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Automation Knowledge Sharing Event**

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EUR22_34 - Enabling Edge and Cloud Computing in the O&G Industry

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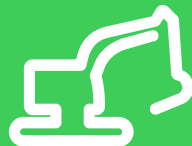
Summary

- The Oil & Gas industry relies on IT compute power for most all processes and applications used to run operations, gather and analyze data, monitor and control equipment, ensure safety, etc.
- The data center is the foundation of all processes and applications: Edge computing, private cloud, IoT, analytics, HPC
- Building a data center in remote, difficult and/or hazardous locations is very challenging, extremely difficult, time consuming and expensive – most all oil and gas activity is on the ‘edge’
- Prefabricated data centers can be delivered, installed and operated at the point of use quickly, easily and effectively, even in remote locations and on the ‘edge’
- A prefabricated data center utilized at the point of use can eliminate costly, damaging and dangerous latency delays, bandwidth concerns and data security issues

Challenges of Deploying a Data Center in the O&G Industry



Time



Harsh-Remote
Location



Regulatory
Compliance



Mission Critical

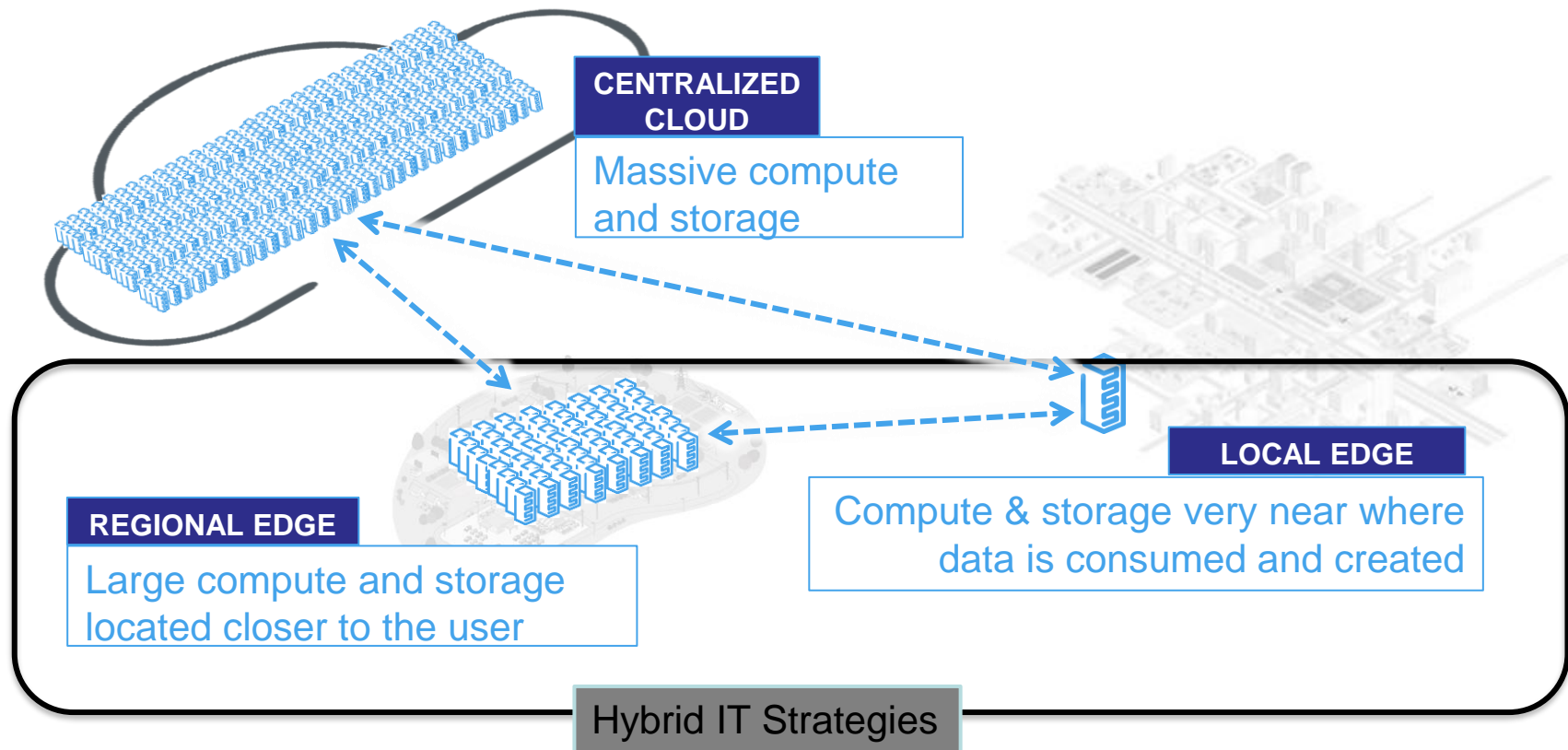
“We have new E&P operations in Algeria that *need immediate IT capacity*. I cannot afford waiting 1 year for my DC to be completed.”

“I am tasked with the construction of a data center in a remote location in Angola where *environmental conditions are very harsh & suitable communications and specialized workforce do not exist.*”

“In Iraq as well as other countries, *raw oil exploration data has to be processed within the country* and cannot be transferred to my existing data center elsewhere.”

“My data center needs to be *compliant with the highest industry standards* in terms of resiliency. Any loss of E&P data would have *disruptive and costly impact* on the business.”

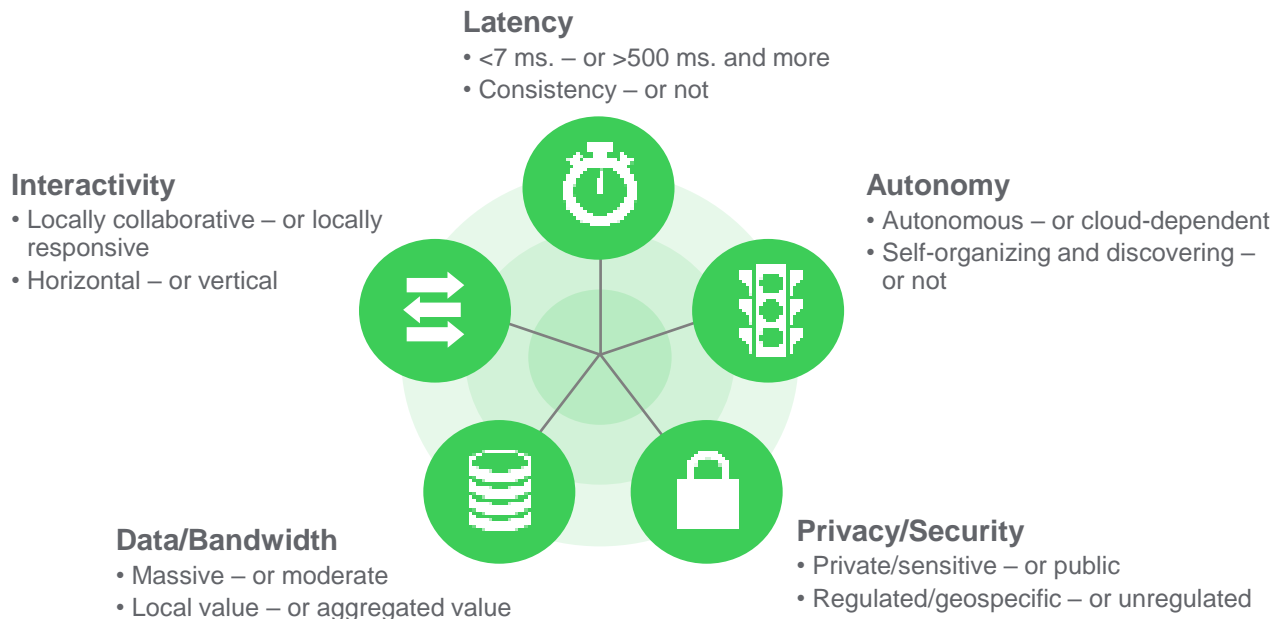
Choose between Centralized and Distributed Architecture



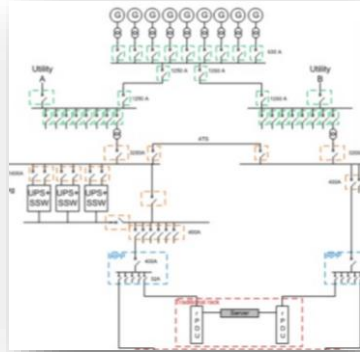
If choosing the Cloud for your compute needs, there are limitations....

- Part or all of the compute architecture needs to be local for the experience or process

• Why Edge? – Five Imperatives Driving Compute to the Edge



The best practices seen in centralized and regional data centers...



Redundancy



Monitoring



Data Center
staff

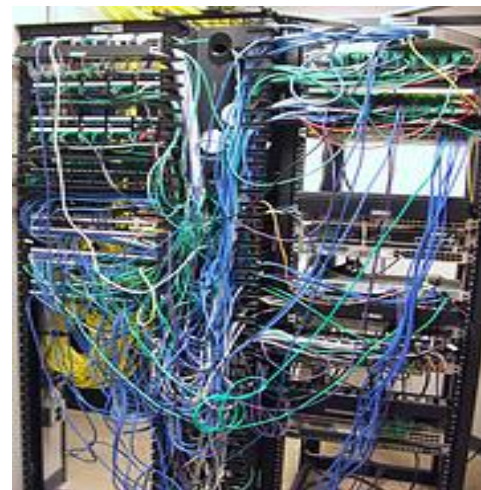
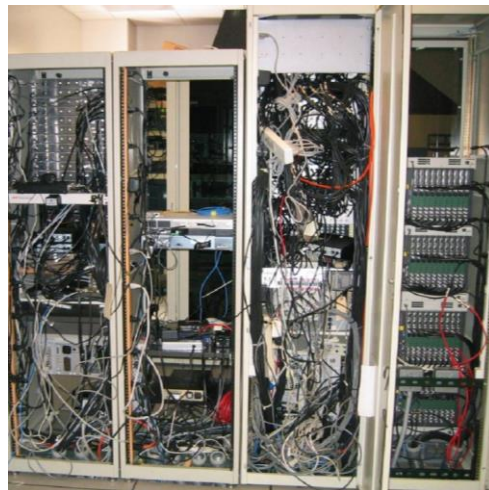
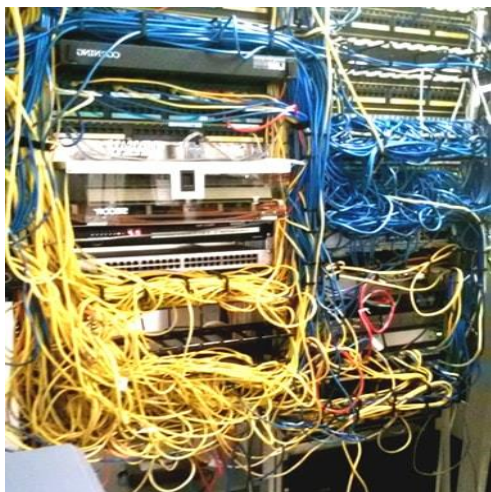


Organization



Security

...are usually not at the local edge



❌ No Redundancy

❌ Unstaffed or
Understaffed

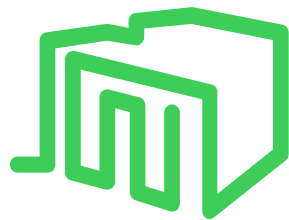
❌ Unsecure

❌ Lack of
Organization

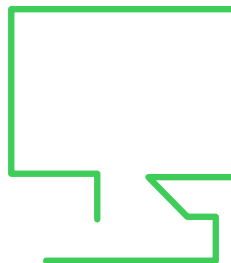
❌ Unmonitored

Rethinking physical architectures for Local Edge will address the needs in the O&G industry as well as demands of IOT and limitations of the Cloud.

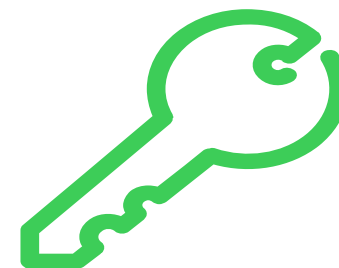
Standardization and Redundancy



Remote Site Management



Secure Environment



Improve Response Times and Decrease Bandwidth Issues



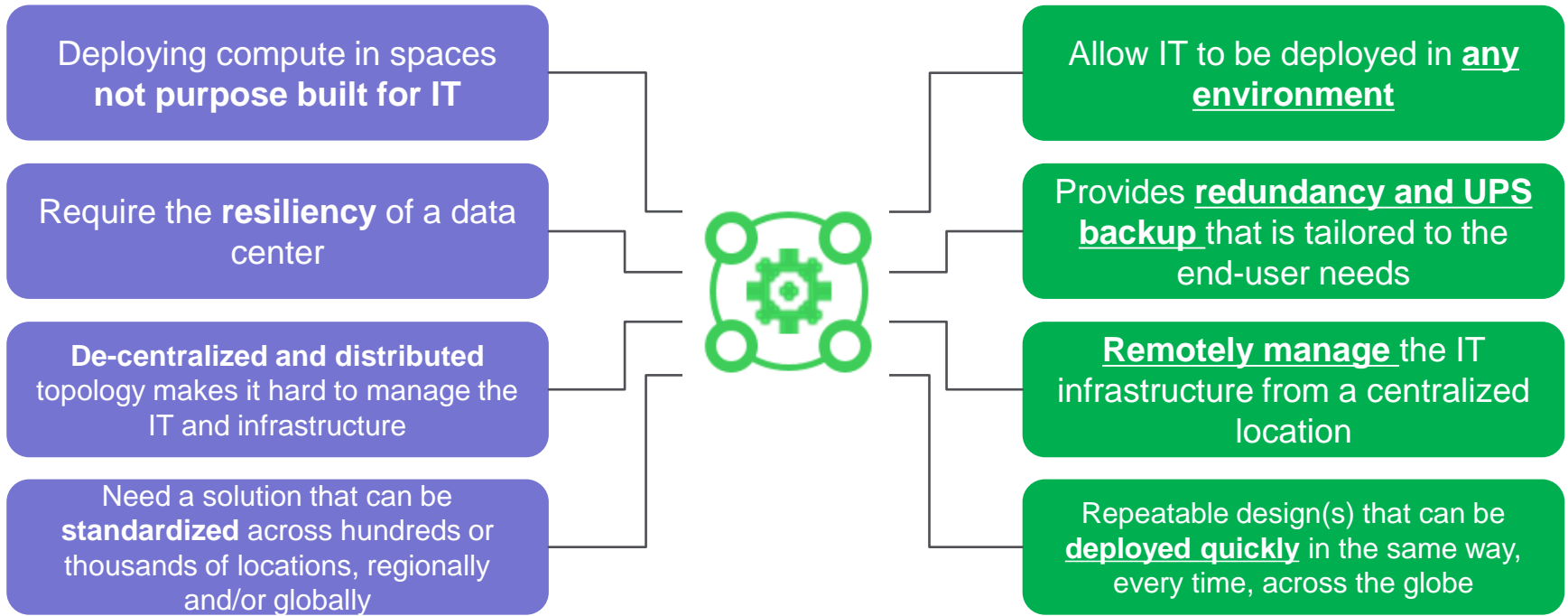
Increase Data Security



Decrease Operational Costs



Reduce Time to Deploy and Maintain



Rethinking physical architectures for Local Edge will address the needs in the O&G industry as well as demands of IOT and limitations of the Cloud.

Modular and Micro Data Centers meet the challenges of the O&G Industry and Edge Computing



- **Standardization and Redundancy**

- All prefabricated modules are designed and built in a controlled factory environment assuring the design is correct and quality of build is high





- **Remote Monitoring**

- Software can monitor and manage all the assets in the prefabricated module. The software can be factory installed and configured reducing risk of errors or underutilization

- **Secure Environment**

- Prefabricated Modules are designed to be deployed in any environment, with access control, security, cameras, to ensure all your data is protected

Prefabricated solutions can be packaged into operationally optimized Building Blocks or “All-in-One” Configurations

-  • Pre-engineered, wired, manufactured and tested in a factory, can be integrated with hardware and software
-  • Arrives on-site ready to deploy quickly and easily
-  • Enables a new-generation of data centers with multiple levels of densities, redundancies and voltages
-  • Standard Designs and Engineered to Order solutions available to meet every need

Reasons why actual customers deployed a modular data center

- Trouble allocating or justifying **space** to build or expand
- Capacity or Business drivers require new capacity **fast**
- **Simplify** construction projects normally plagued with changes and delays
- Standardized build process ensures **Predictable Cost** and **Predictable Performance**
- Variances in labor **quality, experience and knowledge** in different regions

Those reasons resulted in the following value

Flexible

- Offers alternative construction option for building or expanding data centers – overcomes limitations of traditional data centers
- Easily deploy in remote areas
- Utilize outdoor, unused or warehouse space

Fast

- Shorten planning and design cycle and reduces project complexity
- Simplify site coordination with multiple trades' schedules
- Minimize project changes and delays

Predictable

- The density, availability and efficiency you expected
- The **cost** you were promised
- Final design as intended
- Assembled and tested in factory

Prefabrication for design, reliability and efficiency

- Best-in-class components are configured into complete data center solutions to meet your challenges in remote areas, hazardous location or at the Edge

Micro Data Centers



Modular All-in-One Data Centers



Management

Security

Services

Power

Cooling

Enclosures



Modular Data Centers: Quick facts

Turnkey, fully tested and validated modular data centers delivered to your site with environmental protection, extreme weather protection, blast and hazardous areas ratings, etc. for plug & play deployment



- Highly adaptable solution
- Time and space saving
- Control on management of risks and time
- Optimal availability of design through simulation

- Reduced costs
- Personnel safety
- Integrated solution: power-cooling-data-communication
- Accessible multi engineering capabilities
- Cost and scheduling control

- Reduce Site Project Management
- Project & Planning under control
- Drastically Reduced Delivery time
- Optimized quality
- Reduced site local resources variances

Data Center Infrastructure can be delivered as modular building blocks...

Power



- UPS
- Switchgear
- Air conditioning
- Monitoring
- Genset connections

Cooling



- Chillers
- Economizers
- Pump packages
- Monitoring and Control
- Optional UPS

IT Space



- IT racks
- Security and Monitoring
- CRAC
- PDU's
- Optional UPS

... For Fully Integrated, Ruggedized and Repeatable Modular Data Centers



Or, there are “All-in-One” Configurations

ISO Container

Range: 10 – 150 KW

- Single Unit 20' and 40' containers
- Innovative Cable management

Main Benefits

- Easy to Deploy - transportable
- Lower Cost
- Easily ruggedized for harsh environments



Custom Sized Modules

Range 50 – 250 KW

- Single and Dual Bay Configurations
- Purpose Built enclosure with larger spaces for access and maintenance

Main Benefits

- Spacious solution
- Higher density cooling options
- Multiple rows of IT racks possible



Data Halls

Range: 250 – 1MW, 50 – 200+ Racks

Larger Datahall to scale a multi MW datacenter in larger increments

Main Benefits

- Accommodates Air Economizer or Chilled Water
- Flexible design accommodating various rack and size requirements



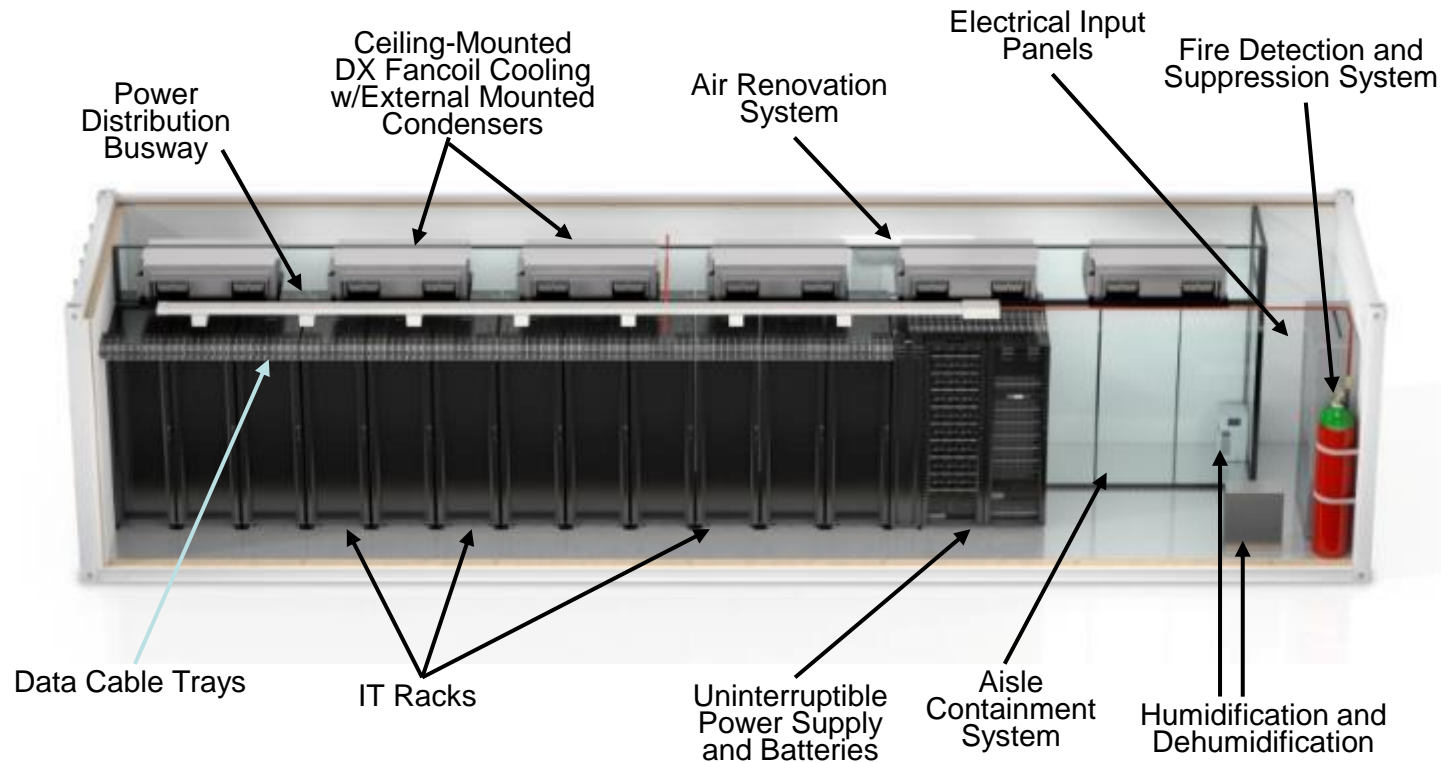
Prefabricated Rooms

Converts unfinished space in building into a datacenter

- Ships flat pack and constructed on site
- Fast to deploy
- Fireproof
- Watertight
- High Security



Example of an “All-in-One” ISO Container Data Center



Modular data center solutions engineered for the environment

- Enclosures designed to withstand mechanical stress and the harshest of environments.
- Enclosure walls designed with fire rated paneling for 60-120 minutes, compliant with EN1047
- ISO container designs available for easy transport globally.
- Sliding rack system enables access to front and rear of racks in containerized modules where space is limited
- Engineered, highly-secured doors are in full compliance with EN1047-2, IPx5 & EN1627
- Sealed cable and pipe work entry points
- Remote environmental monitoring, video security, and biometric entry.



Modular prefab solutions can be engineered to meet your needs



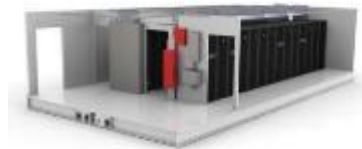
Modify individual modules

- Local code compliance changes, railings and access, power ratings, voltages, component preferences
- Typically, prefabricated data centers can be delivered in 16 weeks or less: PO to ship



Modify the solution configurations

- Redundancy levels, power levels, cooling preference, IT racks and density, module layouts



When considering a modular data center, look for these capabilities:

Assessment Services

- for existing or planned facilities or sites to understand viability of using prefabrication

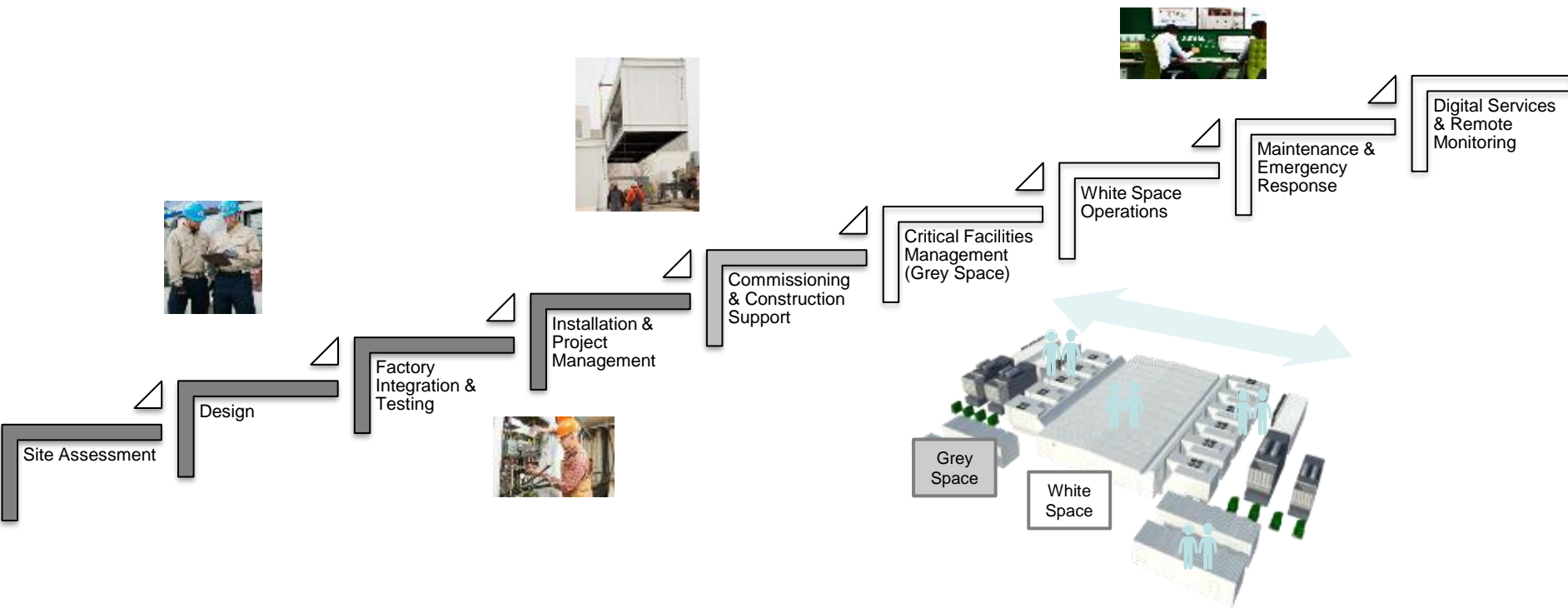
Planning Services

- to demonstrate where prefabrication could benefit performance, cost or timing

Design and Build Services

- Portfolio of reference design starting points
 - Data centers with all prefabricated modules
 - Hybrid data center with mix of prefabricated modules and traditional
- Project management including installation management, site coordination and construction coordination

Also look for Modular Data Center Solutions Lifecycle of Services



Conclusions

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Thank you!

Thank you for your attention,
please enjoy the rest of PCIC Europe 2022

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