



Quickly and Easily Implement Compute Power in the Oil and Gas 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
- The data center is the foundation of all processes and applications: private cloud, IoT, analytics, HPC
- Building a data center in remote, difficult and/or hazardous locations is extremely difficult, time consuming and expensive
- Prefabricated data centers can be delivered, installed and operated at the point of use quickly, easily and effectively
- A prefabricated data center utilized at the point of use can eliminate latency issues, bandwidth concerns and security issues

Challenges of Data Center Construction in the O&G Industry

Harsh Environments

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

Business Critical

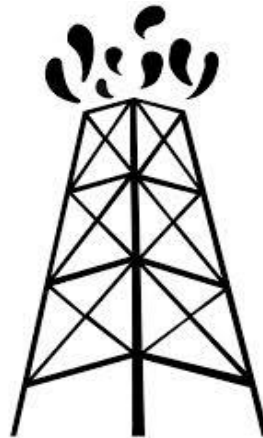
"My data center needs to be compliant with the highest industry standards in terms of resiliency. Any loss of E&P data would have a disruptive impact on the business ."

Deployment Time

"We have new E&P operations in Iraq that need immediate IT capacity. To manage data out of our corporate data center in the US conflicts with local data protection laws and it's not efficient"

Risk & Unpredictability

"Data Center design and construction is a lengthy and complex process and performance levels may be very unpredictable in O&G sites"



Challenges of Data Center Construction in the O&G Industry

• Challenges:

- Harsh environments, remote locations and unique requirements for critical IT equipment
- International transportation issues and concerns for construction materials and equipment
- Minimal to no local support in remote areas for data center design / build / deploy
- Need real-time data processing at operations sites, latency and bandwidth issues are a concern
- Security of data being transmitted over long distances
- On-site construction concerns and interruptions

Prefab Benefits:





- Prefabricated data centers can be designed for harsh environments, environmentally isolated and highly secure
- Self-contained data centers can be transported globally, are easy to deploy and pre-tested in the factory minimizing on-site support.
- Pre-engineered, prebuilt and repeatable designs minimize local engineering at remote locations
- Brings localized data processing to the point of use
- Can create on-site private clouds, IoT analytics, HPC, etc.
- Most structures are complete, very minimal on-site work required.

How Prefabricated Data Centers solve challenges to Data Center Construction in the O&G Industry



Prefabrication for design, reliability and efficiency

Packaged into operationally optimized Building Blocks or “All-in-One” Configurations

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

Data Center Infrastructure delivered as Prefabricated building blocks...

Power



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

Cooling



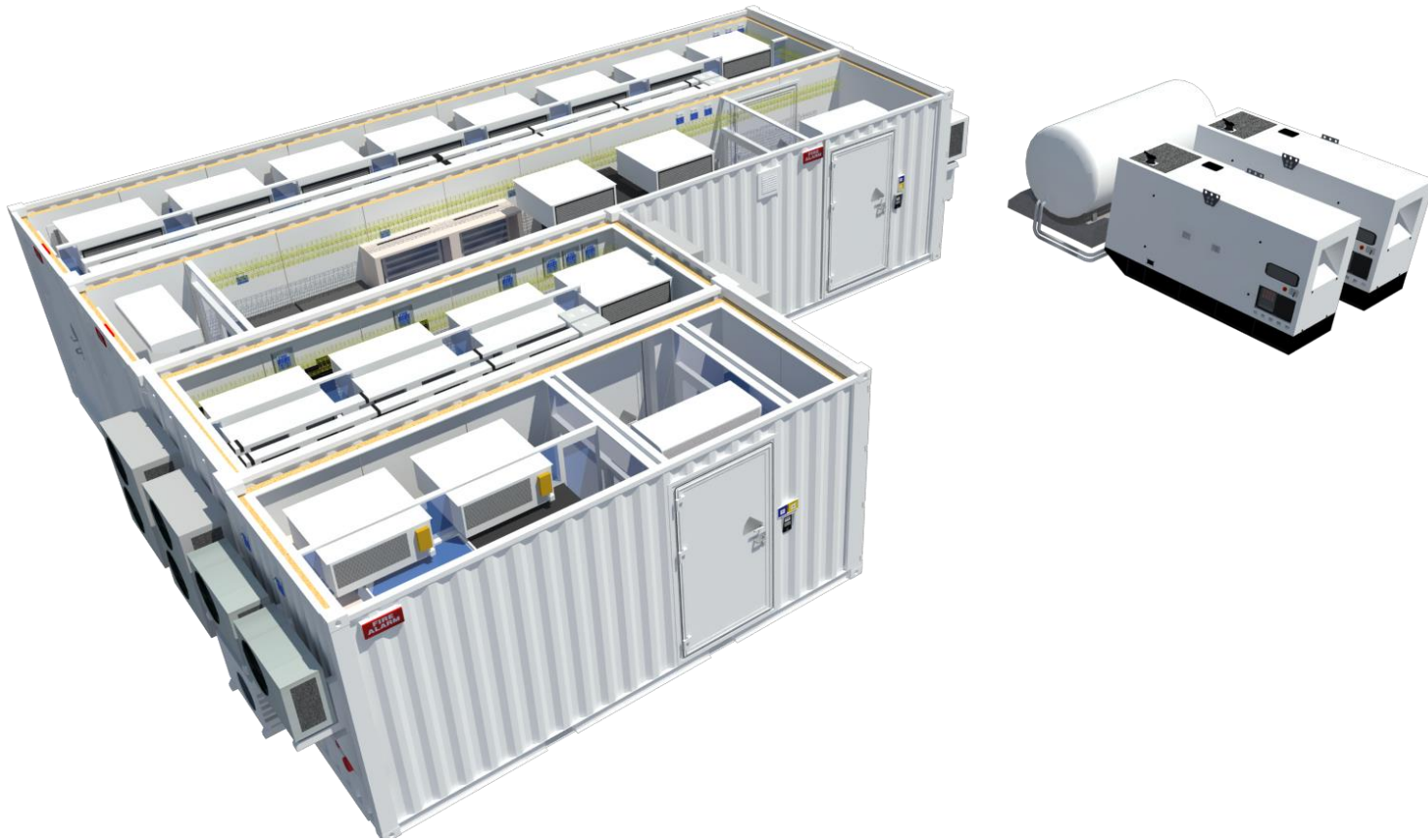
- Chillers
- Economizers
- Pump packages
- Monitoring and Control
- Optional UPS

IT Space



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

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



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

Types of Prefabricated Solutions

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



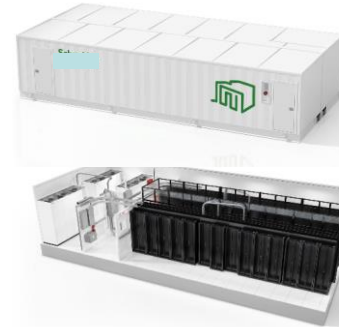
Custom Sized Modules

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

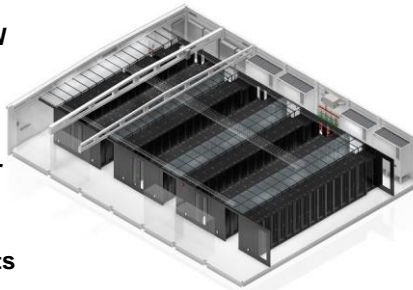


Data Halls

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



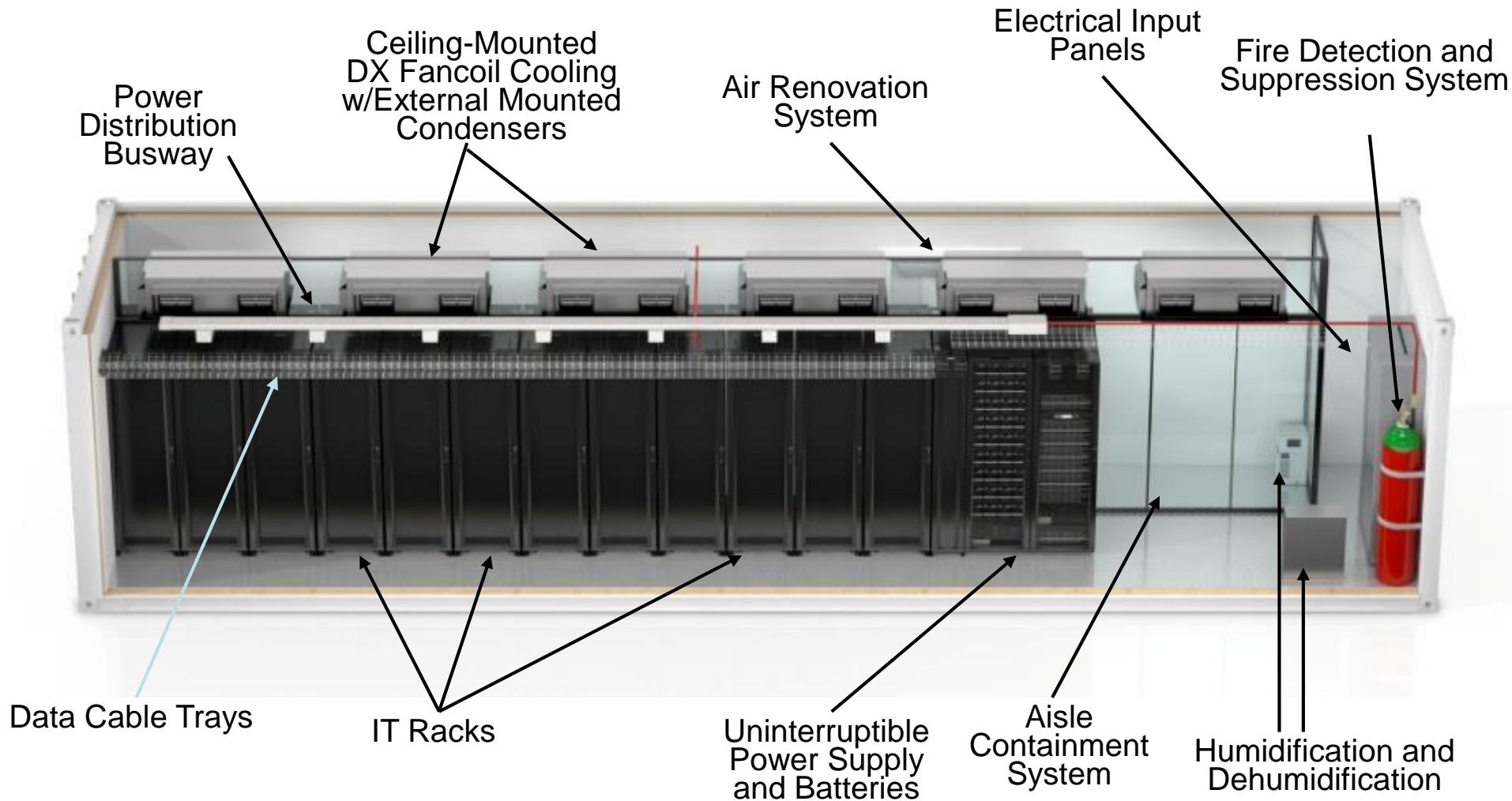
Prefabricated Rooms

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 ISO Container “All-in-One” Data Center



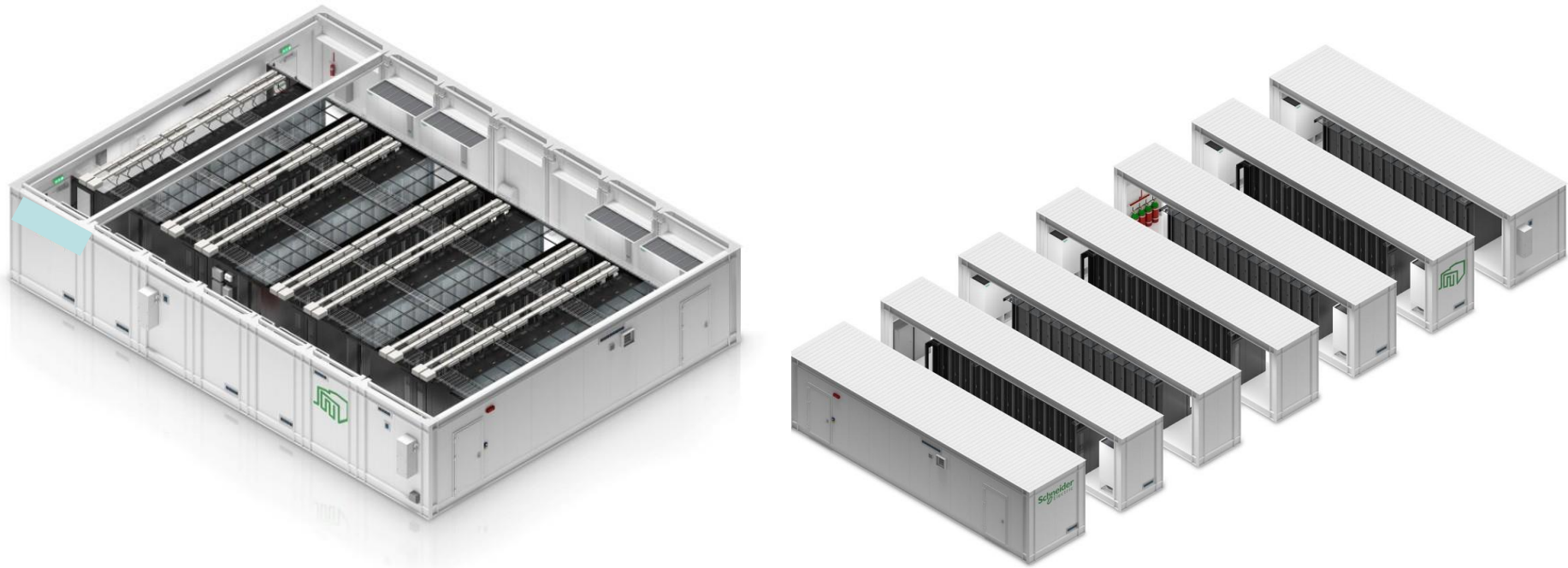
Example of a Module “All-in-One” Data Center

- Wider and longer than an ISO container solution, allowing for multiple rows of racks and full width hot and cold aisles
- Complete data center with IT racks, power, power distribution, cooling, security, monitoring, fire detection and suppression
- Can be configured with separate rooms for IT space, electrical rooms, vestibule, etc.
- Multiple modules can be joined together for larger applications with multiple rows of IT racks



Example of a Prefabricated Data Hall

- Designed and built as a complete system
- Factory assembled and tested
- Delivered to site as individual modules that are re-joined into a finished, robust building
- Manufactured, Installed, and Commissioned in less than 6 months
- Install indoor or outside, in nearly any environment



Prefabricated Data Center advantages to O&G Operations

Simple and Repeatable

- Deliverable in remote locations and space constrained environments
- Pre-engineered solutions simplify design and build process
- Deploy same basic design in multiple sites around the world

Faster Deployment

- Pre-manufactured and pre-tested prior to delivery
- Site preparation done concurrently with manufacturing
- Delivery in 16-20 weeks or less (upon design sign-off and receipt of PO)

Predictable Performance

- The availability, security and efficiency you expected
- Optimized to prevent critical data loss in O&G operation sites
- Designed to withstand harsh environmental conditions

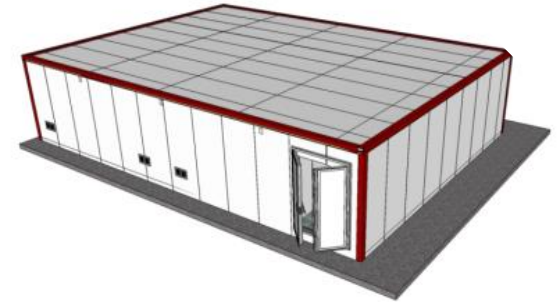
Large range of solutions

Power



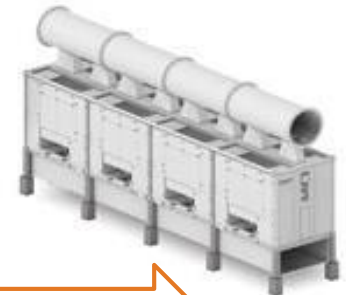
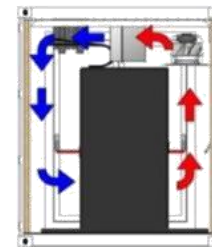
200kW – 1.5+MW

IT Space



5 Racks – 200+ Racks

Cooling



DX – Chilled Water – Direct Air – Indirect Air

PCIC MIDDLE EAST

Modular 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.



Global Applications

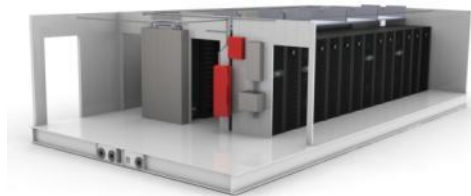
Modular prefab solutions can be engineered to meet your needs

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



Prefabricated Data Center versus Traditional

	Prefabricated Data Center	Traditional Data Center
Time to Deploy	8 – 16 weeks	18 – 24 months
Scalability	Add as you need	Must know needs for 15 – 20 years on day 1
Flexibility	Add various modules of different sizes, power densities, cooling capacities, etc.	Locked in to all these factors from day 1
Capital Expense	Pay as you grow, only pay for what you need today	Must pay for size and capacity you may never need
Operating Expense	Very efficient, uses latest technologies, smaller spaces	Locked in to technology, larger, unused space
Construction	All done in a factory, quality controlled, tested, little on-site construction	All done on-site, results vary by labor crews, weather delays, delivery delays, massive on-site construction
Reuse	Can be moved and reused	Cannot be moved

When considering a prefabricated 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

Prefabricated Data Center Example Installations in Harsh / Remote Environments





Thank you

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