

Platform Economics Premise vs. Cloud

Q3 2023 - Frank Benke

AGENDA

1. SETTING THE STAGE
INTRODUCE HAHN AUTOMATION GROUP
2. SETTING THE REFERENCE
INTRODUCING QUICK SUMMARIES OF IT SIZE
3. COST ANALYSIS 2022
4. COST REVIEW 2016 TO 2022
5. LIVEOPTICS
CLOUD PLATFORM COST ASSESSMENT
6. PREMISE VS. CLOUD ARCHITECTURE
EVALUATE COMPLEXITY
7. ESTIMATE ADDITIONAL CLOUD COST
8. CONCLUSIONS



FRANK BENKE
HEAD OF IT

COMPUTER SCIENCE
UNIVERSITY TÜBINGEN

SINCE 1994 IN IT BUSINESS
ENTIRE SUPPLY CHAIN

- HEWLETT-PACKARD (1994)
- CERTIFICATION & TRAINING
- SUPPLIER
- MAGENTA SERVICE PROVIDER
- FINALLY END CUSTOMER (2014)



THE COMPANY





9 Countries

3 Continents

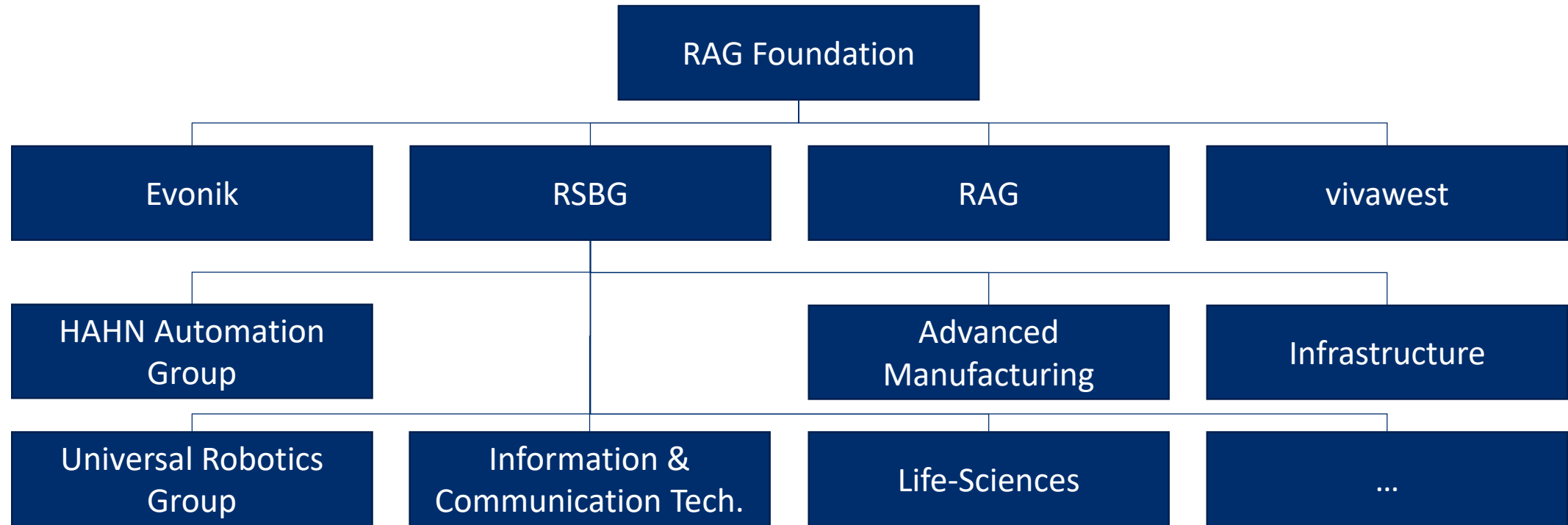
1800 Employees

23 Locations

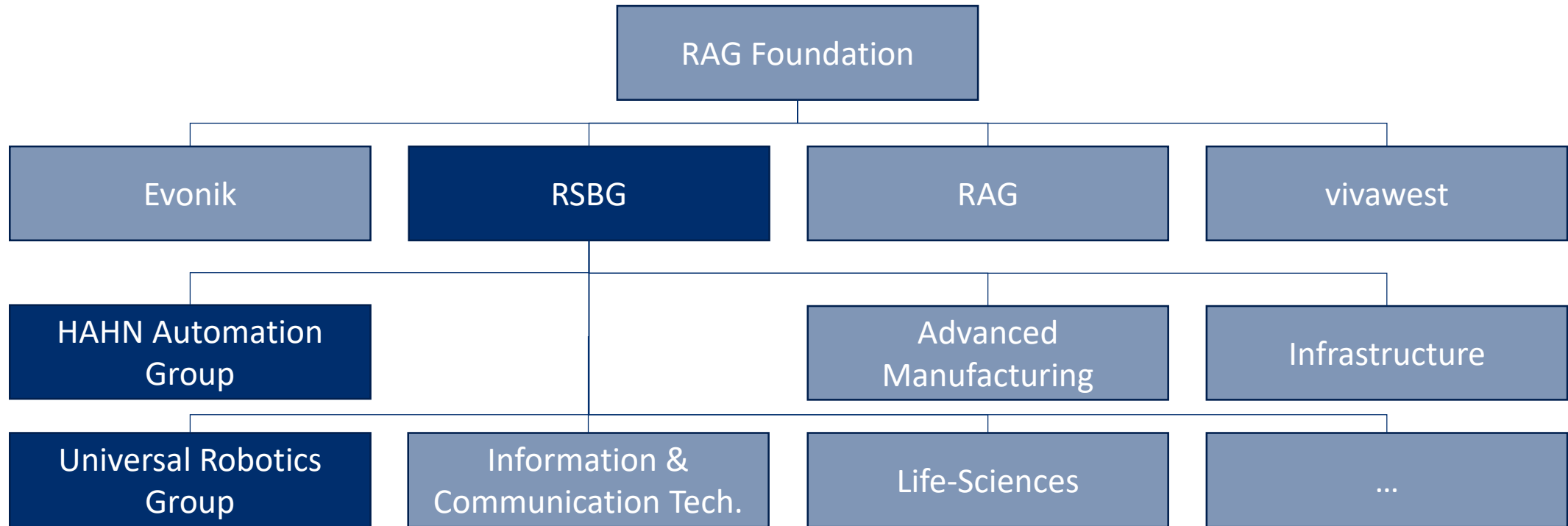
ca. 28% p.a. growth pre corona

> 250 MEUR Revenue

OWNER ECOSYSTEM



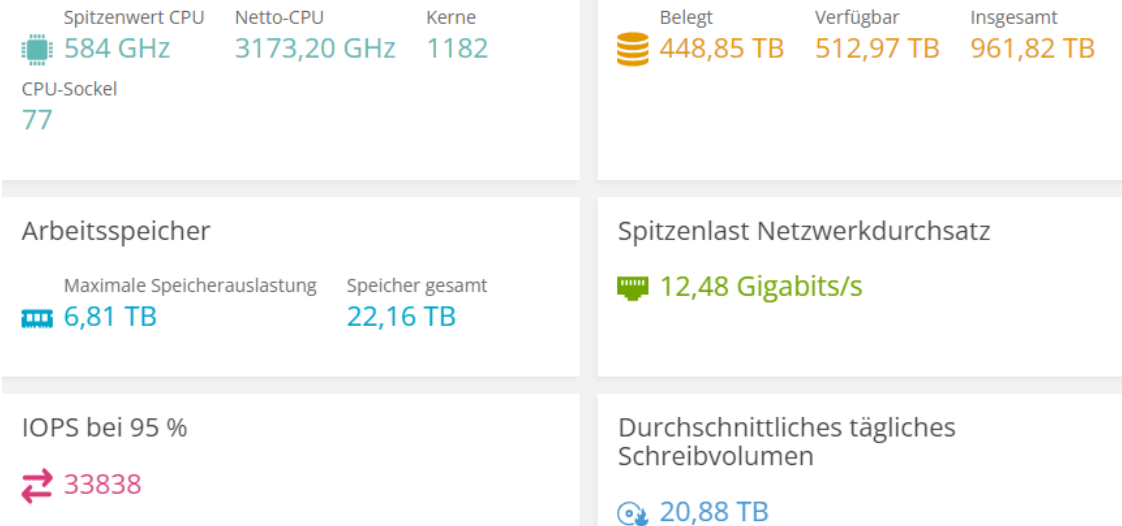
OWNER ECOSYSTEM – DELIVERING IT SERVICES



THE IT SYSTEM ENVIRONMENT

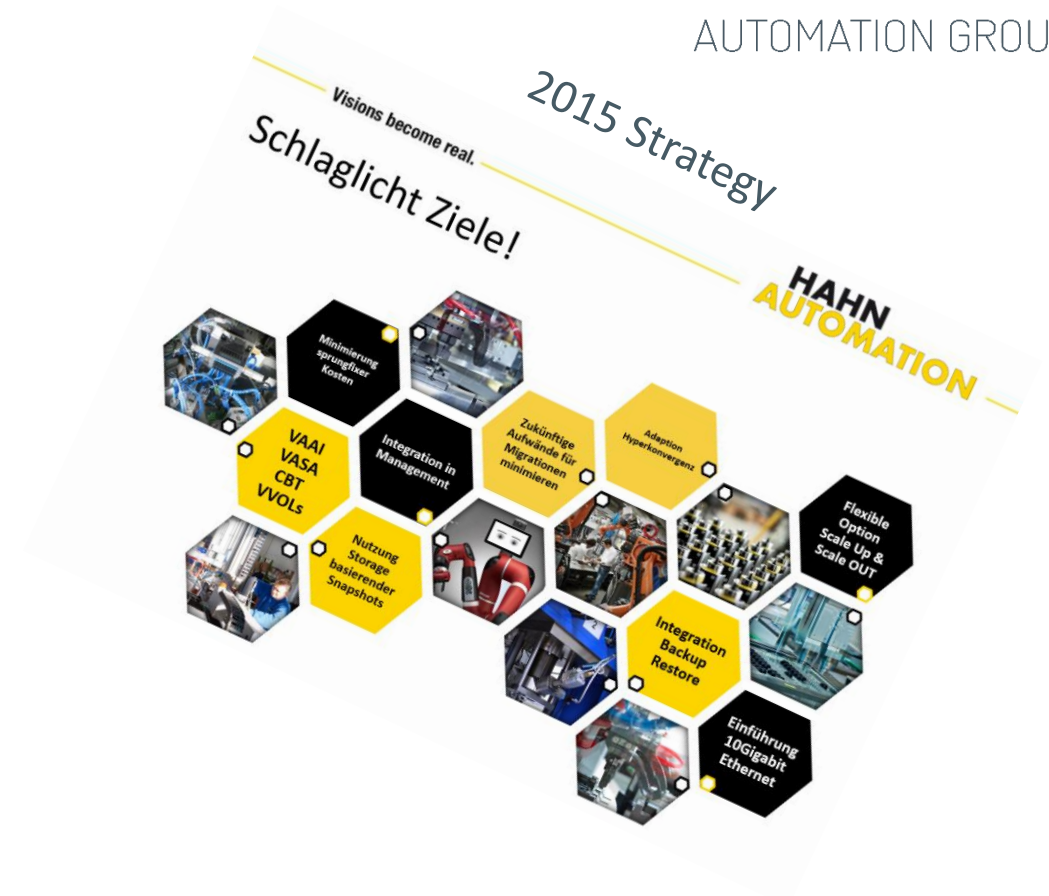
- Self hosted and self operated
 - Global unified service catalogue
 - 100% Transparent Tennant Cost ... (;O/)
 - 100% Virtualized
 - Global Virtual Clients
 - Integrated Communications
-
- 30 TB Main Memory Server Capacity
 - 6 PB Installed Self Optimizing Storage Capacity
 - 160 GB Network Ring

VMWARE ONLY:



OPERATIONAL IT STRATEGY

- 2014 Standardization
- 2015 Software Defined
- 2015 Hyperconvergence
- 2016 Generalized Infrastructure
- 2017 Strategic Vendor & Supplier Management
- 2018 Automation
- 2019 „Site Reliability Engineering“
- 2020 AMD & Single Socket
- 2021 Virtual Engineering Private Cloud
- 2022 Dokumentation & Monitoring & Automation Integration
- 2023 Exception Elimination & Further Standardization

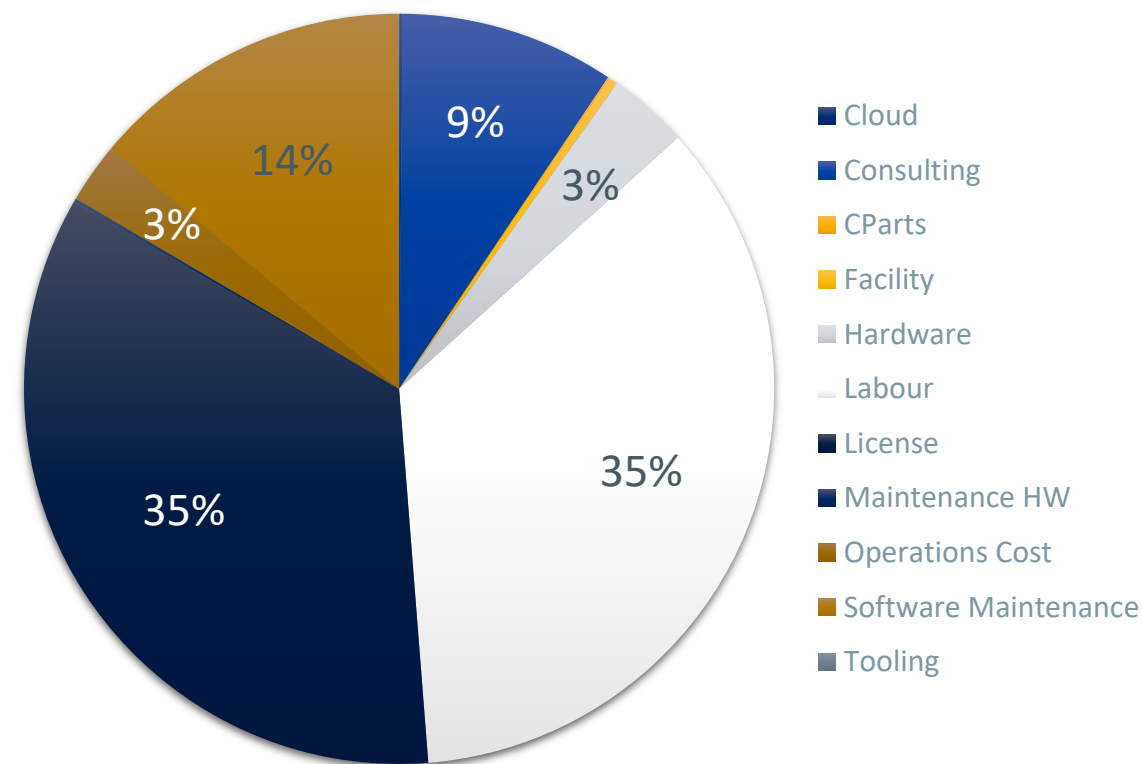


NUMBERCRUNCHING STATUS QUO ON PREMISE



IT COST DISTRIBUTION 2022

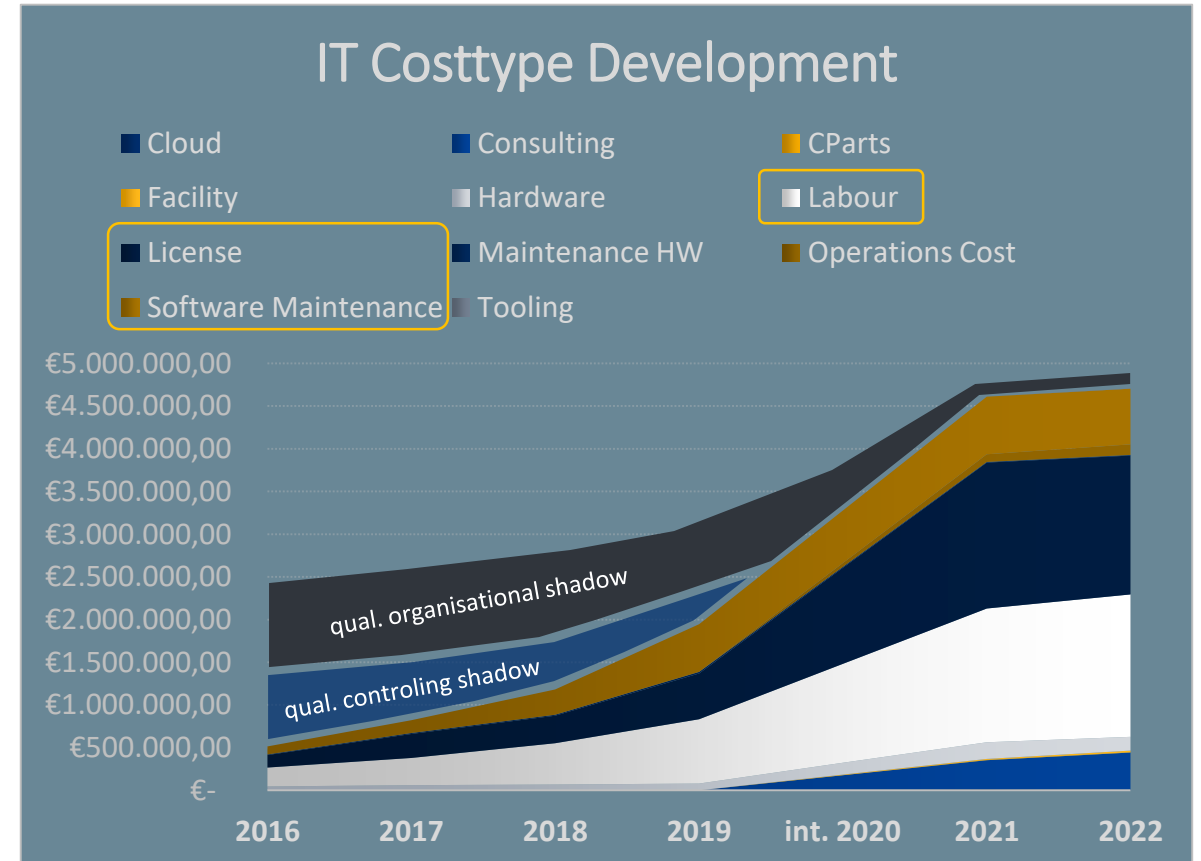
- Overall budget analyzed in 2022 is 4.7 MEUR
- Data derived from internal service calculation*
- Budget is software heavy with 49%
- Labour is second with 35%, 44% including consulting
- Hardware is 3%
- Other operational cost is 3%
- Excluded clients and peripheral devices
- Excluded missing updates



*excluding some cost, to eliminate overlap with hourly rates from labour packet calculation

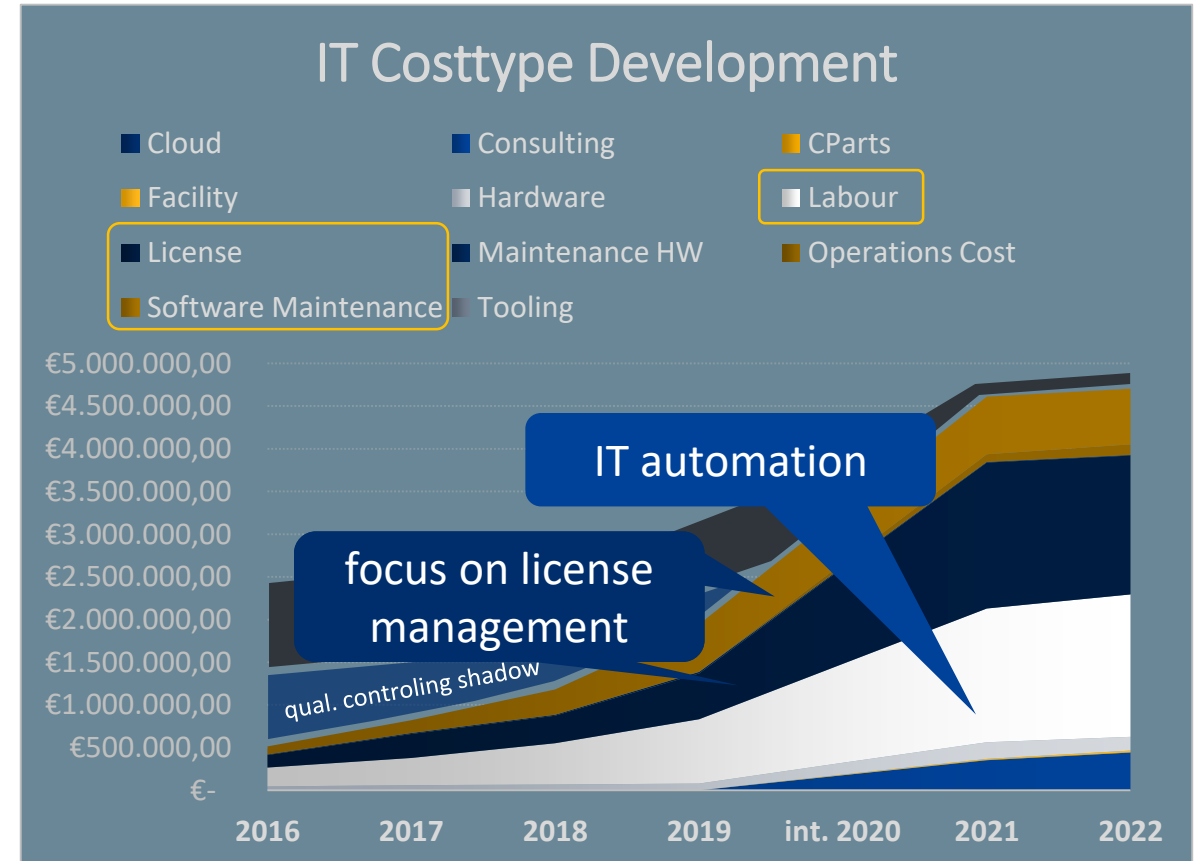
SEVEN YEAR COST DEVELOPMENT

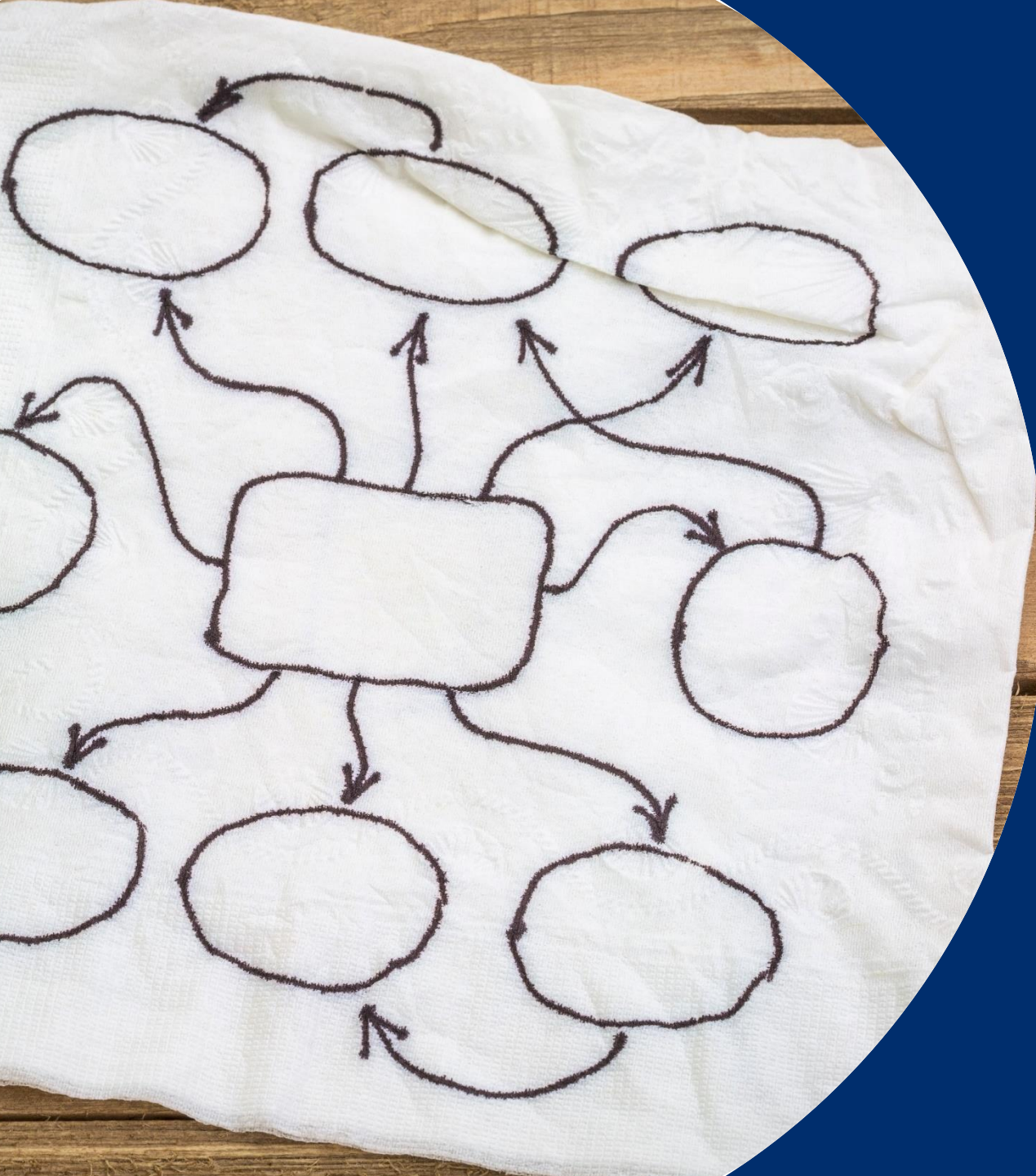
- 2020 interpolated due to missing data
- 2021 & 2022 data from internal service price calculation
- Data before 2020 from shadow bookkeeping
 - Without coverage of business applications
 - Match of „old“ cost types to current ones
- Include organic & anorganic growth
- Hardware & operational cost vanish
- Outtasking & consulting can be neglected



SEVEN YEAR COST DEVELOPMENT - CONCLUSION

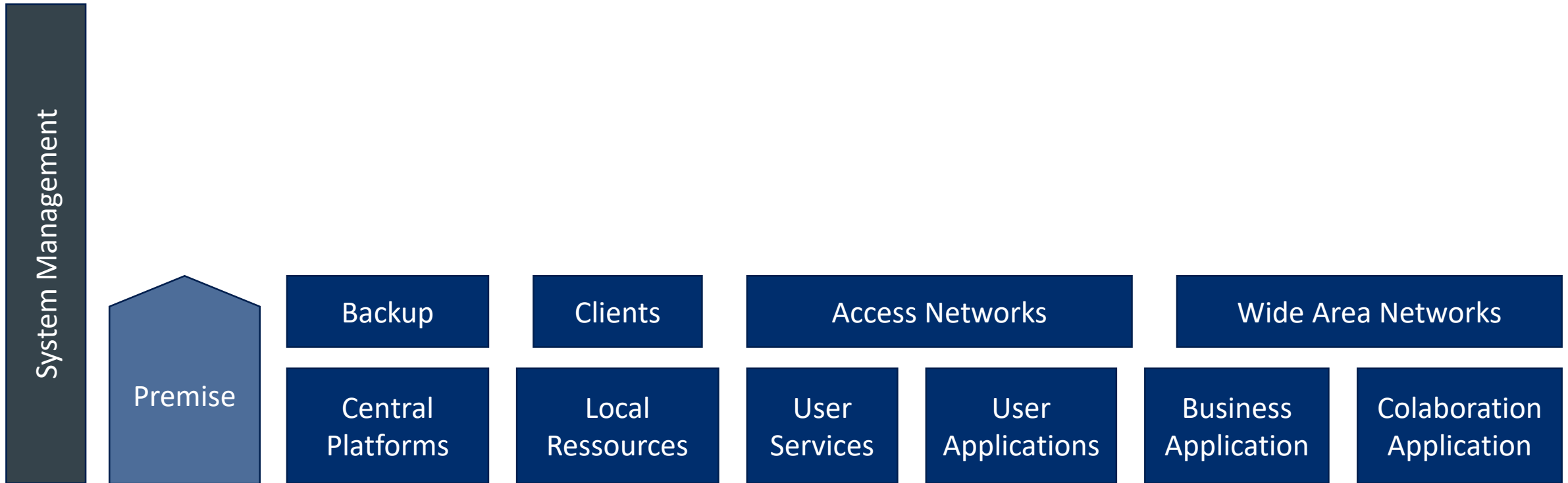
- Software is #1 cost driver
- Increasing complexity & security
 - Increasing workload
 - Cloud pushes this tendency
- Continue IT automatization projects
- Intensify license management
- IT automation uses cloud technologies
≠ migrate to the cloud



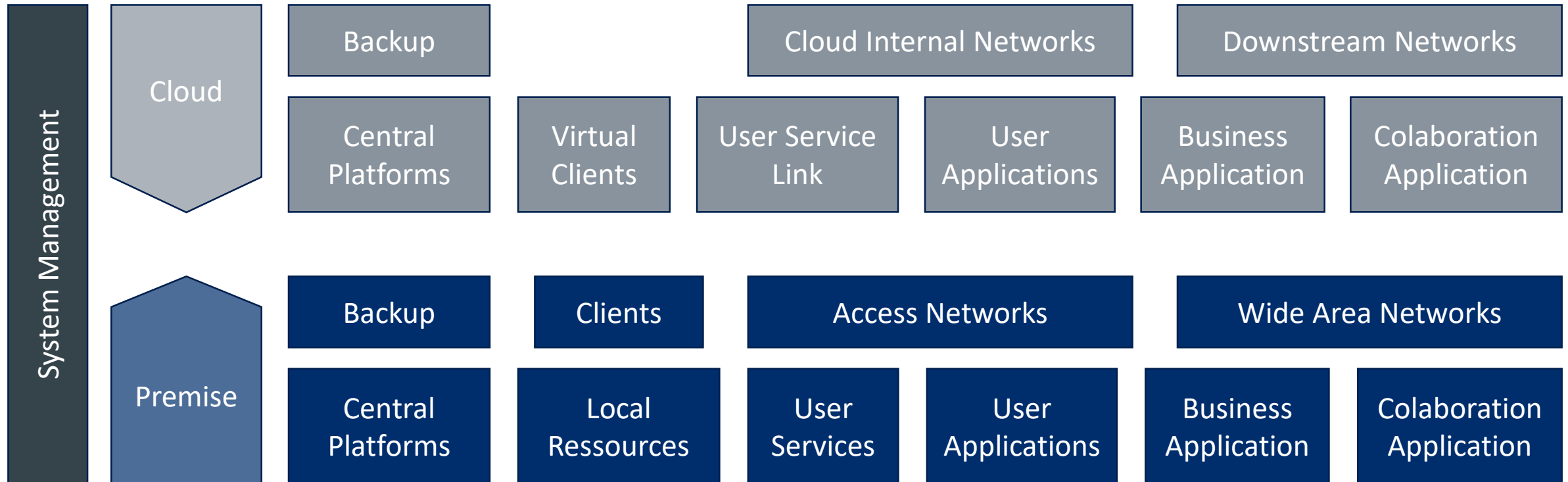


CONCEPTUAL CONSIDERATIONS

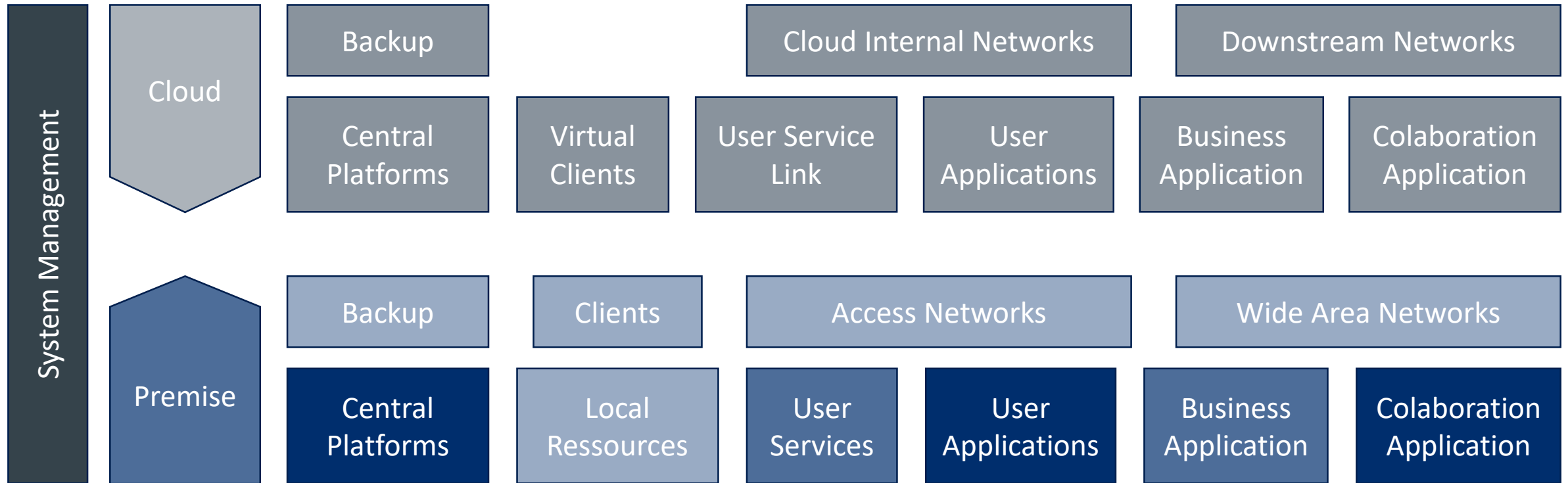
ARCHITECTURAL ELEMENTS PREMISE



ARCHITECTURAL ELEMENTS CLOUD

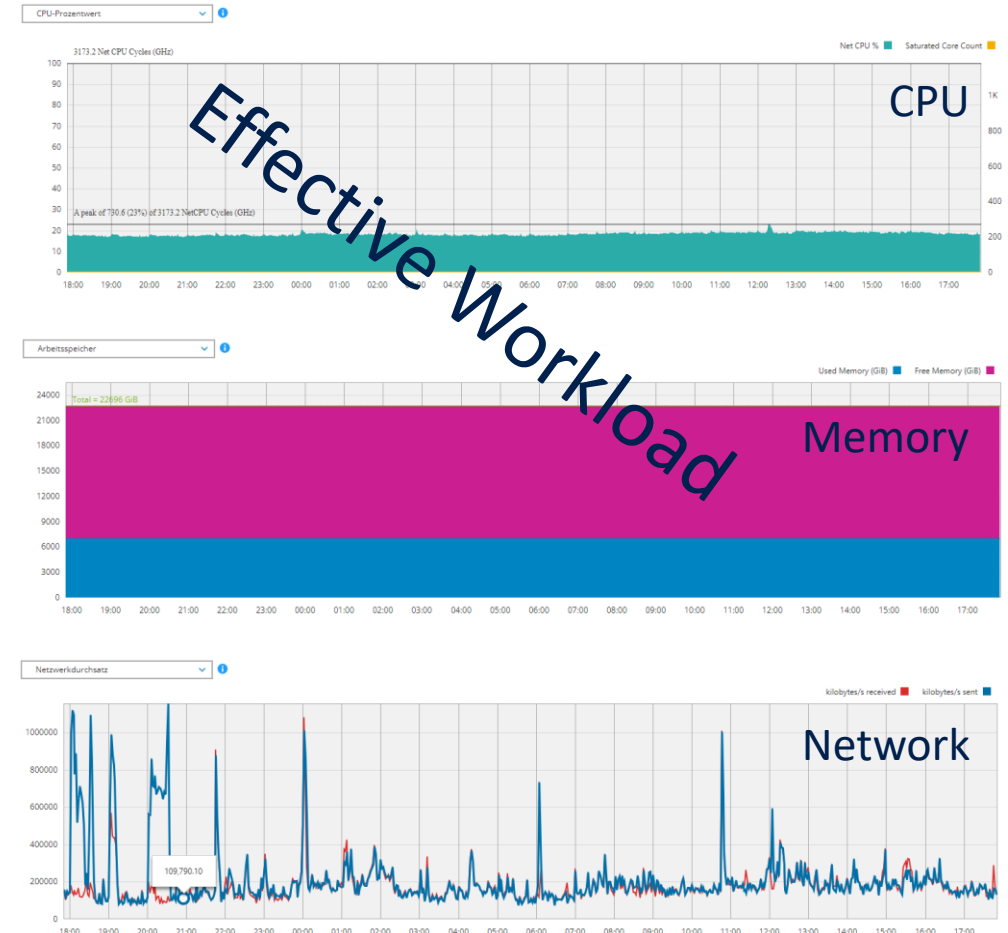


SAVING ELEMENTS



BUSINESS AND WORKLOAD CONSIDERATIONS

- Individual engineering is data heavy
- Data locality is extremely important
- Workflows are latency sensitive
- Customers require immediate integration
- Global synchronization is essential
- Mechanical industry IT budgets are „constant“*
- Workloads are extremely constant
- Network demands are volatile and high
- Identify baseline workloads

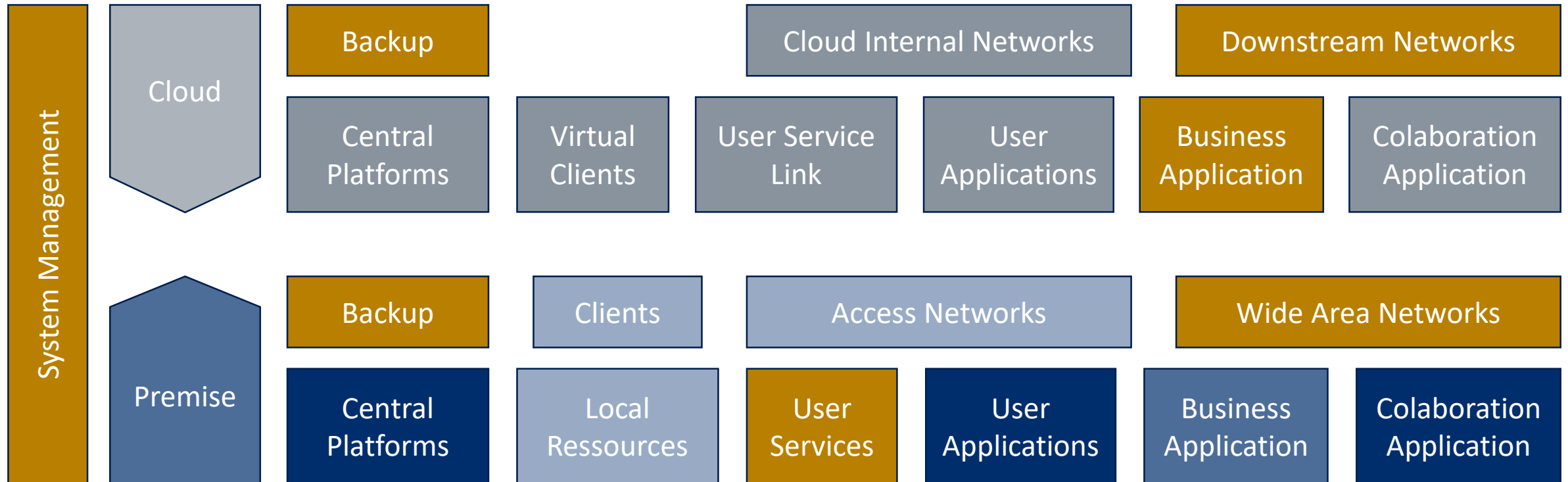


* In relation to revenue – according to VDMA 2% in average

WORKLOADS CAN BE DIFFERENT



INCREASING COMPLEXITY



CLOUD COSTING



CLOUD COST OF CURRENT OPERATIONS



Monthly Public Cloud Pricing Comparison

All running VMs have been priced across all three public cloud providers. This is the comparative monthly cost at a 1 year commitment pricing discount.



- Compares only platform cost
 - Storage
 - Main Memory
 - CPU
- Need for cloud use case architecture
 - Result in additional sizings
- Cloud cost not covered:
 - User licensing & multi geo tenant
 - Downstream traffic
 - Data access & touch
 - Cross platform communication
 - Additional licence requirements

ADDITIONAL CLOUD COST

- Extend operations software (Backup)
- Consulting on business continuity
- Downstream traffic
- Geo- Tennancy
- Cross geography in cloud traffic
- Data access and touch
- Additional security tools and complexity
- Compliance requirements and audits



Monthly Public Cloud Pricing Comparison

All running VMs have been priced across all three public cloud providers. This is the comparative monthly cost at a 1 year commitment pricing discount.

AWS

\$416,521

Azure

\$383,805

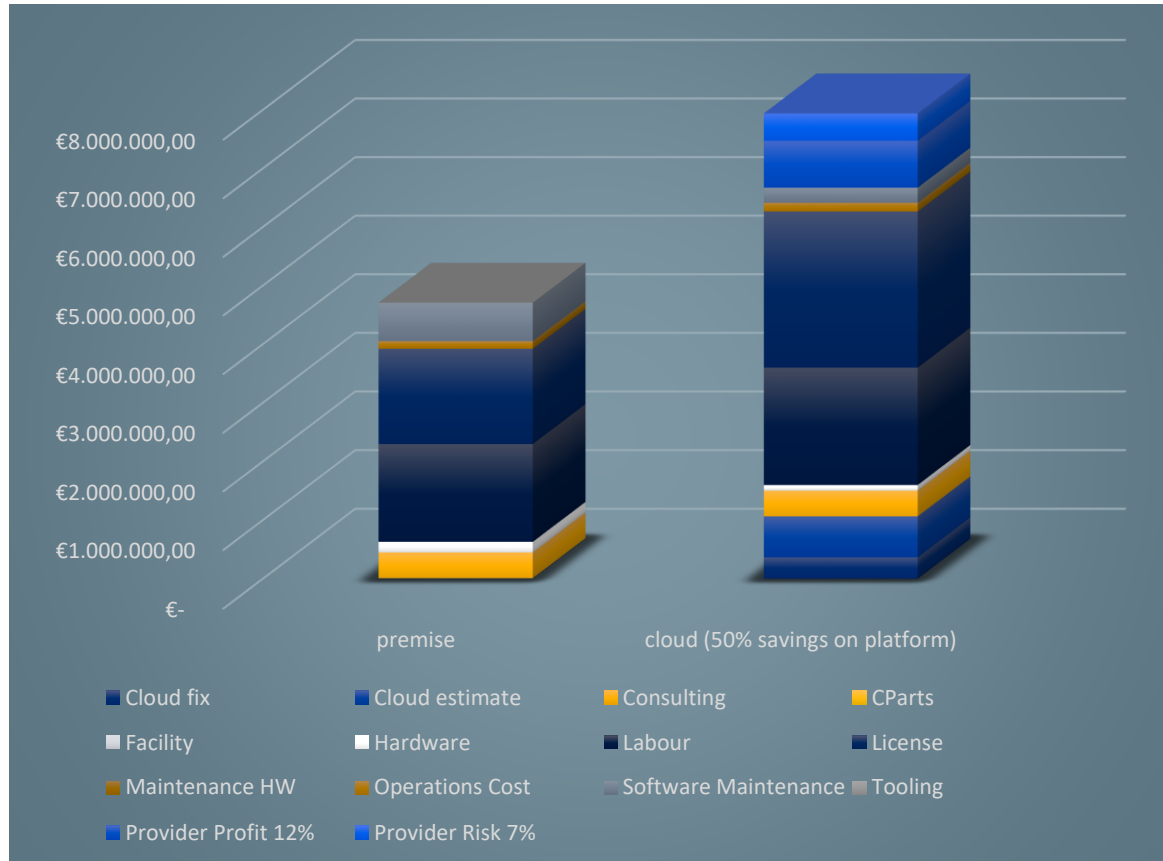
Google

\$304,571

VMs
only



CLOUD COST SIMULATION*



- Assume 50% spare on platform
- Take cloud reference pricing from live optics (23.08.23)
- Consider 30% Azure price increase in Q4'22/Q1'23
- Eliminate EA maintenance prices
- Consider cloud provider economic goals (experience)
- Known IO pricings
- Estimates on network traffic based on current traffic
- Additional three FTEs on cloud policy management
- Budget rise to 7.937.100,- EUR – about 69%
- Business application improvements not measurable

PLATFORM CONSIDERATIONS



IT SERVICE & ARCHITECTURE

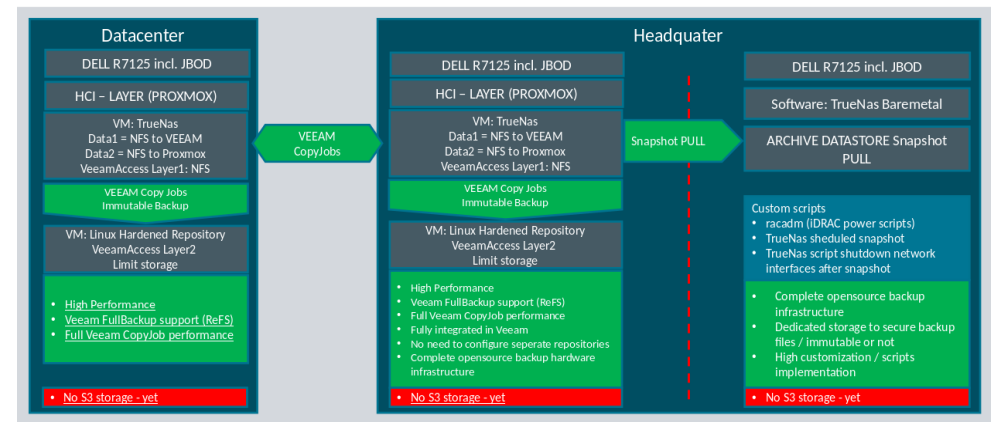
- Define IT service perspective
- Think in platforms
- Let go of single system perspective
- Match service cost to platform utilization
- Evaluate baseline workloads
- Consider platform „footprint“ for other services
- Extrapolate consumption development

SERVICE CATALOG

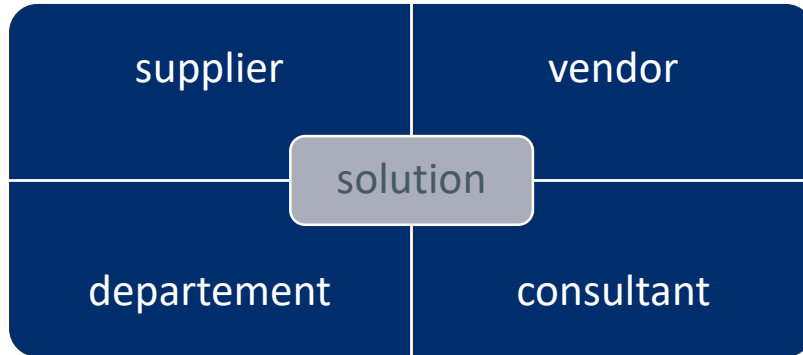
Workplace Services	Annual Charge	Application Services	Annual Charge
Digital Services User	390,- €	Controls user	990,- €
Integrated Communications & Collaboration User	159,- €	CRM Genesys user	990,- €
Digital Workplace non standard client	1050,- €	EPLAN user	2.650,- €
Digital Workplace standard client	630,- €	LabView user	individual charge
Citrix Office User	250,- €	Machining user	Individual charge
Citrix 3D User	990,- €	GAIN PDM user	1580,- €
		Solidworks user	1500,- €
		AMS ERP user	670,- €
		AMS Time user	280,- €
		Software Development user	950,- €
		Virtual Commissioning user	Individual charge

Technical Services	Annual Charge
Tenant - direct mapped storage	0,49 €/GB
Tenant - virtual machine	145,00 €/GB
Backup – location and tenant	0,65 €/GB
Central Fileservices	2,20 €/GB

SOLUTION DESIGN CORE TOPOLOGY DETAIL



BENCHMARKING



- Define building blocks
- Extrapolate platform demand
- Challenge on solutions
- Focus on persistent asset value
- Require horizontal & vertical scalability
- Simplify design
- Eliminate jump cost
- Decide on effective service price impact consider empty assets in pricing (80% rule)

Scoping 2015

Bedarfsabschätzung.

Max 10% hot data. Max 10.000 IOPS.

	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	1806,89 GB	2944,91 GB	
6 AMS WMSD		240, GB	391,2 GB	627,86 GB	1029,18 GB	
7 DBWORKS		300, GB	489, GB	792,87 GB	1289,22 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	648,38 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			130,4 GB	212,55 GB	346,46 GB	
14						
15 Summe Storage hot		3413, GB	563,19 GB	9394, GB	15312,22 GB	
16 Snapshot Quote hot	15,00%	511,95 GB	844,48 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	8231,9 GB	13417,35 GB	21870,27 GB	
24 File Migration RH		1980, GB	3227,4 GB	5205,66 GB	8574,88 GB	
25 File Projekte		2930, GB	4759,6 GB	7758,13 GB	12645,78 GB	
26 File Infrastruktur		1600, GB	2608, GB	4251,04 GB	6929,2 GB	
27 File FTP Transfer		700, GB	1120,8 GB	1813,3 GB	2921,92 GB	
28 File Userdaten		800, GB	1304, GB	2125,52 GB	3466,6 GB	

>70% File - cold data.
Service, non- archive.

- **Entscheidung für ein Konzept!**
- 10 Jahre Zeithorizont.
- Sizing auf 3 Jahre.
- Wachstum & zyklischer Tausch.
- Wachstumsprognose 40% bzw. 63%.
- Bestandsaufnahme Datenvolumen.
- Abschätzung projektierter Anwendungen.
- Klassifizierung von Anwendungen.
- Snapshot Quote „hot storage“ 15%.
- Snapshot Quote „cold storage“ 3%.
- Deduplizierungsgewinn File 30%.
- Kompressionsgewinn 8%.
- Kapazität in ca. 10 Jahren auf jeden Fall im Peta- Bereich.

EXAMPLE – FILE & STORAGE

Internal:

Technical Services	Annual Charge
Tenant - direct mapped storage	0,49 €/GB
Tenant - virtual machine	145,00 €/GB
Backup – location and tenant	0,65 €/GB
Central Fileservices	2,20 €/GB

Complete internal service stack

- including access traffic
- including all IOs and transactions needed
- including administrative support (labour)
- 350 GB – 770,-€ p.a.

All In

Azure*:

	Disk Size	Price per month
P1	4 GiB	€0.71
P2	8 GiB	€1.42
P3		€2.84
P4	32 GiB	€5.29



Transactions and data transfer	Premium	Transaction optimized
Write transactions (per 10,000)	Included	€0.0137
Write transactions are any operations which modify a file's data stream. This category also includes file handle operations.		
List transactions (per 10,000)	Included	€0.0137
List transactions are any operations which enumerate parts of the file share, such as listing files and directories within a share.		
Read transactions (per 10,000)	Included	€0.0014
Read transactions are any operations which read from a file's data stream.		

Internet Egress (Routed via [Routing preference transit ISP network](#))

Source Continent	First 100GB / Month	Next 10TB / Month
From North America, Europe to any destination	Free	€0.0728 per GB

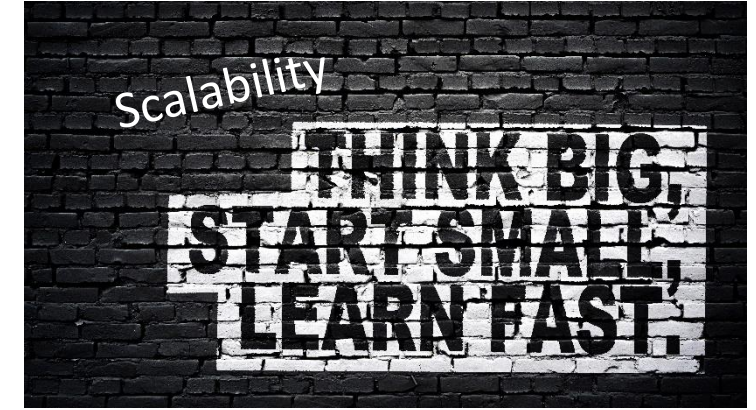
Solution in Azure is complex

- file volume is only 1.050,- € p.a.
 - not considering file frontend
 - list transactions** of PDM alone are 11.508,- € a month
 - repeating status checks on millions of small files by 200 engineers
 - egress traffic 28.700,- € a month – 21.2 TB change rate per day
- => Estimated access cost 482.496,- €



CONCLUSIONS

KEY TAKEAWAYS



KEY TAKE AWAYS

- Use cloud technologies on premise to improve own operations
 - Automate workloads, management, maintenance, reporting and customization
 - Intensify license management
 - All persistent and basic workloads need to be cheaper, better and more robust on premise
 - Develop partner network with consulting and persistent knowledge focus
 - Challenge on solution spaces
-
- Focus on cloud solutions for peak or dedicated microservice workloads
 - Custom cloud optimized application design required



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