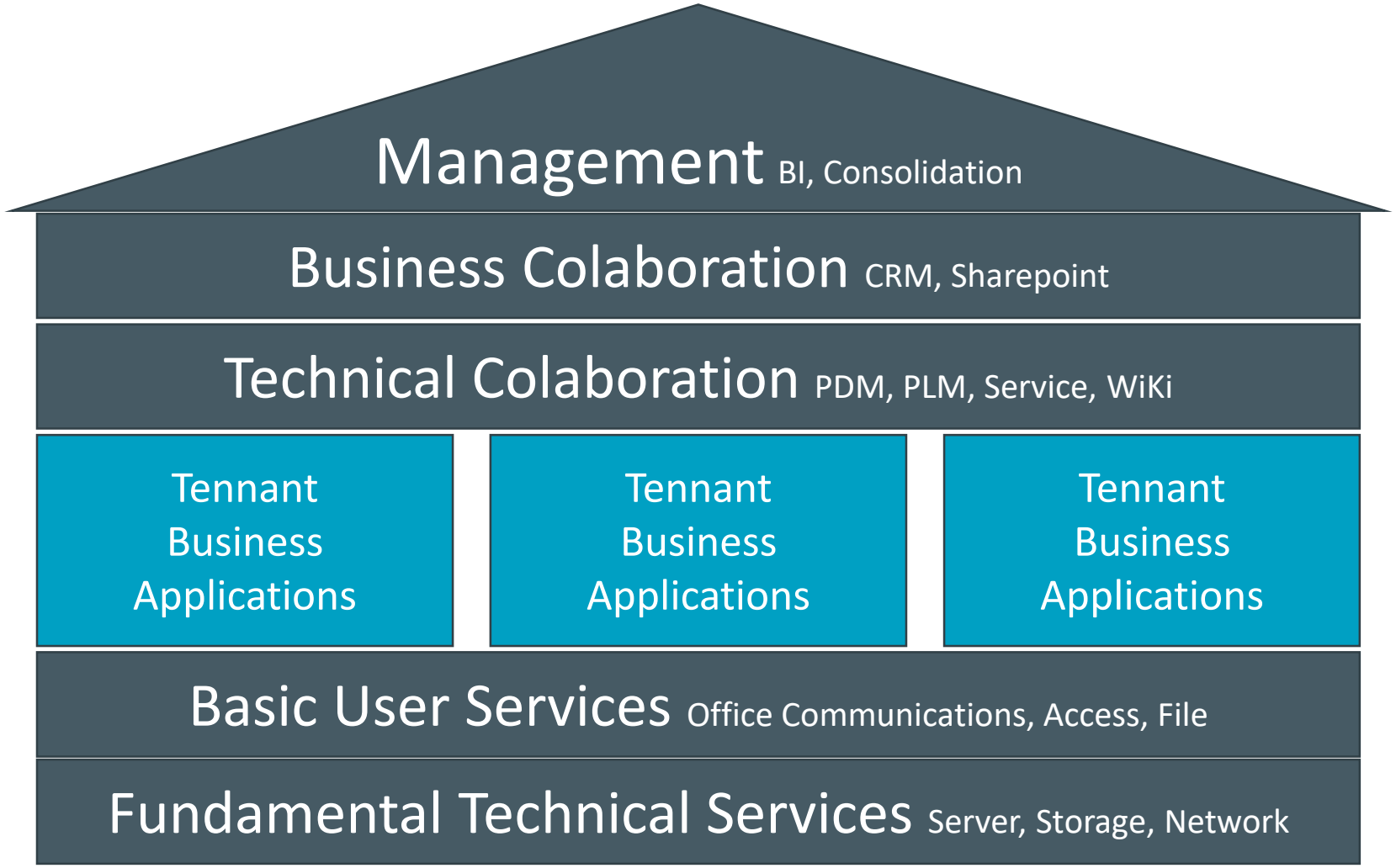

Individual Businesses vs.

Standardized Process Footprints

through divisions

Pushing

Application Standardization

HAHN Group IT Locations

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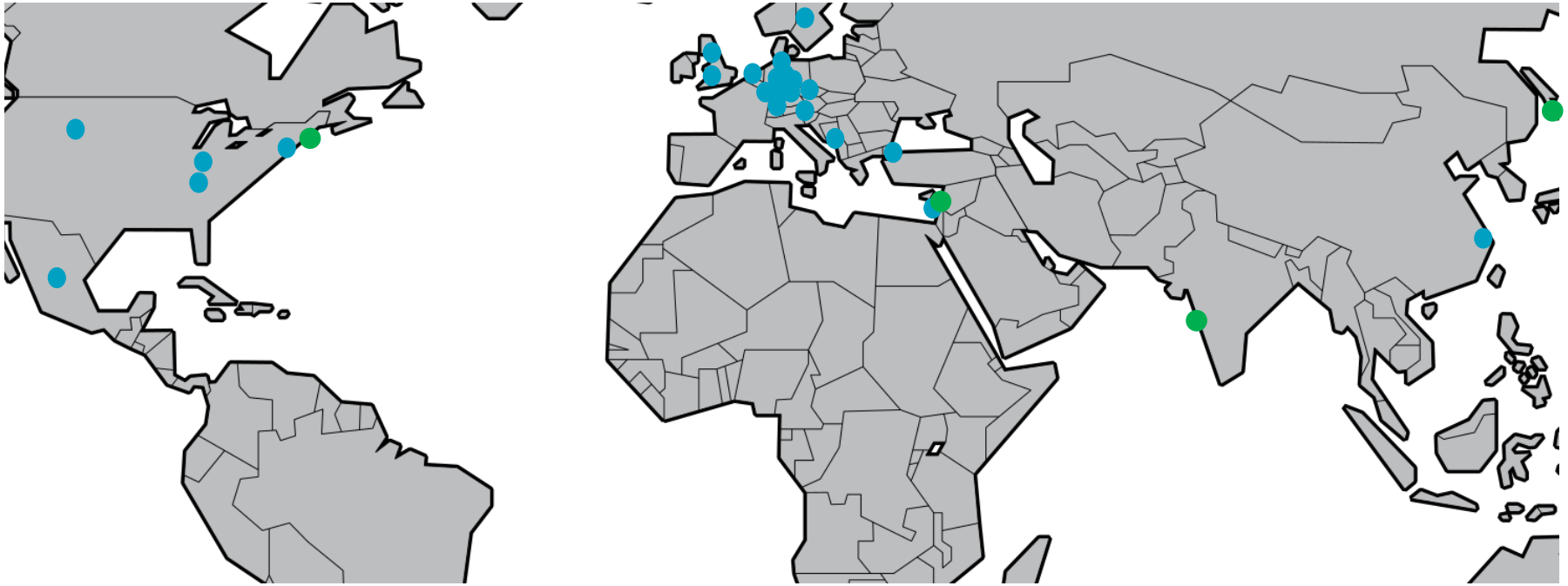
Global Footprint



Standardization of local Infrastructure and Application Service Set

Transform IT to Software Definition

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Identify Fileds of Action

Plan

Create Transparency
Analyze
Built Categories
Simulate

Do

Standardize
Automate
Implement Scalable Solutions

Check

Monitoring
"Machine" Learning
Review Target Parameters

Act

Adjustments
Automatic Response
Platform
Optimization

Learning From The Big Fishes!

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Evolution

Site Reliability Engineering google 2003

Amazon Web Service
2006

NETFLIX Streaming 2008

NIST Definition
National Institue of Standards and Technology 2011

RAD 1991 Martin

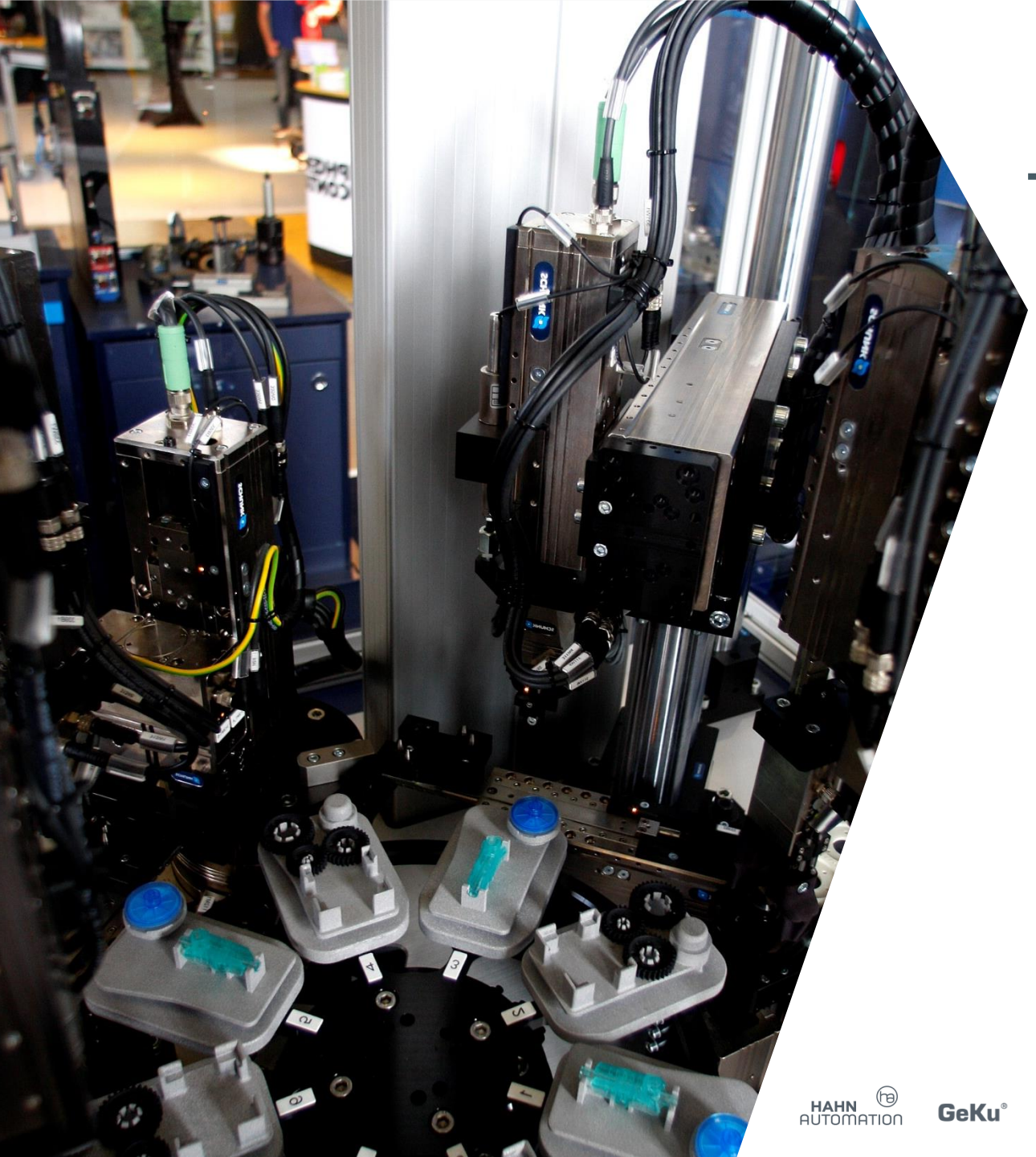
SCRUM 1995 Schwaber

Agile 2001 Schwaber/Beedle

DevOps 2008, Flickr 2010, Netflix 2012

Open Compute Project 2005 Google, 2011 Facebook

Docker Mesosphere 2013



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Capacities
and
Cost

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Growth & Monitoring

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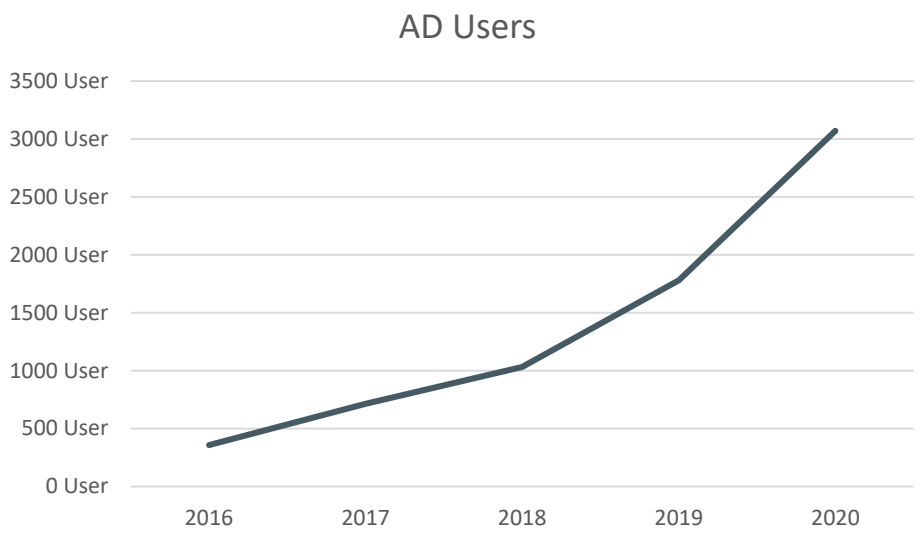

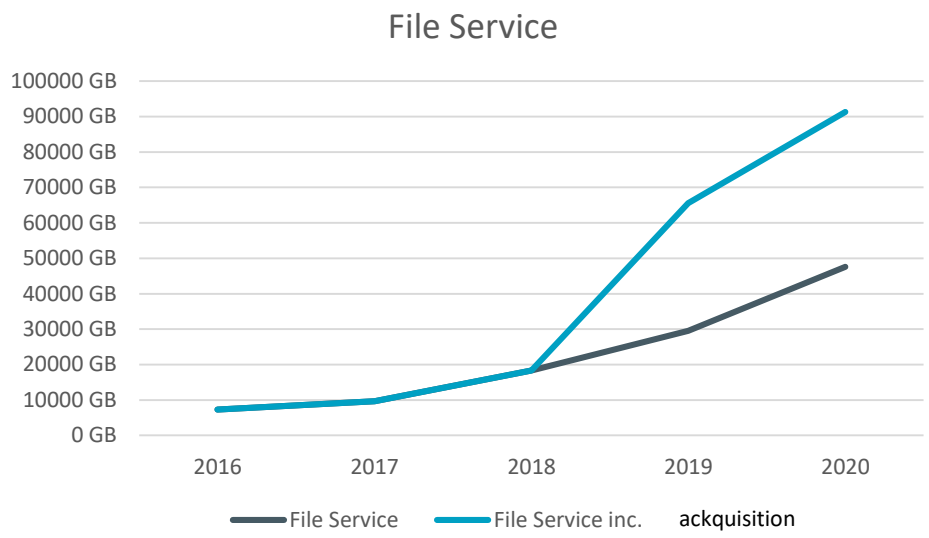

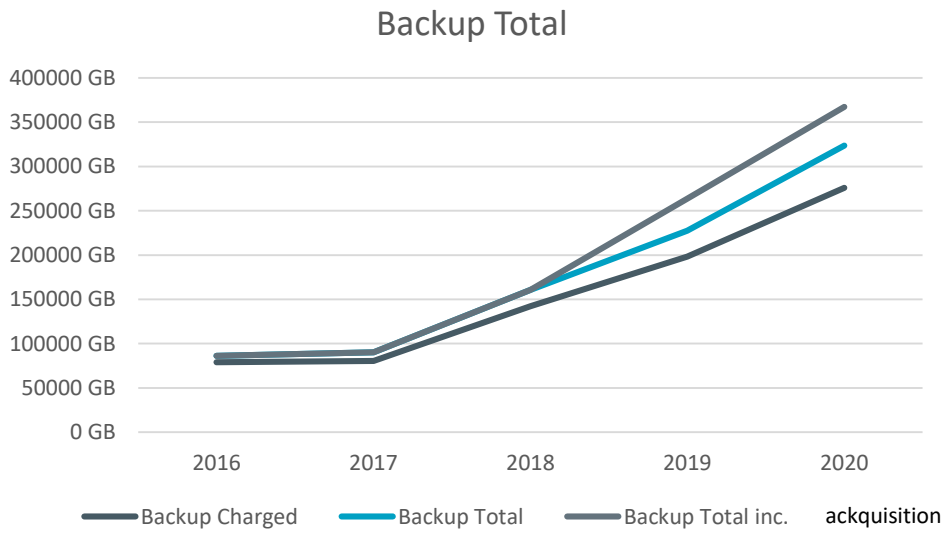

„If It Has No Metric It Doesn‘t Exist“

Harper Reed @ Atmosphere 2017

Example: Software Defined Storage - Consumption and Development

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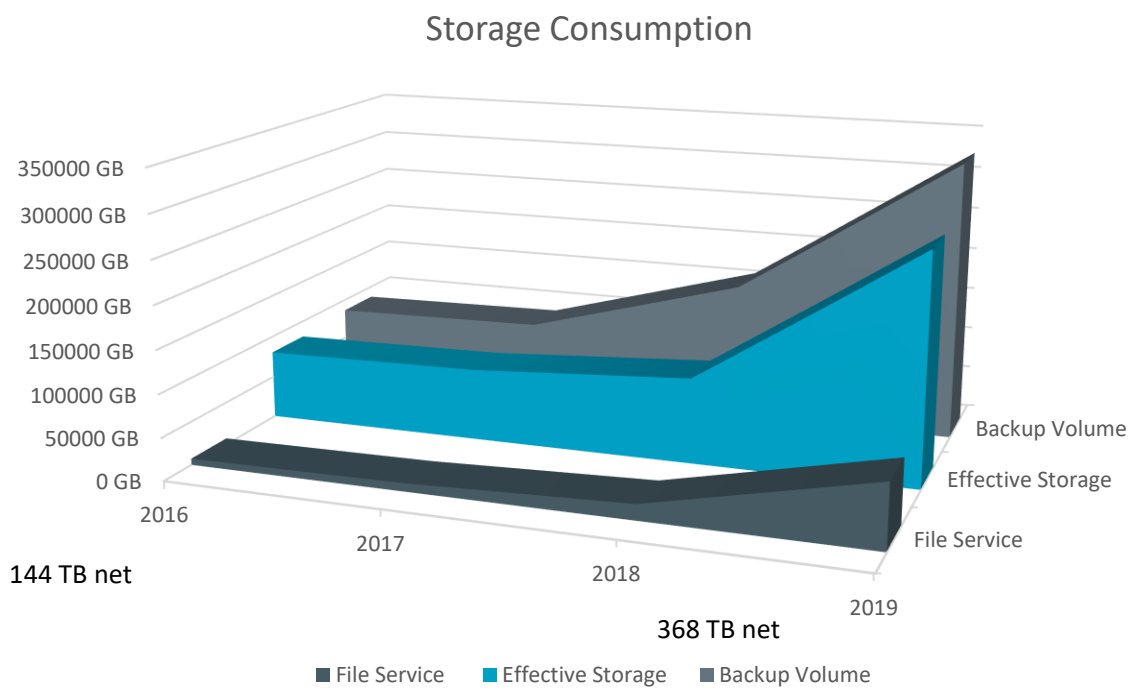

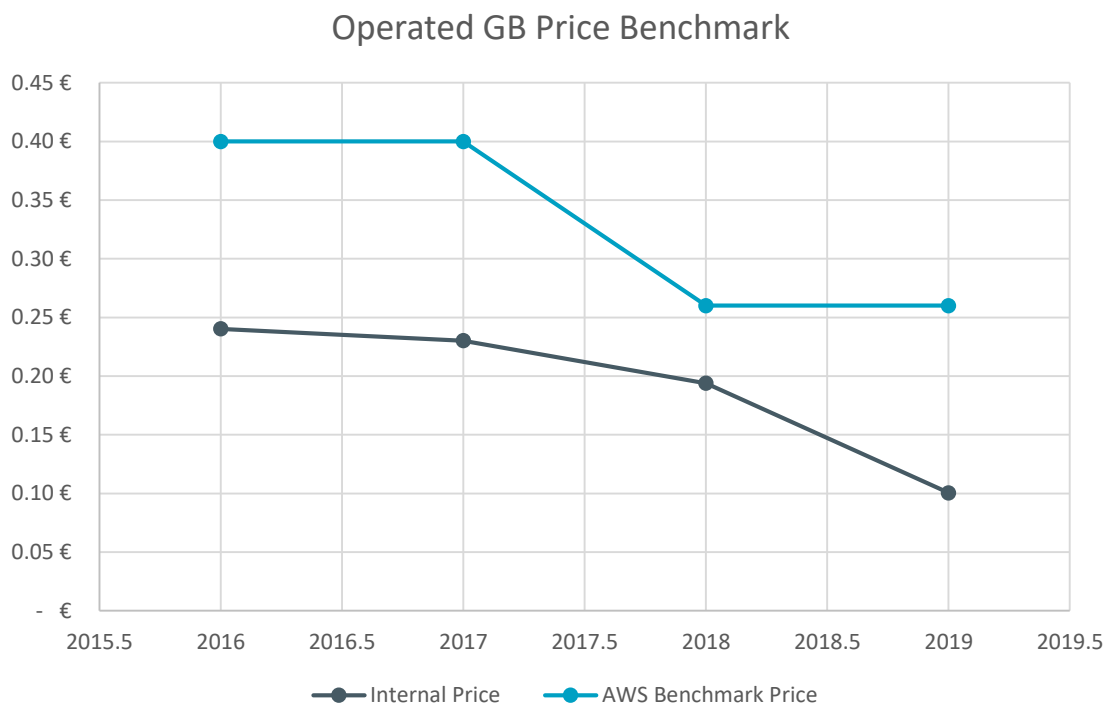

HAHN Automation
File growth 90%

HAHN overall growth 61%

HAHN backup growth 40%

Efficiency targets with

63% deduplication

and on top

21% compression

Q2 2018 Major Release Upgrade
Q4 2018 Storage Extension

Intel reference growth 40%
Gartner reference growth 63%

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True Assessment

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Eliminate Blind Spots

Real vs. felt Needs

Everybody plans with a safety margin

Stakeholders identify themselves by ressource importace

Consultants consult on their Home Turf

	A	B	C	D	E	F
1	Storage Pool	Faktoren	Bestand	2016	2017	2018
2						
3	jährliches Wachstum	63,00%				
4						
5	AMS		680, GB	1108,4 GB	1806,69 GB	2944,91 GB
6	AMS WEMO		240, GB	391,2 GB	637,66 GB	1039,38 GB
7	DBWORKS		300, GB	489, GB	797,07 GB	1299,22 GB
8	PDM			200, GB	326, GB	531,38 GB
9	Exchange		919, GB	1497,97 GB	2441,69 GB	3979,96 GB
10	LYNC DB		244, GB	397,72 GB	648,28 GB	1056,7 GB
11	EdgeCAM		50, GB	81,5 GB	132,85 GB	216,54 GB
12	Mailstore		900, GB	1467, GB	2391,21 GB	3897,67 GB
13	Ticket DBs		80, GB	130,4 GB	212,55 GB	346,46 GB
14						
15	Summe Storage hot		3413, GB	5[illegible]3,19 GB	9394, GB	15312,22 GB
16	Snapshot Quote hot	15,00%	511,95 GB	8[illegible]4,48 GB	1409,1 GB	2296,83 GB
17						
18						
19	Virtual Machines		3259, GB	5312,17 GB	8658,84 GB	14113,9 GB
20	VMs Legacy		202, GB	329,26 GB	536,69 GB	874,81 GB
21						
22						
23	File CAD		5050, GB	[illegible]231,5 GB	13417,35 GB	21870,27 GB
24	File Migration RH		1980, GB	3[illegible]27,4 GB	5260,66 GB	8574,88 GB
25	File Projekte		2920, GB	4[illegible]59,6 GB	7758,15 GB	12645,78 GB
26	File Infrastruktur		1600, GB	[illegible]2608, GB	4251,04 GB	6929,2 GB
27	File FTP Transfer		[illegible]	260,8 GB	425,1 GB	692,92 GB
28	File Userdaten		800, GB	1304, GB	2125,52 GB	3464,6 GB

Hot

80% Cold

Example Solution Benchmark

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	Solution A	Solution B	Solution C	Solution D	Solution E	Solution F
Server Type	Blades	Rackmount	Rackmount	Rackmount	Rackmount	Rackmount
Platform Architecture	Software Defined	Software Defined	Software Defined	Appliance	Software Defined	Software Defined
Storage Control	Nexenta	Nexenta	Nexenta	Nutanix	VMWare VSAN	VMWare VSAN
VM Control	vCenter	vCenter	vCenter	Prism	vCenter	vCenter
Scalability	Scale Up, Scale Out 2022	Scale Up, Scale Out	Scale Up, Scale Out	Scale out	Scale Out	Scale out
VM capacity	1613 GB	1782 GB	1434 GB	1000 GB	2355 GB	2355 GB
VM price	0,85 €/GB	1,09 €/GB	1,08 €/GB	2,47 €/GB	3,45 €/GB	2,76 €/GB
Usable Storage	190 TB	190 TB	337 TB	94 TB	213 TB	179 TB
Storage price	0,01 €/GB	0,01 €/GB	0,03 €/GB	0,17 €/GB	0,04 €/GB	0,04 €/GB
Building Block	254.833,20 €	234.069,20 €	263.711,00 €	359.777,00 €	817.224,82 €	706.401,68 €

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SD vs. Cloud Cost Benchmark

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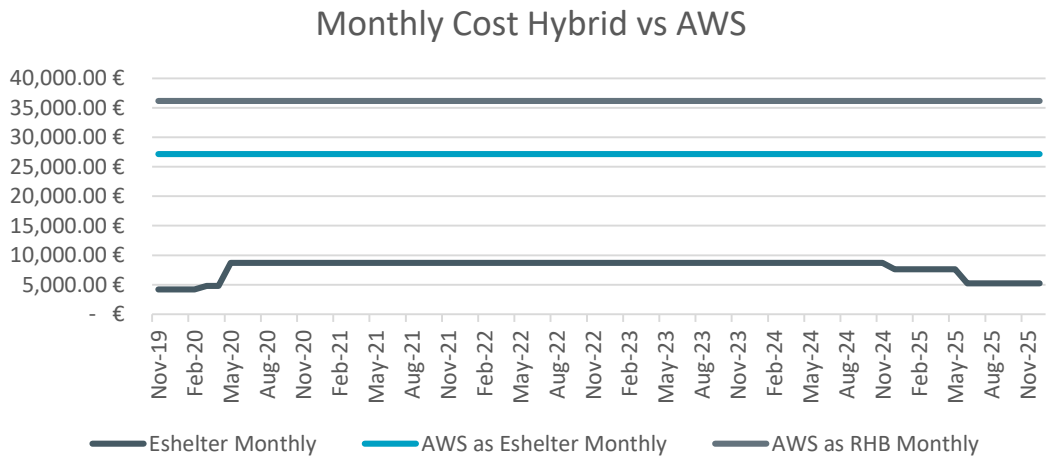

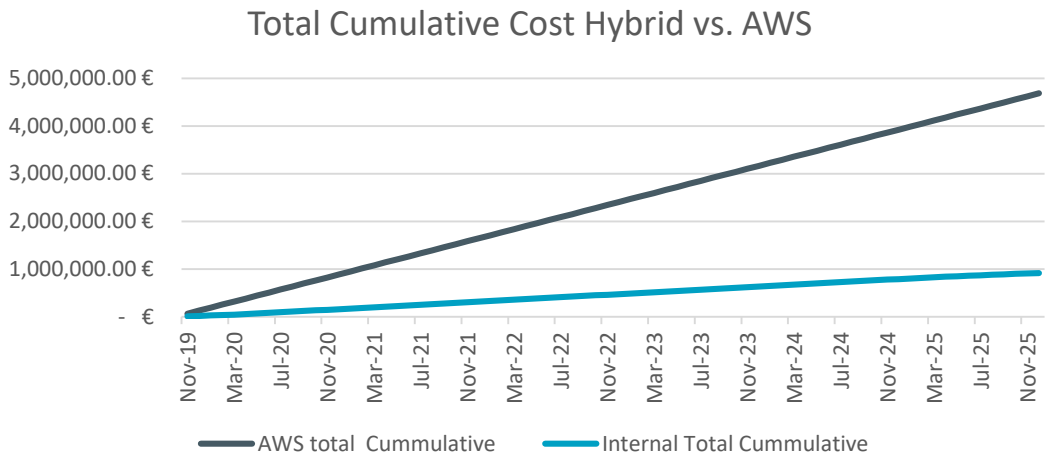

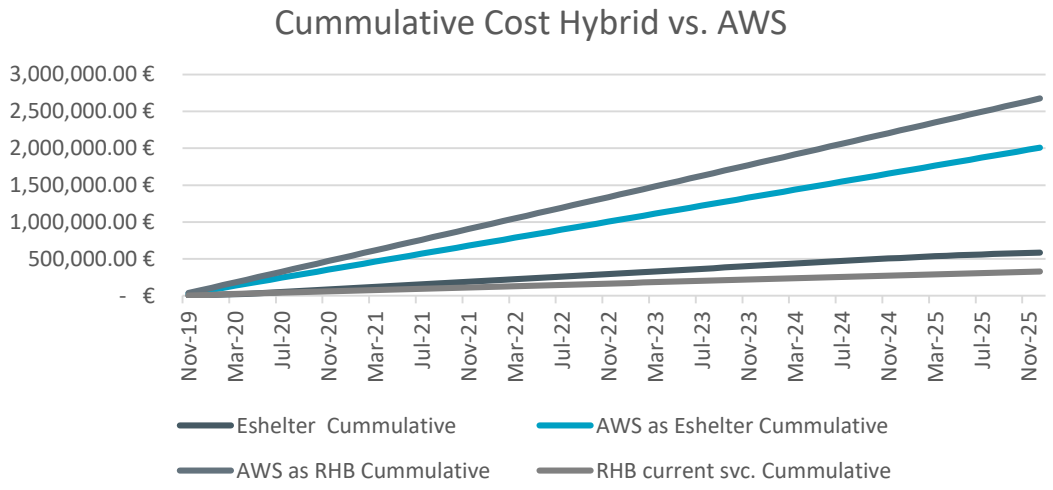

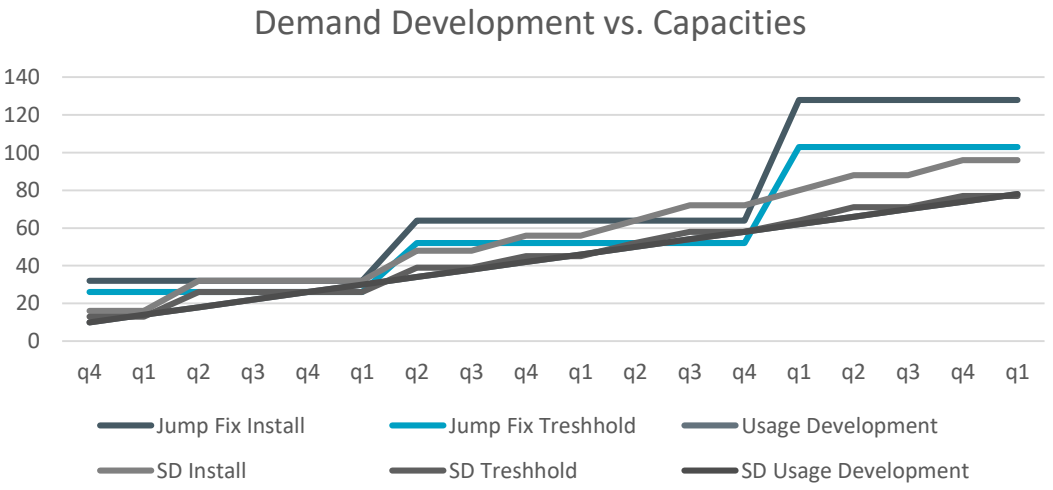

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Translate
to
Strategy

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What says Gartner?

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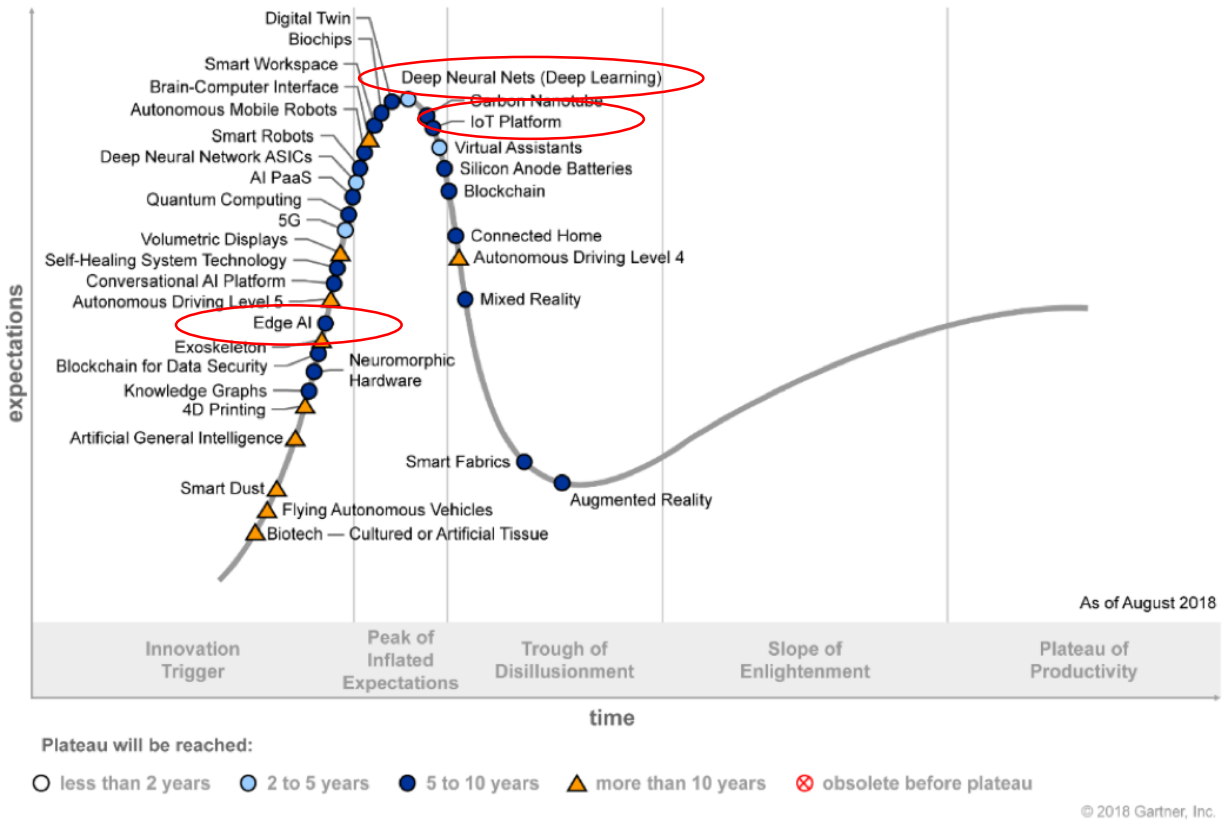
2018



2014

Software Defined Everything (SDx)

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Software fefined

≠ cloud washing ?

Extend Virtualization concepts as abstraction, pooling, automation and provide All Resources virtualized

Management and Automation software, enable provisioning, control and management of all components

From en.wikipedia on software defined datacenter

Service Cost Development

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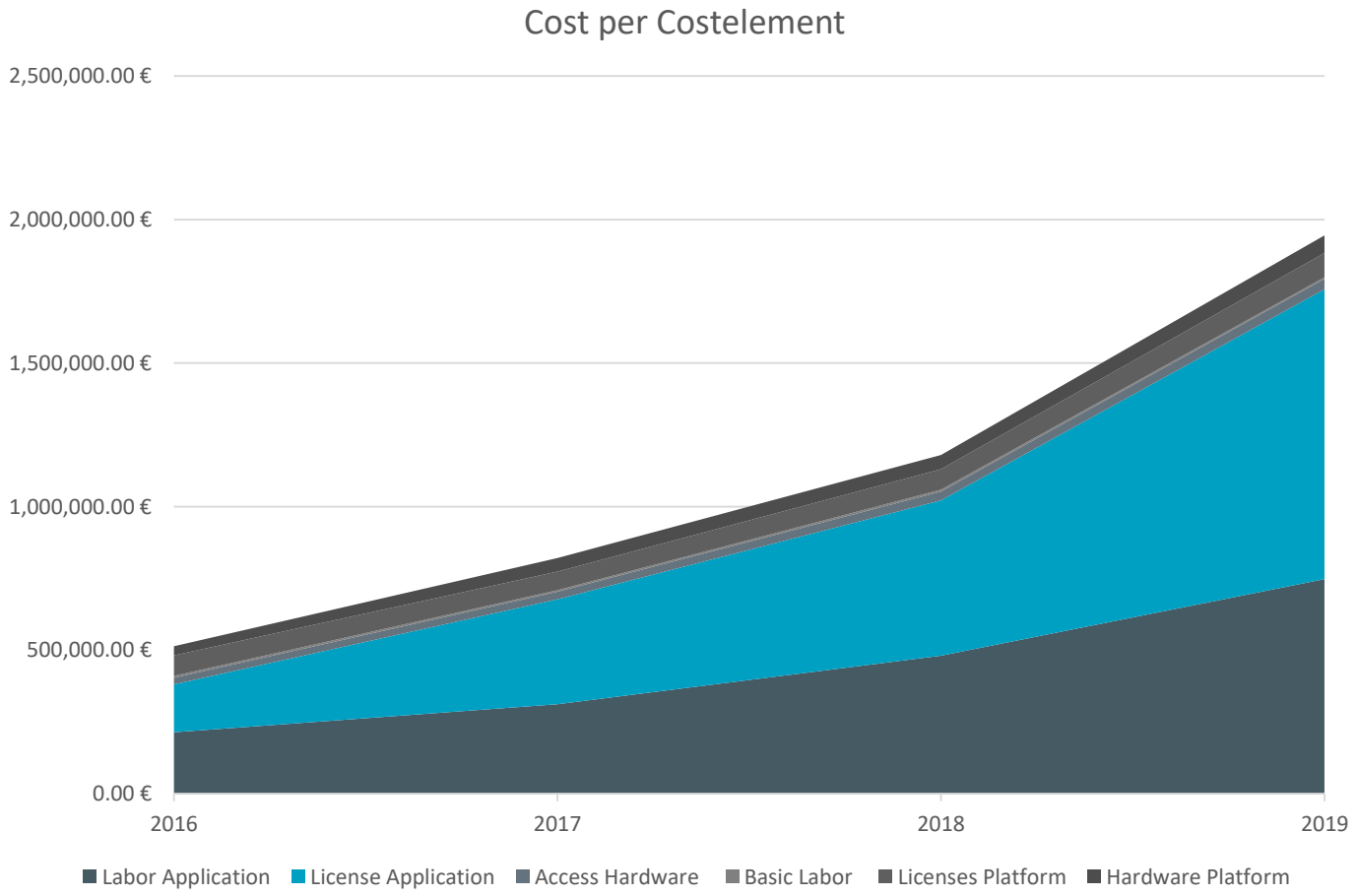
Review of the Available Service Dataset Within HAHN Group



Automatized

Infrastructure

Corridor is Stable

Application

Maintenance and

Operation needs to be

Automatized

On Premise vs. Cloud

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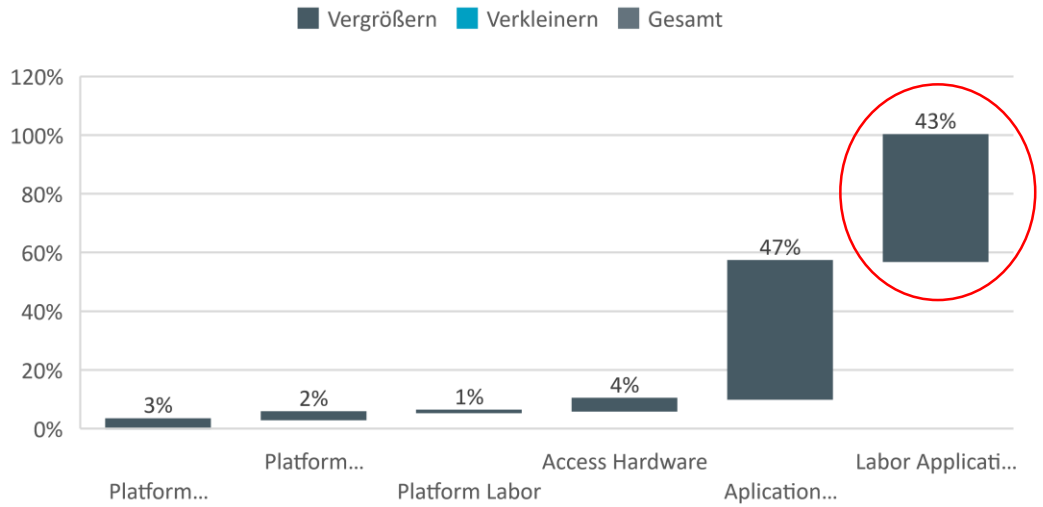
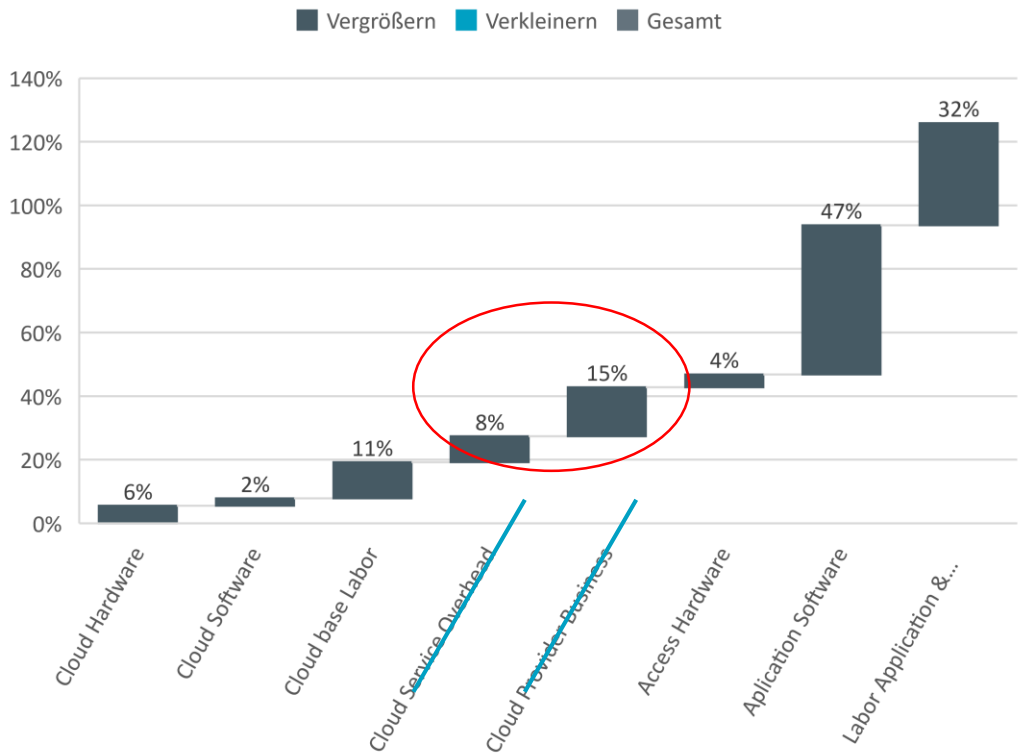
On Premise Operations*



* Based on 2018 internal service charges

Total of 1.1 M€ vs. est. 1.4 M€

Cloud Operations**



Optimization with

Standardization and

Service Automation

Service Cost Development

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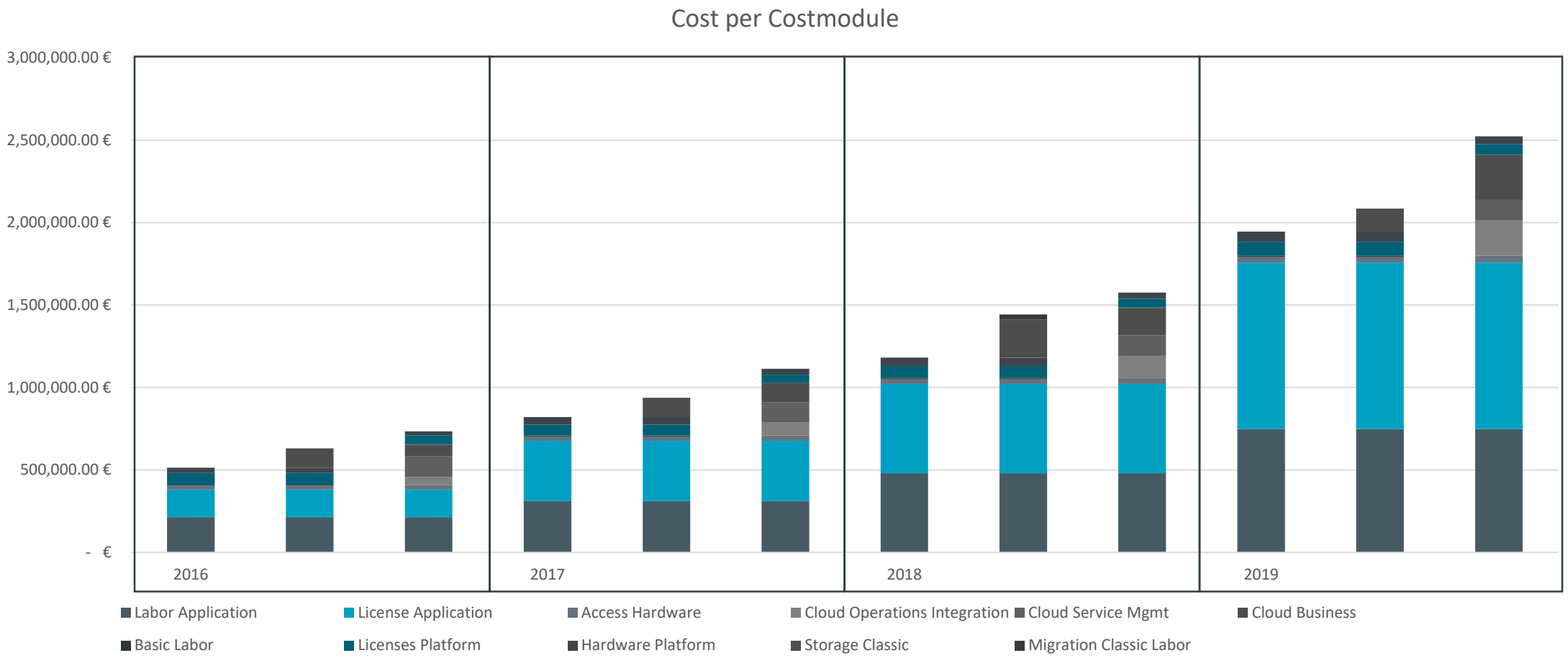
Software Defined vs. Classic vs. Cloud



Software Defined Architecture

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Monitoring

Operations

Orchestration !!!

Running Services

Provisioning

Virtual Servers

Virtual Applications

Virtual Cients

Ressource Pooling

Virtualization

Compute

Storage

Network – LAN & WAN

World of Software Definition

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Product World

- Operations: vRealize, MS SC Ops, BMC CLCM, Microfocus ServiceNow
- Storage: Falcon Store, Data Core, Nexenta, vSAN, OntapEdge, HPE VSA
- Platform: vSphere, HyperV
- RollOut: MS SCCM
- Network: VMWare NSX, Cisco Nexus 1000v, Riverbed, Arista, Cisco ACI, Netscaler
- Security: ClearPass, Palo Alto VM Series
- “Hyperconverged”: Nutanix, Simplivity, Pernix
- Client: Citrix XenApp
- Orchestration: Terraform, BMC CLCM

Open Source

- Operations: i-doit, ipam, OTRS, request tracker
- Storage: FreeNAS, Ceph, Lustre
- Platform: KVM, Vagrant
- Network: OpenFlow, OpenVPN
- Orchestration: Ansible, Vagrant, Puppet
- Container: Docker, Kubernetes
- Integrated Stack: OpenStack

Operations Software Stack @ HAHN

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SD !!!

Act

Plan

Operational Dashboard

OTRS process engine

Grafana | Tensor Flow | Caffe2 | R | Capacitor

Postgress | Icinga Web 2 | Elastic Search | InfluxDB

Nagios 2 | LogStash / Kibana | S/N-Flow | Telegraf

Smoke Ping | SSH | CACTI | vSphere vCenter | Nexenta Fusion

SNMP | XenApp | vSwitch | vSphere ESXi | Nexenta Stor

Network | Virtual Connect | Server Ressources | ILO 4/5 | Storage Ressources

IPAM | Go Lang | Perl

Ansible | PVS | MS SCCM

Vagrant | Power Shell

Linux | Windows Server

Appliances | Virtual machines

Hardware

Check

OnCommand

Image Streaming

Scripting & REST APIs

Do

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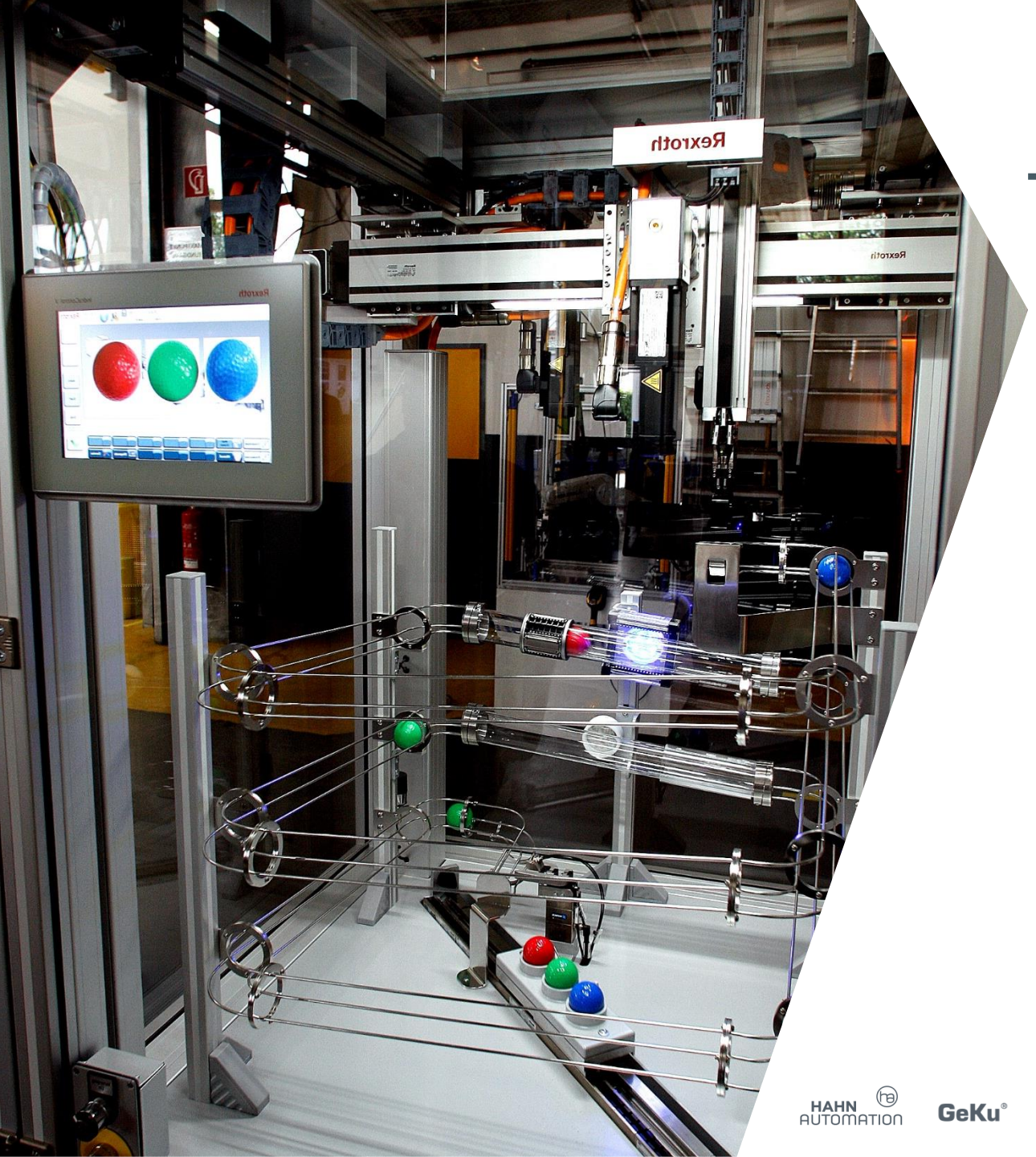

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Knowledge
becomes
Code

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Conclusion

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Growth & Agility is a must

Software Definition

is a 25+ year Evolution

Ressource Abstraction is ubiquitious

Economy resides in Scale, technical

Optimization and Standardization

Frank Benke
Head of IT
f.benke@hahn.group

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Business Enablement IT Services

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Translate business requirements in permanent IT processes

Application platform for business growth

True usage assessment with requirement classification

Growth estimates long term on

statistics, business plans and market research

Platform architecture on horizontal and vertical growth strategies

Sizing downscaled on current need plus 2 years

Automatisation efforts on volume tasks

Eliminate step cost

HAHN Group IT Locations and Integration Levels

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High		Medium		Low	
HAHN Automation DE	Tennant	HAHN Automation R&D	M	HAHN Automation CH	S 2020
HAHN Automation US	M	HAHN Automation CN	L 2019/2020	HAHN Automation TR	S 2020
HAHN Automation HR	S	HAHN Automation MX	M	Waldorf Technik DE (s.a.)	Si.App.
HAHN Automation UK	M & S	WEMO DE	Tennant 2019	Kitov ISR (s.a.)	Si.App.
HAHN Automation CZ	M+	WEMO SE	L 2020	Rethink US	Legacy Infra.
GeKu DE	M+	Invotec DE	S-	Tbd. US	Si.App
HAHN Group	L+ & M 2020	Walther	M 2019	Tbd. US	Si.App
HAHN Robotics DE	Tennant	HAHN Automation CH	S 2020		
HAHN RobShare DE	Tennant	HAHN Plastics US	S		
HAHN Digital DE	Tennant	Invotec US	L 2019 & S 2019		
Rethink DE	Tennant & M 2019	HAHN Robotics BE	S 2019		
HAHN Robotics Nord DE	Tennant	DFT Maschinenbau AT	L 2020		

Tendency

Standardization of local Infrastructure and Application Service Set

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Transform IT to Software Definition

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Identify Fileds of Action

Act
- Adjustments
- Automatic Response
- Platform **Optimization**

Plan
- **Create Transparency**
- Analyze
- Built Categories
- Simulate

Do
- Standardize
- **Automate**
- Implement Scalable Solutions

Check
- Monitoring
- **Machine Learning**
- Review Target Parameters

Use State of The Art Technogy

Abstraction of Technology

Break Dependencies

Skip Vendor Lock In

Challenge any Assumption

Simulate unlikely Scenarios

Plan Big – Scale Down

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Software Defined Everything (SDx)

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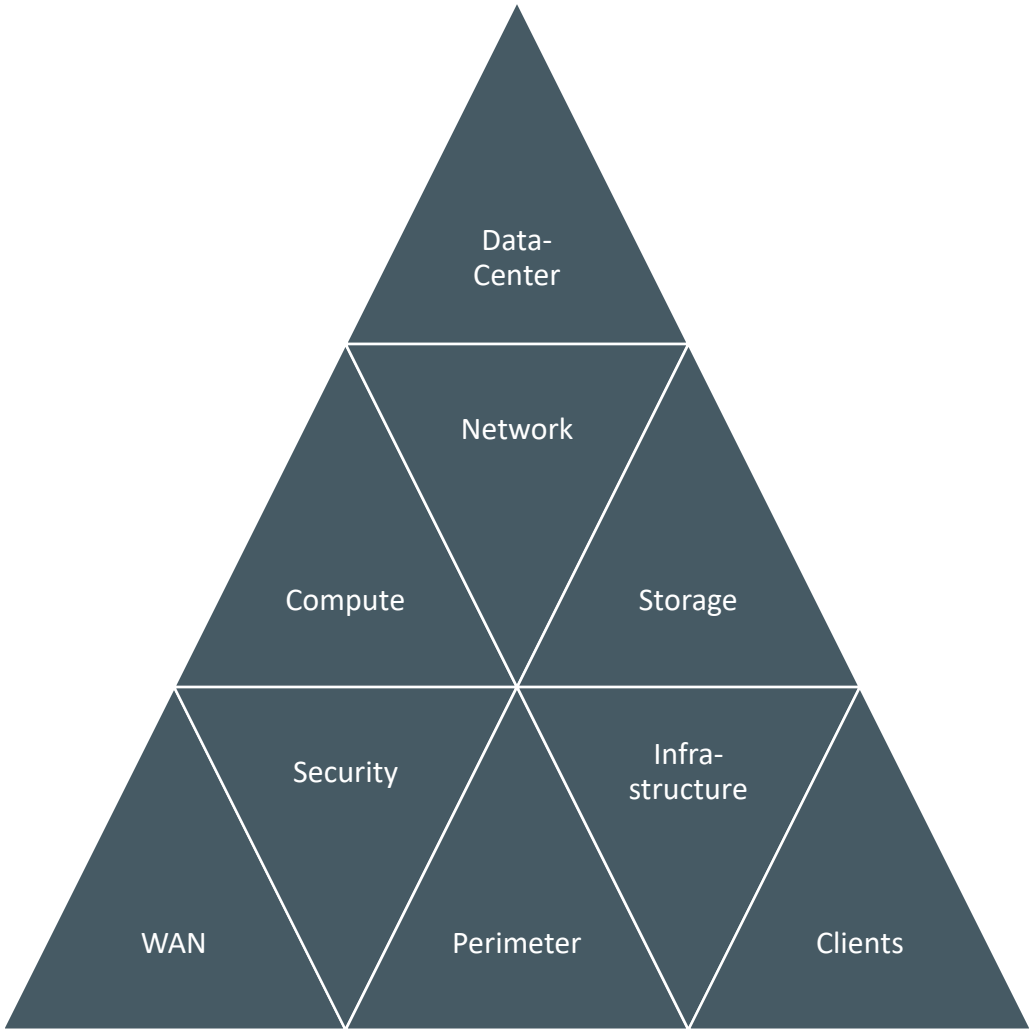

Software defined

≠ cloud washing ?

Extend Virtualization concepts as abstraction, pooling, automation and provide **All Resources** virtualized

Management and **Automation** software, enable provisioning, control and management of all components

From en.wikipedia on software defined datacenter

Conclusion

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CAP- Theorem guarantees for only two of the three traits

Growth will happen and Agility is a must & Traditional approaches limit options for both

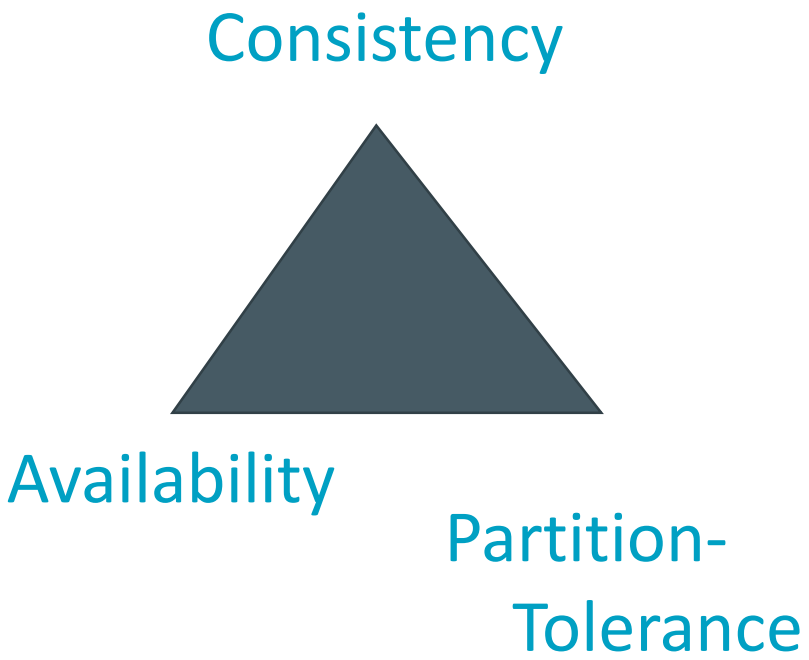
Software Definition is a 25+ year Evolution

Ressource Abstraction is ubiquitious

Cloud technology is nothing but Software Definition

No reason not to utilize SDx self hosted

Economy resides in Scale, technical Optimization and Standardization



CAP Brewer- 2000 UCB – Proof 2002, Gilbert/Lynch, MIT

Public Reading

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Selection of Inspiration:

- https://code.fb.com/
- https://medium.com/netflix-techblog
- https://developers.googleblog.com/
- https://www.blog.google/inside-google/infrastructure/
- Site Reliability Engineering, Murphy/Beyer et.al., 2016, O‘Reilly Media
- Qcon Talk „A Netflix Guide to Microservices“https://www.youtube.com/watch?v=CZ3wIuvmHeM&t=373s