PASHA Technology

PASHA Technology Datacenter Success Story

About us

PASHA Technology

"PASHA Technology" Limited Liability Company (PASHA Technology) was established in 2018 as an IT Service Provider.

The vision of PASHA Technology is to provide IT services, Cloud Computing, Cyber Security Operations and Datacenter Management services.

The following are the focus areas for PASHA Technology:

- Design, build and get certified by Uptime Institute Tier-III Main Data Center and DRS
- Offer end-to-end infrastructure and end-user services
- Bring out synergies through significantly standardizing requirements while increasing **quality**, **resilience** and **business** continuity
- Develop long-term IT technical sourcing strategy
- In-house expertise and knowledge in a form of human capital
- Transform into the **preferred** and **trusted** IT services company in Azerbaijan in the long-term

PASHA Technology STRATEGY

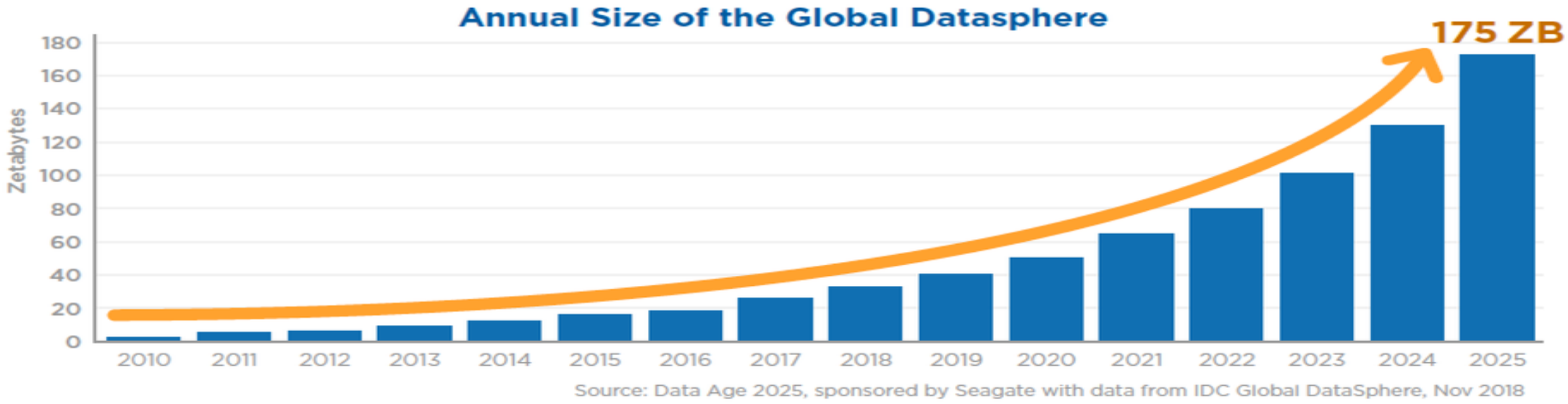
2020	2021	2022	2023	
▪ **Move as is** IT services of 4 SAs to Pasha Technology and **continue operating separately**	▪ **Consolidate** IT services and insurance SAs' ADM efforts; ▪ **Move to cloud** with all new server storage requests; ▪ **Reduce 4 SAs' costs by 10-20%**	▪ **Consolidate** non-differentiated software; ▪ Integrate **DevOps** working principles and enable **automation;** ▪ Have migrated **70-80% of infrastructure to cloud**	▪ **Extend clients** to non-financial Holding SAs as well as other affiliated companies and Holdings	▪ **Become** an **externally profitable** Holding company
✓	✓			$
• Tier – III Certification • Colocation Model • Data Migration Project • HR Migration	• Cloud Model introduction • Infrastructure as a Service • Cloud SLAs • IT Sourcing • Security as a Service	• Software as a Service • Platform as a Service • Cloud optimization • MSSP	• Cloud customers acquisition • Multi-Cloud Management • xaaS services	• IT Consulting • Cloud adoption enabler • Managed Services

Digital Age

PASHA Technology

Digital Transformation is a main driver for technology and data growth has gotten a lot of attention in recent years. According IDC statistics, “the amount of data created, captured, copied, and consumed worldwide is expected to grow from around **59** zettabytes (ZB) in 2020 to around **149** ZB in 2024."

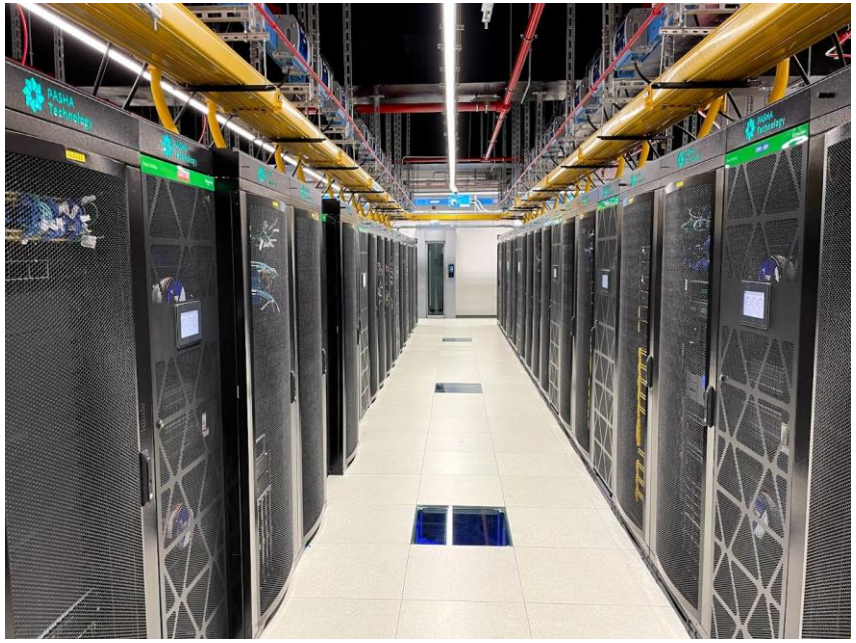
The growth of digital technologies over the next few years will transform the way we work and live and provide greater personalization of services than ever before. Digital transformation will generate increasing amounts of data and demand for ways to analyze and apply this data and store the results



https://www.forbes.com/sites/tomcoughlin/2018/11/27/175-zettabytes-by-2025/?sh=6cb307435459

What is a Datacenter?

At its simplest, a data center is a physical facility that organizations use to house their critical applications and data.
A data center's design is based on a network of computing and storage resources that enable the delivery of shared applications and data.



Datacenter Core Components

Datacenter facilities. Usable space for IT equipment (Critical Loads), power, cooling, physical security, CCTV
Network infrastructure. This connects servers (physical and virtualized), data center services, storage, and external connectivity to end-user locations.
Storage infrastructure. Data is the fuel of the modern data center. Storage systems are used to hold this valuable commodity.
Computing resources. Applications are the engines of a data center. These servers provide the processing, memory, local storage, and network connectivity that drive applications.

Datacenter Journey

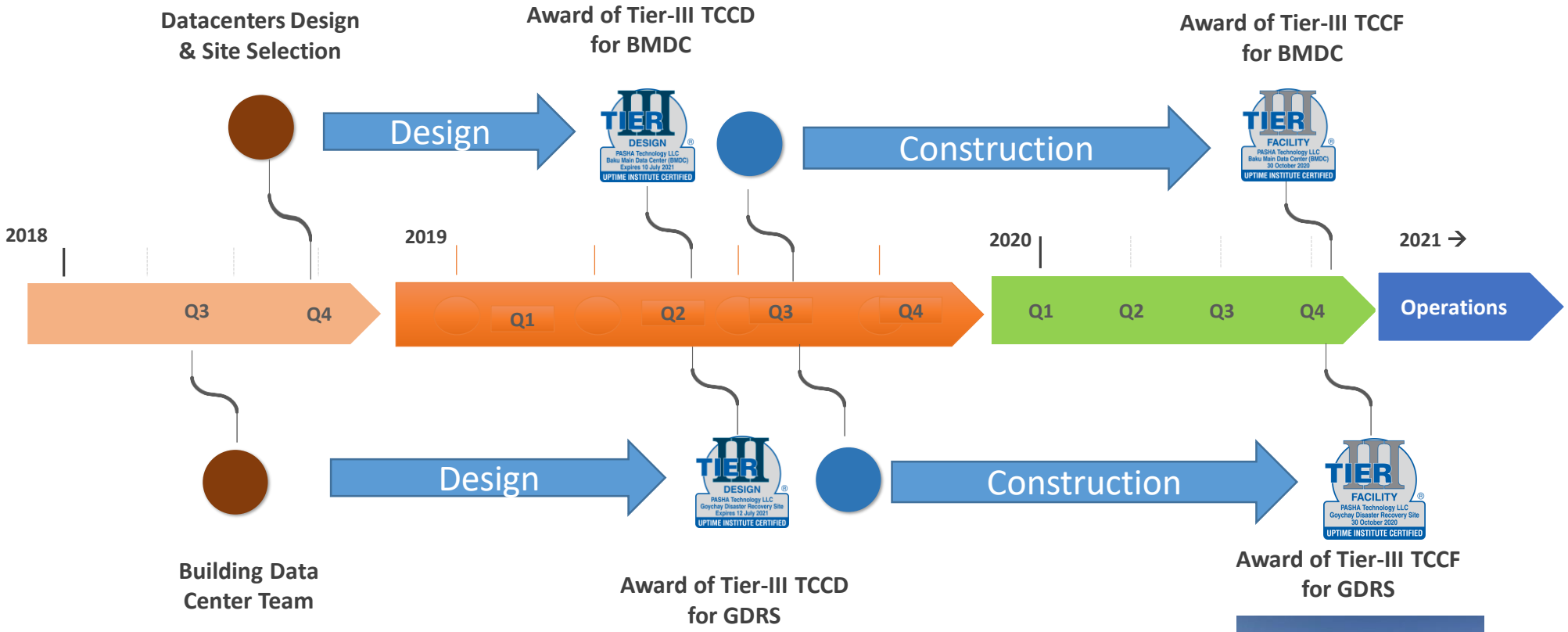
PASHA Technology

Digital Transformation (including Data Confidentiality, Integrity and Availability) forcing business and enterprises to overlook current processing power, scalability of workloads, elasticity of computing resources and datacenters operations where data lives.

PASHA Technology datacenter journey started based on following key principles and processes:

- Organizing a Data Center Implementation Team
- Analyzing current and future needs
- Data center sites selection
- Development of design criteria to be purpose-built, fault tolerant, modular and flexible
- Achievement of Uptime Institute Design Certification (TCDD)
- Construction with “day-end” approach
- Running five levels of testing, from FAT (Factory Acceptance Testing) to IST (Integrated Systems Testing)
- Achievement of Uptime Institute Tier III Constructed Facilities Certification (TCCF)
- Ongoing Operations & Maintenance

DATACENTER JOURNEY (*Flash-back*)



<u>Key takeaways:</u>

- Design Phase with Tier-III Certified Design Documents award – **9 months**
- Construction Phase for both datacenter facilities including FAT, IST (5 levels) – **14 months**
- Constructed Facilities Certification including TCCF awards – **1 months**

DATACENTER FACILITIES

PASHA Technology operating datacenters (Baku Main Data Center or “BMDC” and Goychay Disaster Recovery Site or “GDRS”) designed and built based on the best industrial practices and standard of the data center construction and requirements.

Both data centers facilities and infrastructure fulfilling Tier III Concurrently Maintainable Criteria of Uptime Institute, ensuring each subsystem among electrical, mechanical, monitoring, automation meets the fundamental concepts, criteria and standards for resiliency and fault tolerance

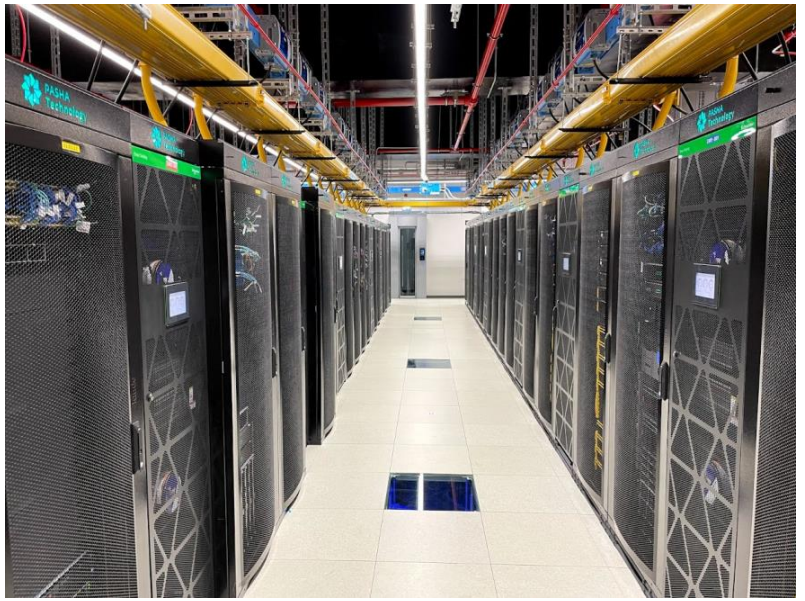
- **99.982%** uptime guaranteed for power, cooling
- No more than 1 hour 34 minutes of downtime per year, 7minutes 53.4s per month
- **N+1** fault tolerant providing at least 72-hour power outage protection
- **Concurrently Maintainable**: There are 2 distribution ways for energy and cooling to IT equipment location. All equipment and distribution paths can be maintained in a planned work without affecting the IT environment.
- The main energy source is the generator with 12 hours’ capacity fuel tank capacity
- Access to Datacenter whitespace equipment controlled by mantraps and additional lock-based cabinet protection
- Both datacenters designed for PUE (Power Usage Effectiveness) factor as **1.4**

Key Technical Parameters

Datacenter Facility	**BMDC – Tier-III**	**GDRS – Tier-III**
Total construction area	**1,814 m2**	**872 m2**
Whitespace area	**405 m2**	**255 m2**
Critical IT Load	**760.5 kW**	**483 kW**
Total Facility Load	**1600 kW**	**1100 kW**
# of System racks	**96**	**60**
# of Network racks	**16**	**12**
Load per system rack	**8 kW**	**8 kW**
Diesel Generators	**4 X 800 kW (2 each side), 2N configuration**	**4 X 565 kW (2 each side), 2N configuration**
Fuel tank capacity	**12 hours per each generator, 2,500 liters each**	**12 hours per each generator, 2000 liters each**
Total fuel tank capacity	**72 hours, 40,000 liters**	**72 hours, 20,000 liters**
Static Modular UPS, IT Load	**2 x 900 kW, 2N configuration**	**2 x 600 kW, 2N configuration**
Static Modular UPS, mechanical loads	**2 x 225 kW, 2N configuration**	**2 x 36 kW, 2N configuration**
Cooling Capacity	**2 x 800 kW (Continuous Cooling)**	**2 x 525 kW (Continuous Cooling)**
Containment	**Hot Aisle**	**Cold Aisle**

White Space

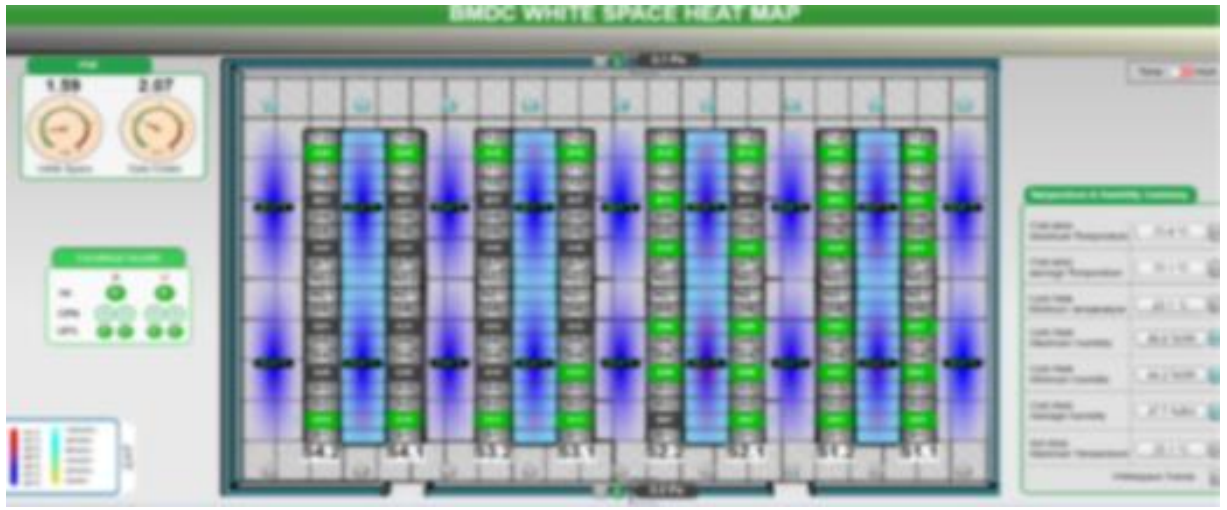
- *Standard 42U rack cabinets, 8kW each*
- *Metered PDUs*
- *Overhead fiber optic trays*
- *Power redundant paths*
- *Redundant busbars system*
- *KNX lighting*
- *Leak detection sensors*
- *VESDA (Very Early Smoke Detection Apparatus)*
- *NOVEC 1230 fire suppression system*
- *Earthquake protection*
- *Biometric access based on roles*
- *Mantraps*



Building Management and Automation

PASHA Technology

- *24x7 Network Operations Center*
- *32k sensors telemetry data*
- *Purpose-built and crafted dashboards*
- *Runtime parameters adjustment*
- *Heatmap monitoring*
- *Prediction analysis*
- *Alarms monitoring*
- *Performance and Capacity management*



Note: screenshots intentionally blurred

Green Datacenter Facilities

We do care about environment

Solar Power

We utilizing Solar System for providing power to non-Critical Facility Infrastructure (office lighting fixtures, outdoor perimeter lighting, auxiliary office equipment.

Total Solar Grid capacity – 16 kWh per each datacenter

Free Cooling

Using latest power efficiency technologies, we utilizing Free Cooling capabilities on Chillers during low-temperature seasons

Free Cooling automatically activating when outside temperature below 15^0 Celsius

How we achieved this

- Clearly defined common goals
- Agility in delivery
- Strong stakeholders support
- Trusted vendors and integrator companies
- Strong team members and spirit
- Onboard expertise and certifications (ATD, Accredited Tier Designer)
- Multiple testing and dry-runs cycles during IST (Integrated System Tests)
- Close cooperation with Uptime Institute on all project phases

What are next steps

- Enhance Operational Excellence
- Develop stronger team
- Continue to invest into knowledge
- Maintain uptime level
- Obtaining Uptime Institute Tier Certification of Operational Sustainability (TCOS)

What is Energy Consumption Effectiveness

Energy consumption effectiveness (ECE) is a metric used to evaluate the energy efficiency of a data center. It measures the ratio of total energy consumption of a data center to the energy consumption of its IT equipment.
The lower the ECE, the more energy efficient the data center is.

The formula for calculating ECE is:

ECE = Total Facility Energy / IT Equipment Energy

Total Facility Energy includes the energy consumed by all the equipment in the data center, such as cooling systems, lighting, and power distribution systems.
IT Equipment Energy refers to the energy consumed by the computing equipment, such as servers, storage devices, and network equipment.

Energy consumption effectiveness **(ECE)** and power usage effectiveness **(PUE)** are both metrics used to evaluate the energy efficiency of data centers and calculations related to each other.

PUE or Power Usage Effectiveness is a measure of how efficiently a data center uses energy, and it is calculated by dividing the total energy consumed by the data center by the energy consumed by the IT equipment within the data center.

The formula for calculating PUE is:

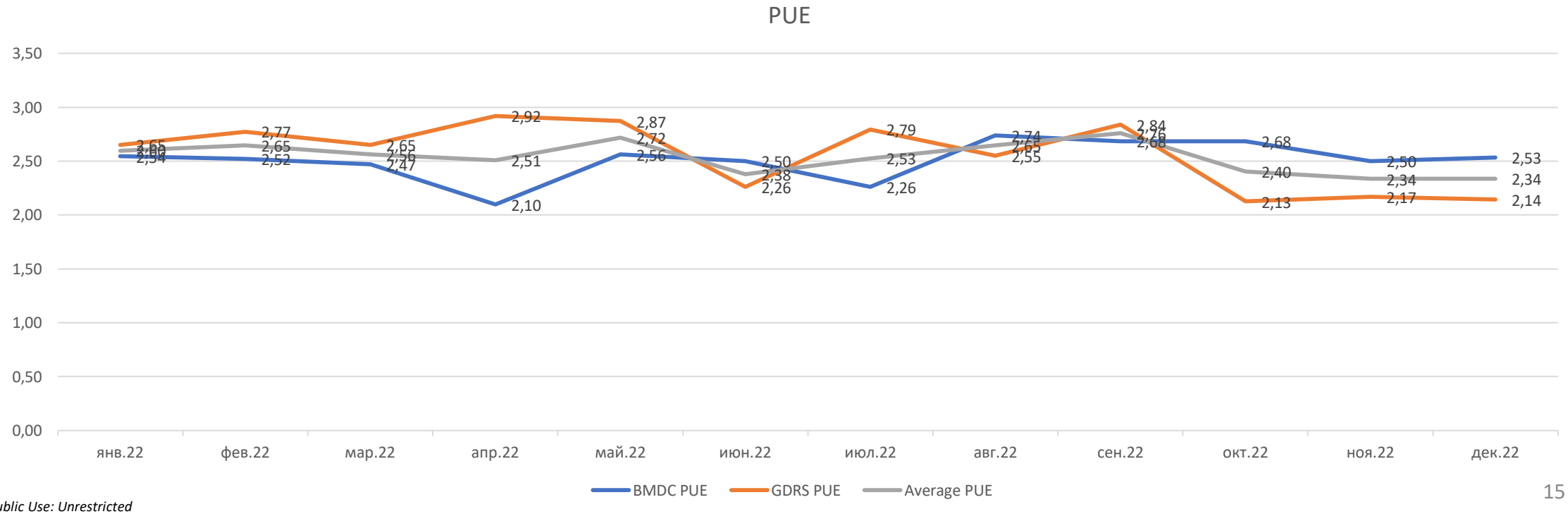
PUE = Total Facility Energy / IT Equipment Energy

Power Usage Effectiveness (PUE) for Y2022

PUE being calculated separately for each Datacenter facility by taking average value through reported period.
PUE can vary depending on white space utilization, datacenter location (region climatic zone), seasonal effect (hot or cold season), IT equipment efficiency and IT equipment energy efficiency.

PUE (Power Usage Effectiveness)

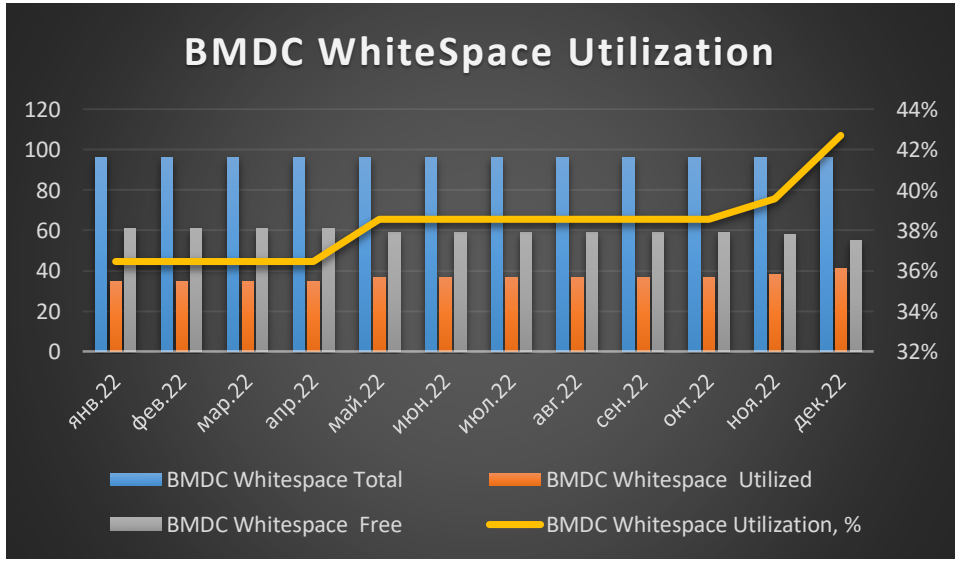
PUE	Jan-22	Feb-22	Mar-22	Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	Annual Average	SLA Obligation
BMDC PUE	2.54	2.52	2.47	2.10	2.56	2.50	2.26	2.74	2.68	2.68	2.50	2.53	2.51	100.000%
GDRS PUE	2.65	2.77	2.65	2.92	2.87	2.26	2.79	2.55	2.84	2.13	2.17	2.14	2.56	100.000%
Average PUE	***2.60***	***2.65***	***2.56***	***2.51***	***2.72***	***2.38***	***2.53***	***2.65***	***2.76***	***2.40***	***2.34***	***2.34***	2.54	100.000%

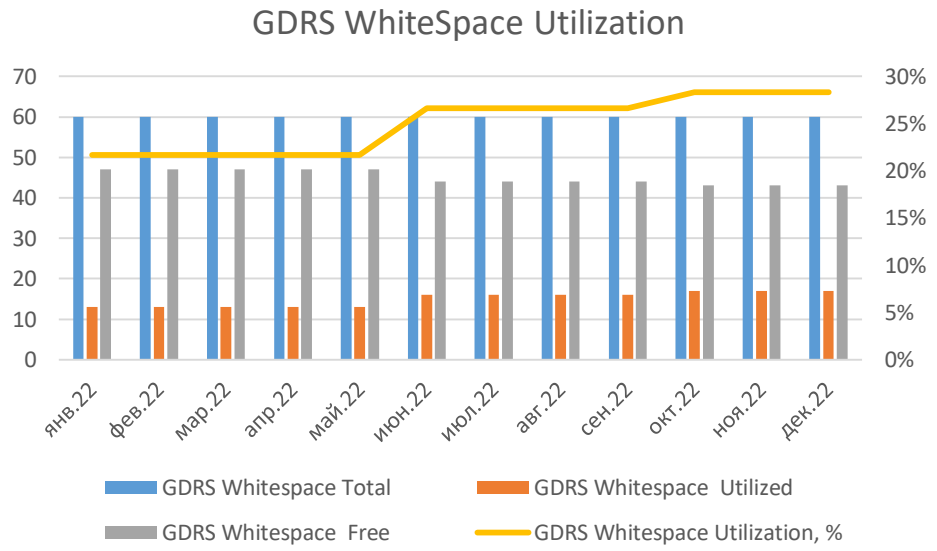


White Space Utilization – Y2022

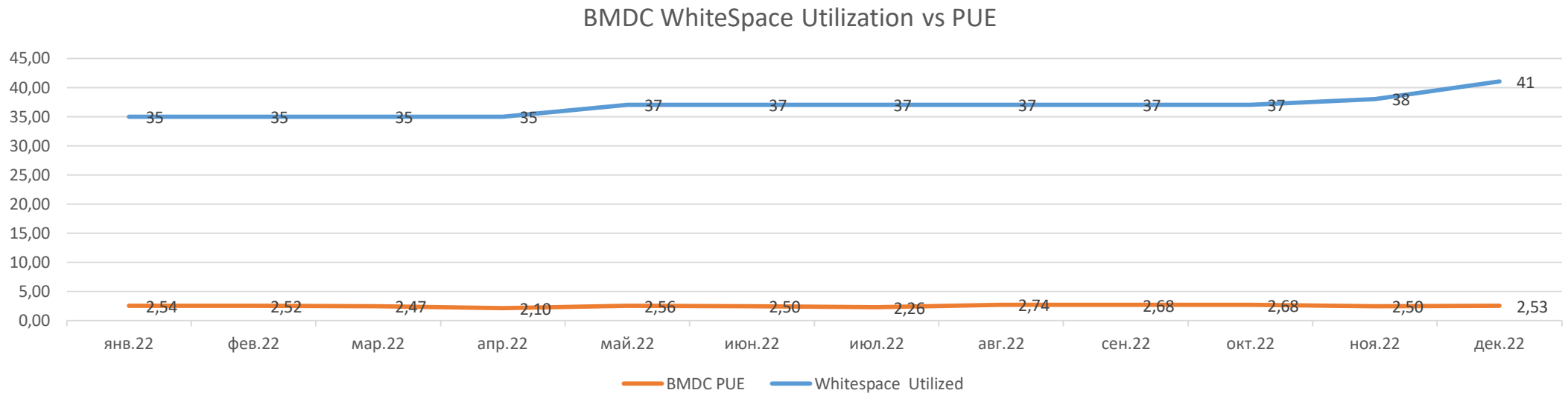
Datacenter	Metric	Jan-22	Feb-22	Mar-22	Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22
BMDC	*Whitespace Total*	96	96	96	96	96	96	96	96	96	96	96	96
	Whitespace Utilized	35	35	35	35	37	37	37	37	37	37	38	41
	Whitespace Free	61	61	61	61	59	59	59	59	59	59	58	55
	Whitespace Utilization, %	36%	36%	36%	36%	39%	39%	39%	39%	39%	39%	40%	43%
GDRS	*Whitespace Total*	60	60	60	60	60	60	60	60	60	60	60	60
	Whitespace Utilized	13	13	13	13	13	16	16	16	16	17	17	17
	Whitespace Free	47	47	47	47	47	44	44	44	44	43	43	43
	Whitespace Utilization, %	22%	22%	22%	22%	22%	27%	27%	27%	27%	28%	28%	28%
Total Whitespace Utilization, %		31%	31%	31%	31%	32%	34%	34%	34%	34%	35%	35%	37%

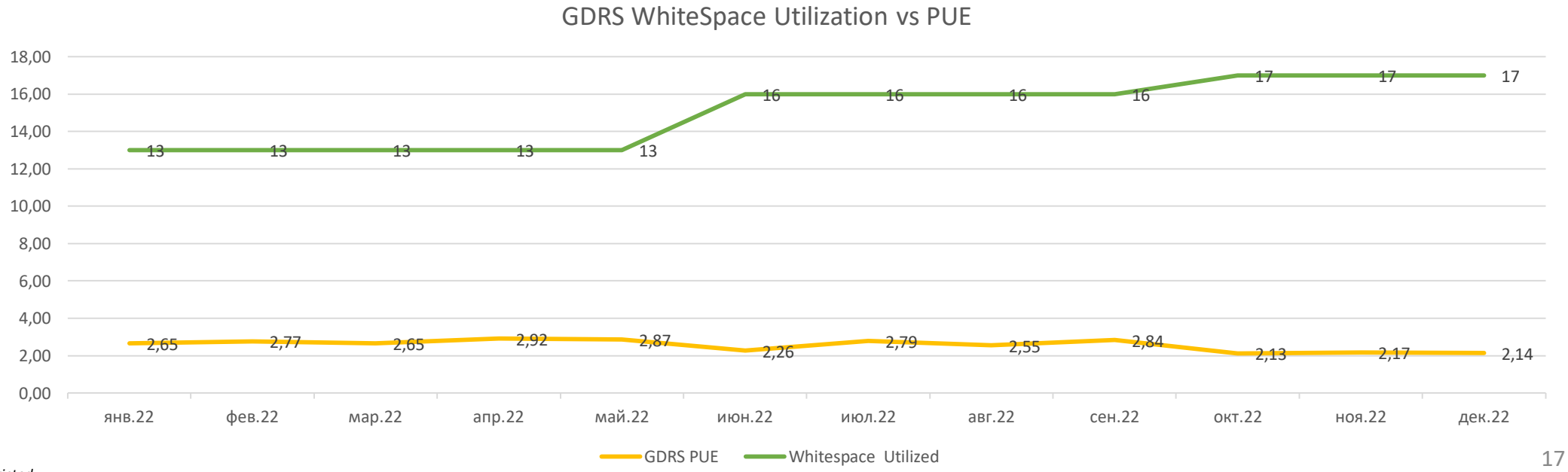
Q1-2022	Q2-2022	Q3-2022	Q4-2022
96	96	96	96
35	36	37	39
61	60	59	57
36%	38%	39%	40%
60	60	60	60
13	14	16	17
47	46	44	43
22%	23%	27%	28%
31%	32%	34%	36%





White Space Utilization vs Power Usage Effectiveness – Y2022



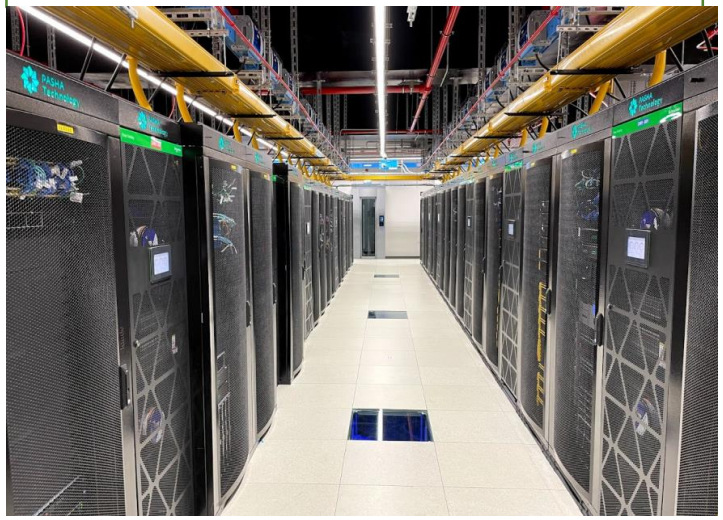


Data Center Colocation Services

PASHA Technology

Colocation Services

- *Dedicated cabinets (standard 42U)*
- *Redundant metered PDUs*
- *Maximum cabinet capacity 8 kW*
- *Front to Rear cooling*
- *Cabinet Magnetic locks*
- *Biometric access*
- *Flexible RBAC (Role-based Access Control)*
- *Overhead cabling distribution system*
- *KNX lighting*
- *Leak detection sensors*
- *VESDA (Very Early Smoke Detection Apparatus)*
- *NOVEC 1230 fire suppression system*
- *Earthquake protection*
- *Biometric access based on roles*
- *Mantraps*



SLA Objective	Availability Level
Datacenter Tier Standard	*Tier III (Concurrently Maintainable)*
Datacenter Facilities Availability (power, cooling), %	*99.982%*
AC Power Availability to cabinet (redundant PSU)	*99.999%*
Datacenter Maximum Air Temperature, Celsius	*27 C*
Datacenter Average Air Humidity, %	*40% - 60%*
Datacenter Networking Availability, %	*99.995%*
Public Internet Resources Availability , %	*99.995%*
Security CCTV Surveillance & Guards	*24 x 7*
Network Operation Center (NOC)	*24 x 7*
Security Operation Center	*8 x 5 (base offering)* *24 x 7 (extended offering)*
POP (Point of Presence) – DC Connectivity Services	• *Own redundant fiber optic from different locations* • *Major ISP onsite-presence* • *MPLS/VPLS connectivity*
Public IPv4 and IPv6 Services	• *Own AS number (AS209700) announced via Tier-I providers* • *Public IPv4 and IPv6 address range* • */28 and /29 blocks allocation* • *100% AS visibility from rest of the world*

CLOUD Services

Infrastructure as a Service

Predefined and Customized IaaS resources
Flexible configuration using Cloud Calculator
Predictable costs

IaaS

- **Compute resources** – vCPU, vRAM
- **Storage** - Block Storage Resources, vStorage, GB
- **Network** – DCN, SAN, Internet Access
- **Virtualization** – VMWare, HyperV, RHEV

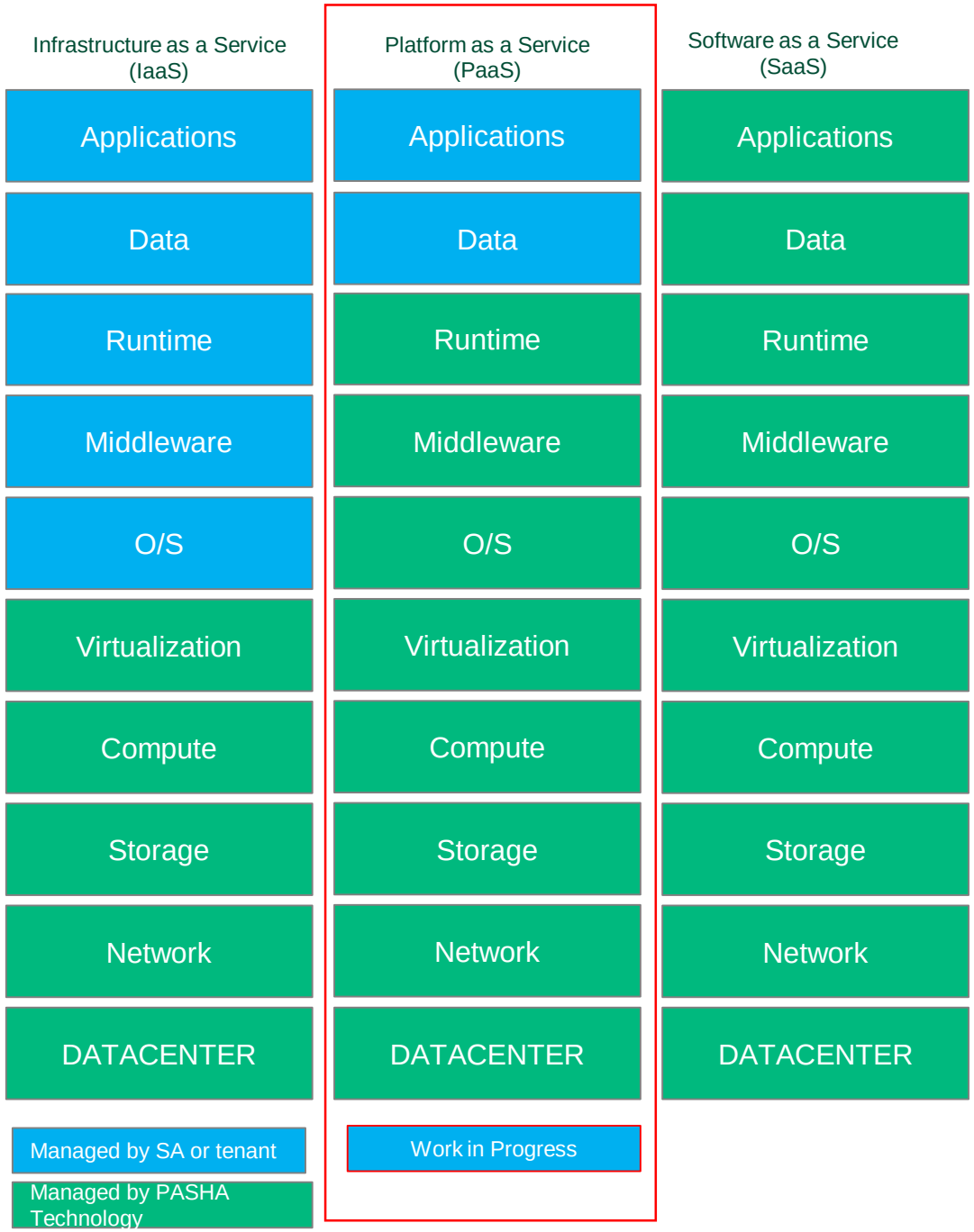
Additional services:

- Backup as a Service
- Security as a Service
- Fully Managed Infrastructure
- 24x7 Monitoring as a Service
- BYOL (Bring Your Own License)
- Connectivity to datacenter facilities

Software as a Service

SaaS

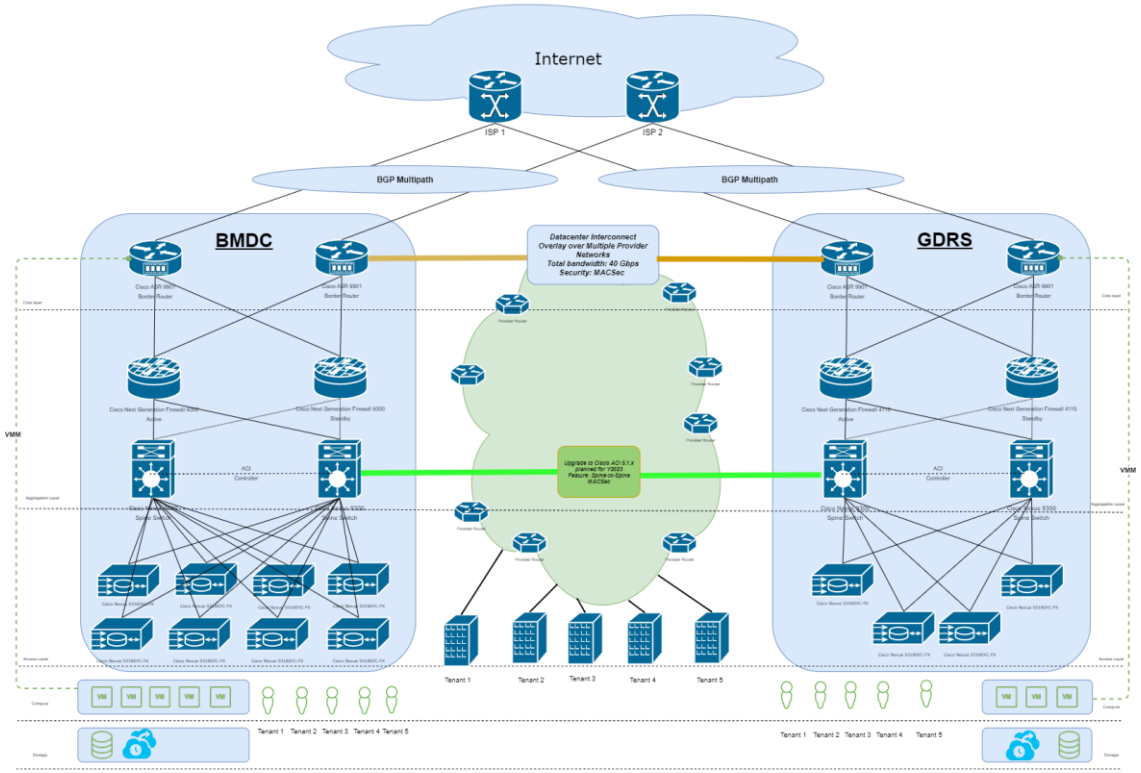
- *Top-to-bottom technology stack operations*
- *Flexible pricing: per-user, per service*
- *Data Security*
- *3rdpty integrations, vendors support*
- *Backup and Restore*
- *Load-Balancing technologies*
- *SSL management*
- *24x7 Monitoring as a Service*



Datacenter Network powered by Cisco ACI

Challenges:

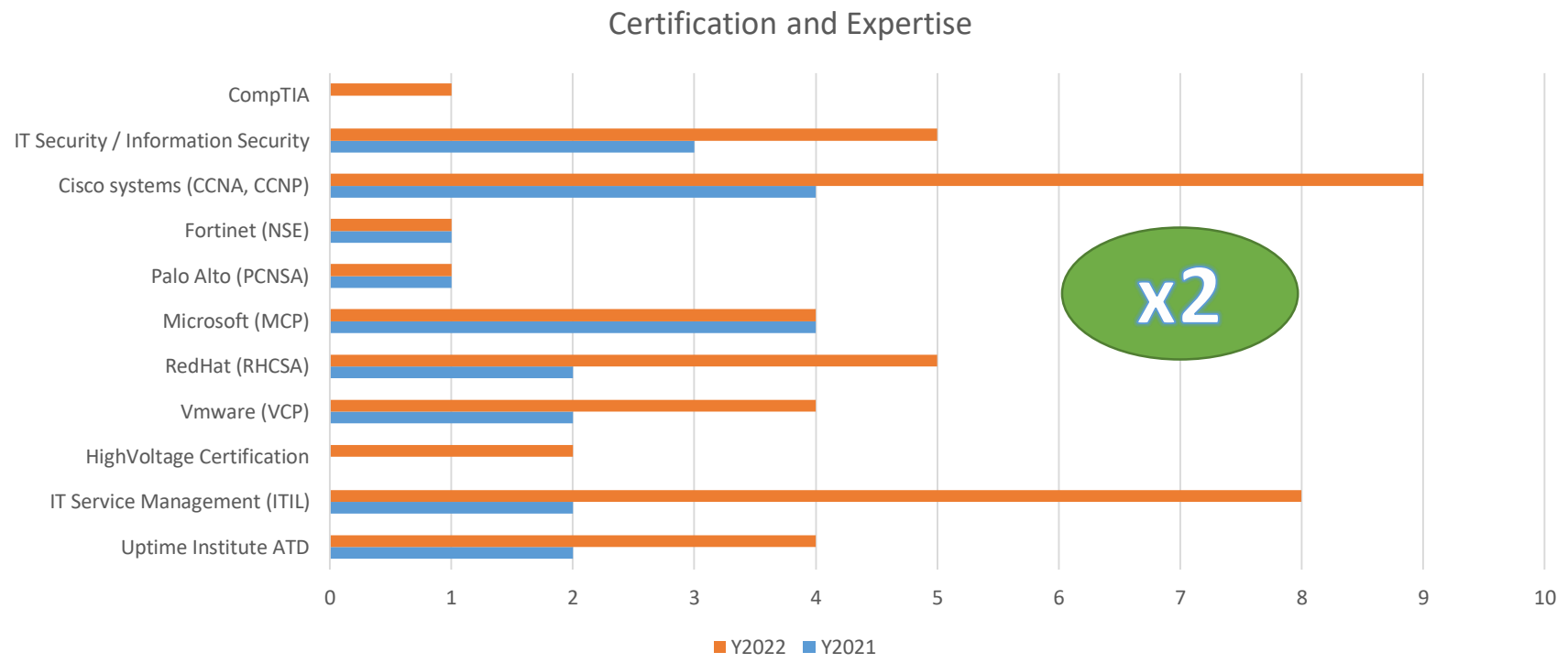
- *Different organizations with different maturity levels and Cloud services adoption*
- *Overlapping networks and VLANs*
- *Different providers*
- *No network automation and application visibility*
- *Absence of network segmentation*
- *Outdated hardware, software and licenses*
- *Slow TTM (Time-To-Market)*



Achievements:

- *Software-Defined Network*
- *True multi-tenancy and tenant data isolation*
- *VXLAN support*
- *End-2-End security using MACSec, IPSEC, TLS*
- *No changes to existing tenant's network topology during migration to Cloud services of PASHA Technology*
- *Application Velocity. Any workload, anywhere*
- *Automation (including DevOpS, DevSecOps)*
- *Centralized-managed policy and policy automation*
- *Design and Implementation using Cisco Advanced Services and approved blueprints*

Staff Expertise Growth



- *Steady YoY expertise growth*
- *Double of expertise in 1 year*
- *Learning curve w/o sacrificing operations !!!*
- *Exploration of new technologies*
- *Improvement of SLAs*
- *Customer Satisfaction*

redhat. BUSINESS PARTNER

Microsoft Partner

vmware PARTNER PROFESSIONAL SOLUTION PROVIDER

CISCO PARTNER

Uptime Institute

ENGAGE FORTINET ADVOCATE PARTNER Integrator

Certifications & Awards

TIER III FACILITY
PASHA Technology LLC
Goychay Disaster Recovery Site
30 October 2020
UPTIME INSTITUTE CERTIFIED

TIER III FACILITY
PASHA Technology LLC
Goychay Disaster Recovery Site
30 October 2020
UPTIME INSTITUTE CERTIFIED

International Organization for Standardization
ISO
20000

CERTIFIED
ISO
27001:2013
COMPANY

International Organization for Standardization
ISO
22301

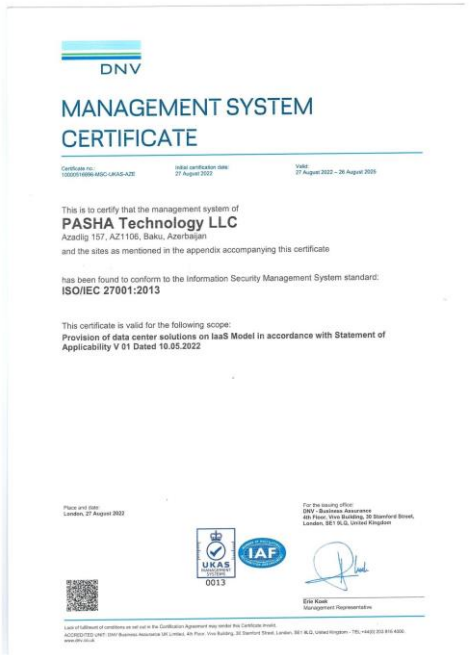

DNV

MANAGEMENT SYSTEM CERTIFICATE

This is to certify that the management system of
PASHA Technology LLC
Azadlig 157, AZ1106, Baku, Azerbaijan
and the sites as mentioned in the appendix accompanying this certificate

has been found to conform to the IT Service Management System Standard:
ISO/IEC 20000-1:2018

This certificate is valid for the following scope:
The IT Service management system of PASHA Technology LLC supporting the Provision of data center solutions on IaaS Model in accordance with the service catalogue.


DNV

MANAGEMENT SYSTEM CERTIFICATE

This is to certify that the management system of
PASHA Technology LLC
Azadlig 157, AZ1106, Baku, Azerbaijan
and the sites as mentioned in the appendix accompanying this certificate

has been found to conform to the Information Security Management System standard:
ISO/IEC 27001:2013

This certificate is valid for the following scope:
Provision of data center solutions on IaaS Model in accordance with Statement of Applicability V 01 Dated 10.05.2022


DNV

MANAGEMENT SYSTEM CERTIFICATE

This is to certify that the management system of
PASHA Technology LLC
Azadlig 157, AZ1106, Baku, Azerbaijan
and the sites as mentioned in the appendix accompanying this certificate

has been found to conform to the Business Continuity Management System Standard:
ISO 22301:2019

This certificate is valid for the following scope:
Provision of data center solutions on IaaS Model

- *PCI DSS 3.2 (Datacenter Colocation Services → Q2 2023 planned*
- *UI Operational Sustainability → Q3 2023 planned*

Partnership, Sourcing and Underpinning Contracts Management

Thank you!

“PASHA Technology” LLC, Bayil Plaza, 29 Gurban Abbasov Street, AZ1003 Baku, Azerbaijan. +994 (12) 377 1919, office@pasha-technology.com www.pasha-technology.com