



Evolution of Micro Data Centers In the Era of Edge Computing

DATA CENTER INDIA 2018
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STERLING & WILSON



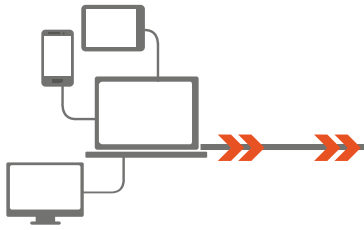


Multiple Smart Cities being announced across all geographies

Smart City. There are numerous definitions for smart city, but the common themes tend to focus on the use of technologies and data to enhance a city's economic development, sustainability, and a higher quality of life for its citizens.



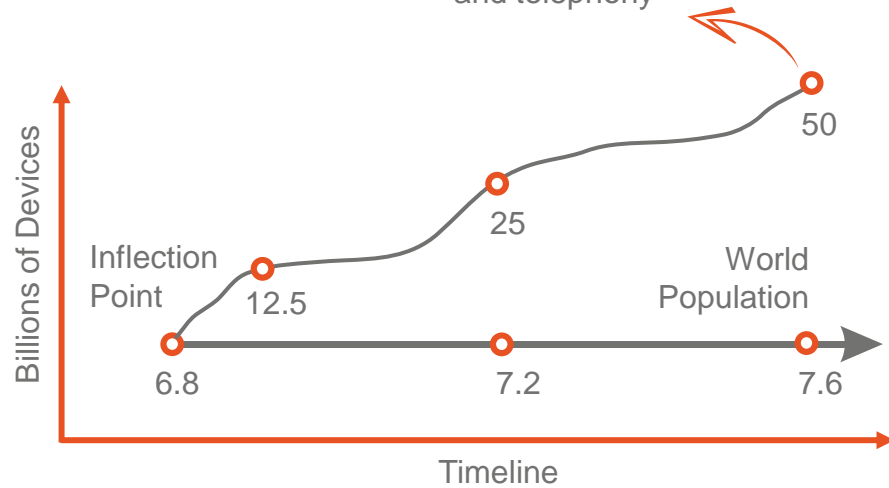
Smart City infrastructure designs tend to follow a common architecture. A smart city gathers data from sensors, transports this data through information and communications networks, analyzes this data, and provides value-added outcomes.



This Data is Headed Straight for your Data Center



50 billion Rapid Adoption Rate of Digital Infrastructure: 5X Faster than electricity and telephony
“Smart Objects”



Source: Cisco Systems



Source: Forbes

By 2020,

the number of things connected to the internet will be approximately

7X 


the number of people on earth today.





Smart Data Center of the Future

A confluence of mega-trends in technology that together finally provide cost and scale opportunities




- Sensing and data gathering
- Internet of Things (IoT)



- Data transport and storage
- Information & Communications Technology (ICT)

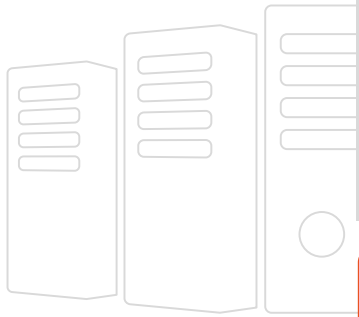


- Data analysis and optimization
- Big Data / Data Analysis



- Services
- Cloud

Building Block Infrastructure of Data Center



5G PROMISES

Computing speeds: **10 times faster** than current networks (10 gigabits per second downloads).

Implications on Data Centers

Mix of edge and modular data centers



Improved network readiness



Larger scale of power, cooling, servers, racks, PDUs, and space.



Increased processing rates and storage capacity



Shift from decentralized mobile networks



Increased centralization of processing capacity



DCs closer to towers



Expansion of DC Infra facilities

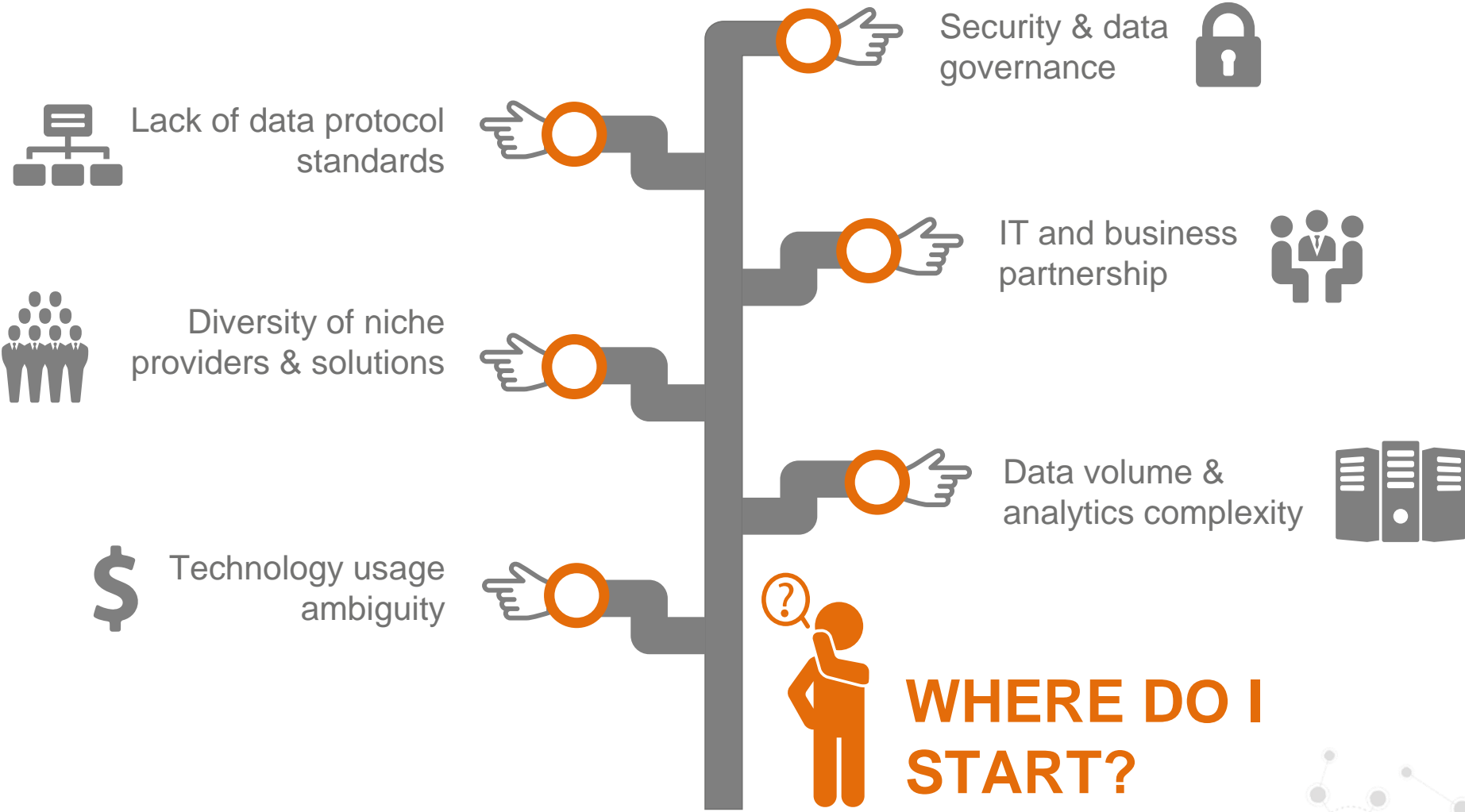


Smaller data centers to support towers.

THE CHALLENGES



THE CHALLENGES AND RISKS CAN SEEM OVERWHELMING



SEAMLESS EXPANSION & SCALABILITY CHALLENGES

01

Traditional Data Center Architectures are not agile and flexible for addressing imminent expansion requirement

02

Lack of scalable and modular approach resulting in high CAPEX and also affects capacity planning

03

Optimum sizing of power and cooling equipment's

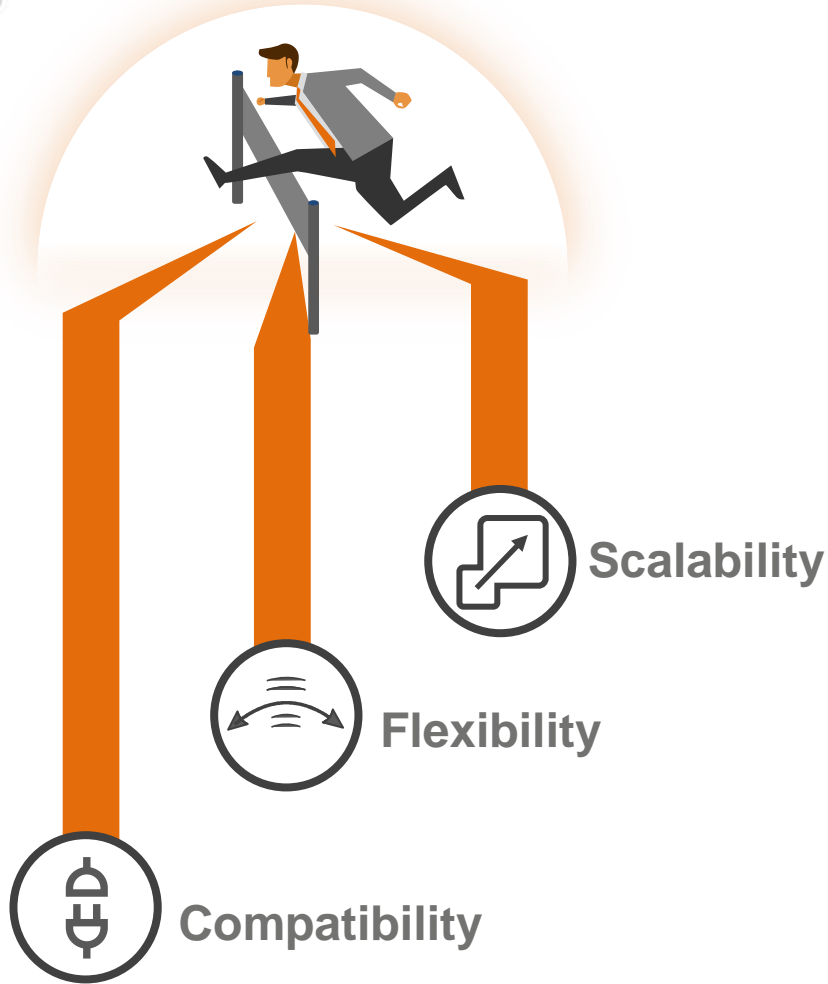
04









Increase in OPEX in each phase of expansion, due to under-utilization

05

Seamless expansion becomes a challenge resulting in frequent downtimes

PHYSICAL INFRA CHALLENGES GOING FORWARD



-  Land for Hyperscale DC being scouted in Metropolitan cities in lieu of well established support (power, networking) but land acquisition/ rentals costly
-  Dynamic and ever changing Technology ecosystem
-  Seamless Expansion & Scalability
-  High Capex and Total cost of ownership
-  Optimum space utilization
-  Boom in Data Usage and high power density
-  High Deployment time
-  Physical Infrastructure has to cope up with IoT and Software Defined DC

LATENCY MATTERS.....!!!



"being fast really matters...half a second delay caused a 20% drop in traffic. and it killed user satisfaction"



- Marissa Mayer @ Web 2.0 (2008)

*"...a 400 millisecond delay resulted in a -0.59% change in searches/user",
[i.e. Google would lose 8 million searches per day - they'd serve up many millions fewer online adverts]*



- Jake Brutlag, Google Search (2009)

"...for Amazon every 100 ms increase in load times decreased sales with 1%"

- Andy King, book author



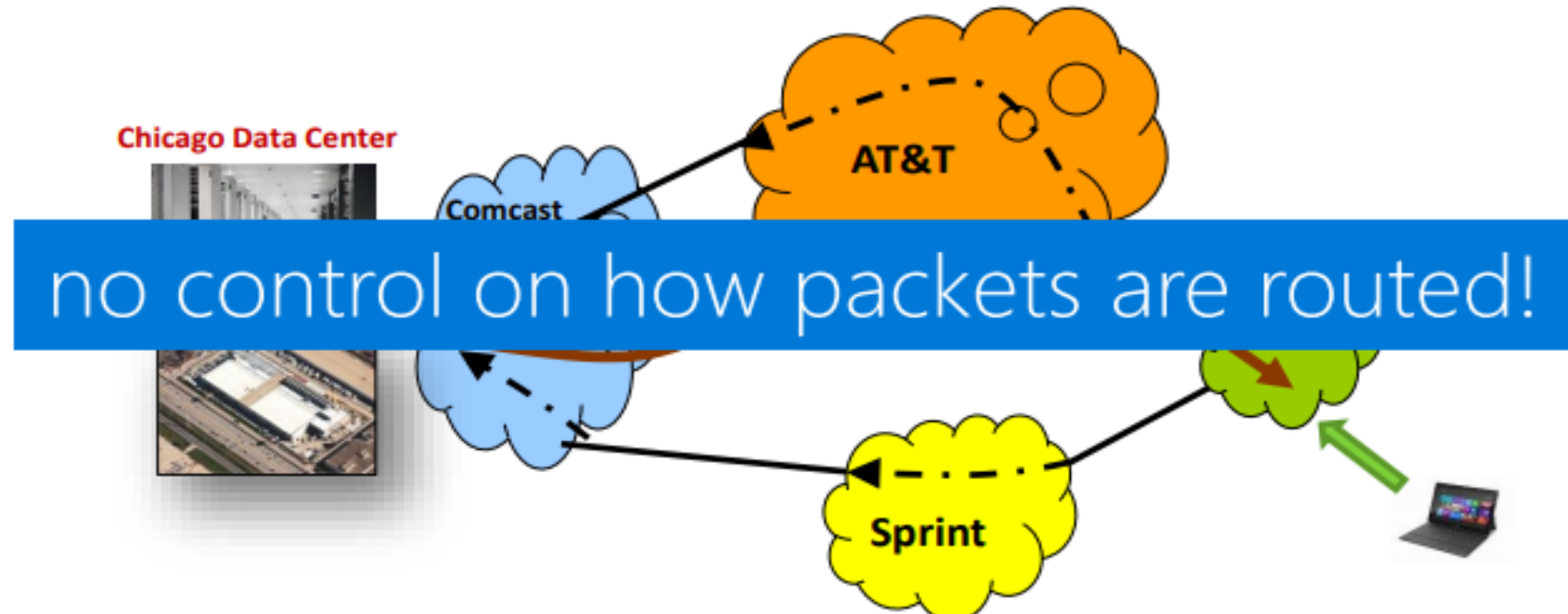
"...when 50% of traffic was redirected to our edges preliminary results showed a 5.9% increase in click-thru rates"

- Andy Lientz, Partner GPM, BingEdge (2013)



INTERNET : A NETWORK OF NETWORKS

A collection of many autonomous systems managed by many ISP's with complex peering relationships



.....but how we can reduce **LATENCY** further ???

Get the packets under our control as soon as possible

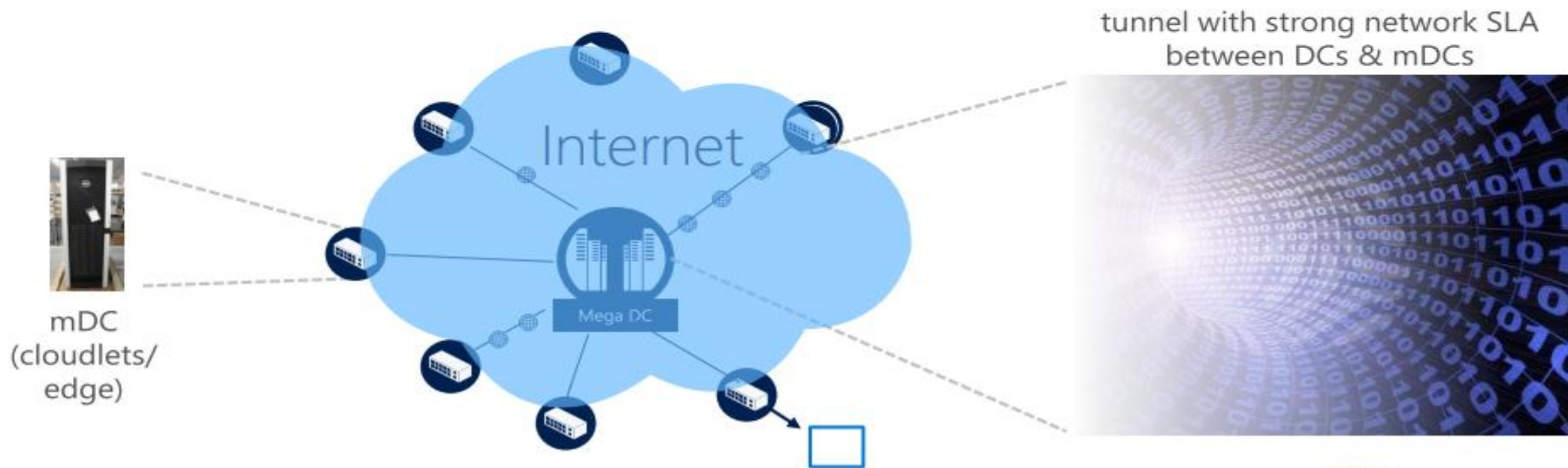
How ??

- Bring the cloud closer to the end-user
- Build lots of DC's around the world and place them in strategic locations

Is Building Hyper scale Data Centers enough ???

no, it's capital intensive and expensive to operate

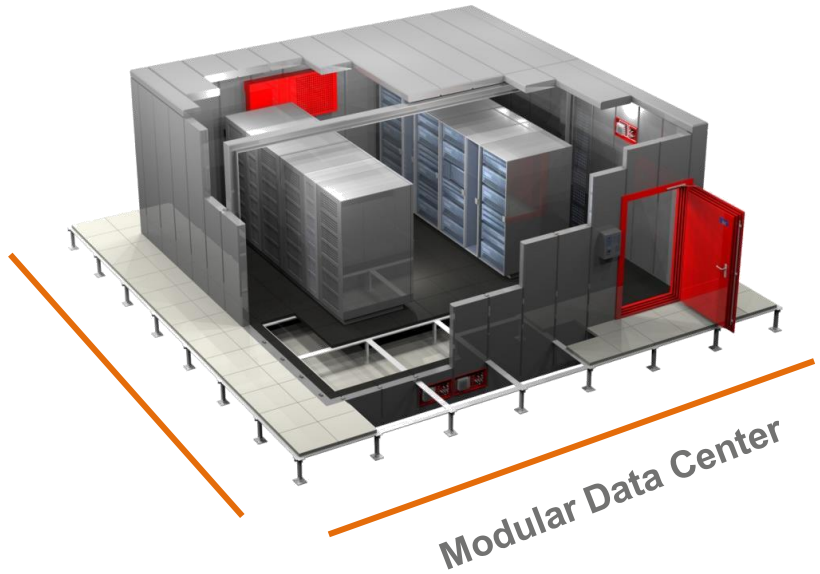
smarter approach: build an extensive infrastructure of micro DCs (1-10s of servers with several TBs of storage, \$20K-\$200K/mDC) and place them everywhere



THE SOLUTION



Sterling & Wilson Modular Data Center Offerings



Containerized Data Center (CDC)

Data Center - End to End scope



Value to Customer
←→



Design

- Energy efficient technology
- Vendor neutral
- TIA 942 & Uptime Institute compliant



Build

- Rapid data center deployment
- Skilled dedicated project and engineering resources



O & M

- Skilled Monitoring
- Total Facility Management
- Detailed & customized reporting



Rich experience of executing IT/ITES & Data Centre Projects



In-house expertise for Civil, Electrical, IBMS, HVAC, Fire fighting, DG sets and O&M division

200 in-house design engineers across India



ATD, CDCP, CDCS & PMP professionals for Data Center projects

Strong team for **liaisoning** with the authorities



Preparation of coordinated drawings using **3D Revit**

Data Center Standards & Guidelines

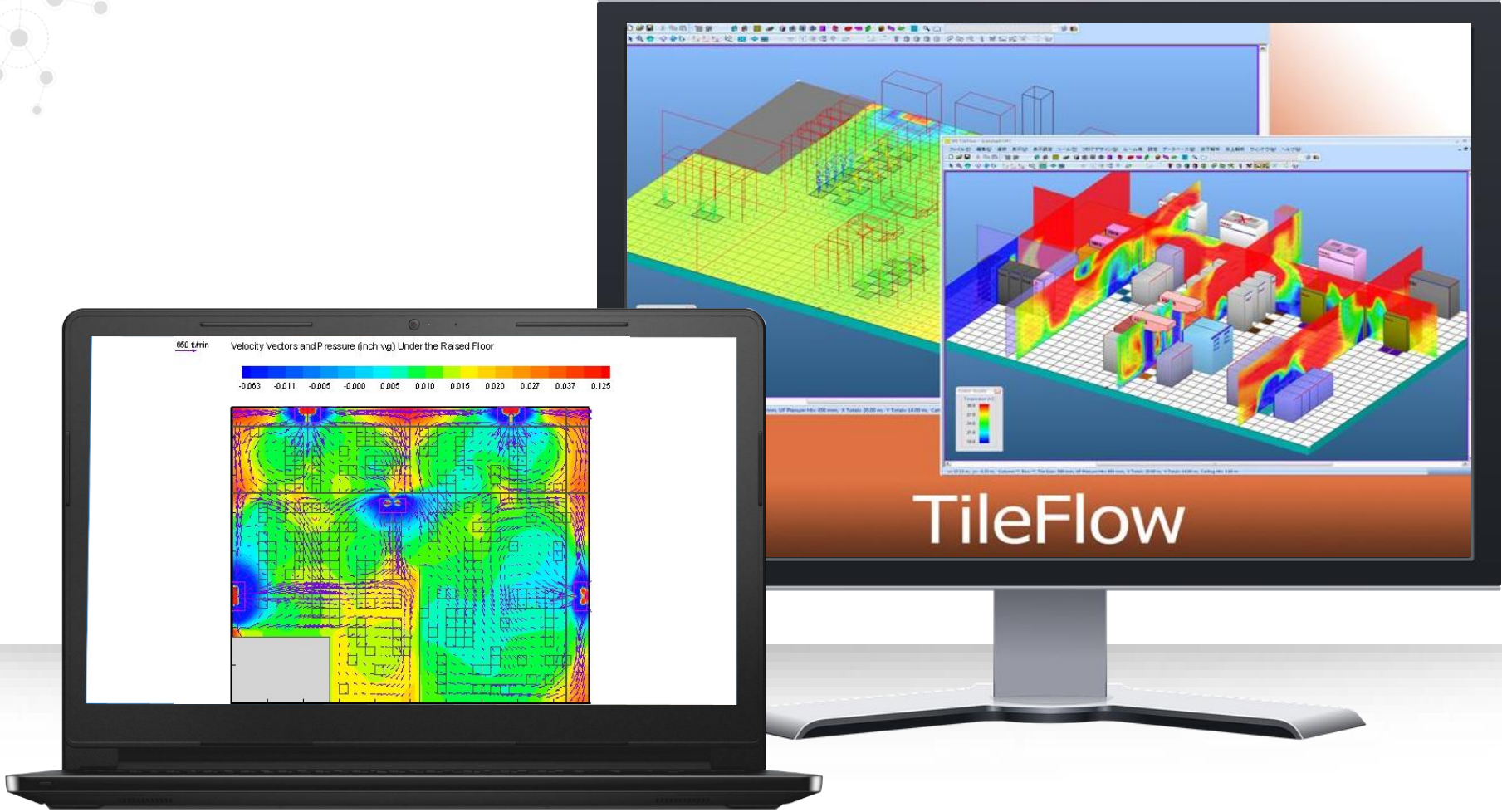


Use of Latest Softwares for Facility Design

3D Modelling “Revit” MEP software is used for critical co-ordination drawings



CFD Analysis to monitor Airflow Management



MODULAR DC SOLUTIONS

STERLING & WILSON



A conglomerate with global presence
and focus on Data Centers

DATA CENTER

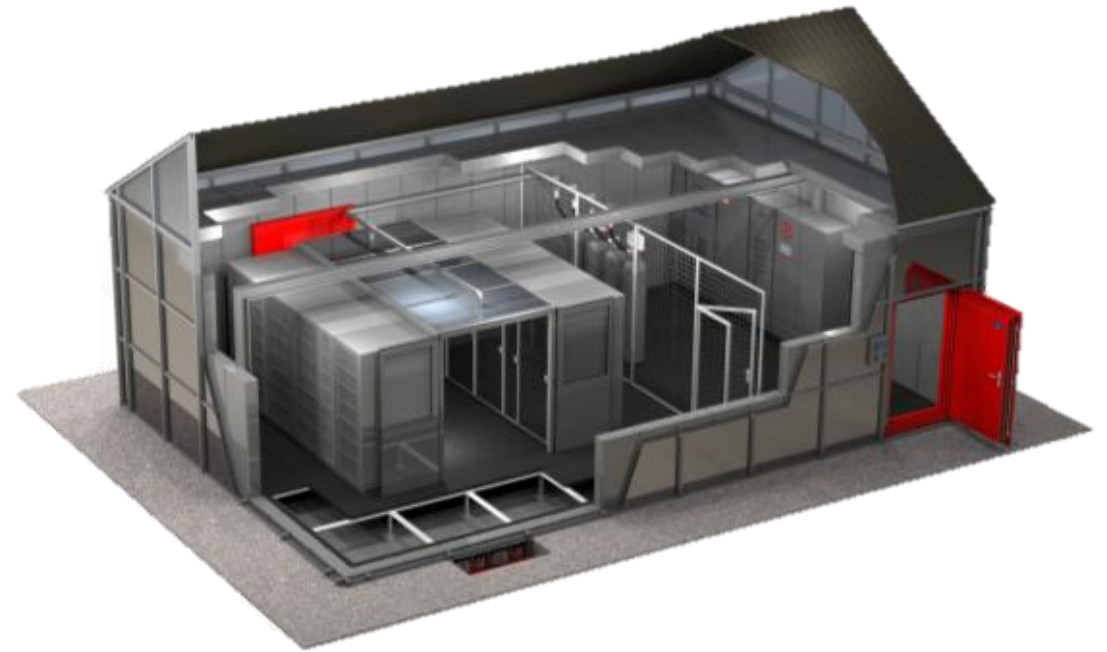
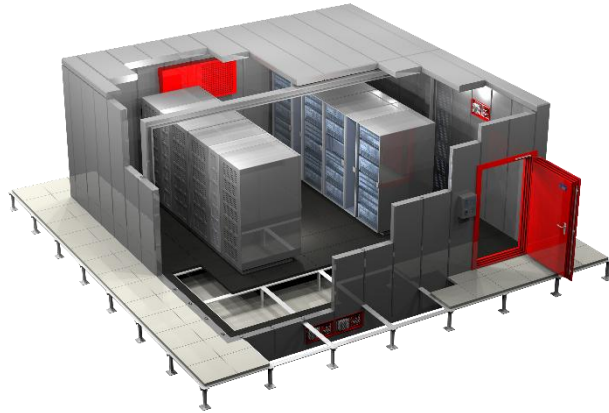


GROUP

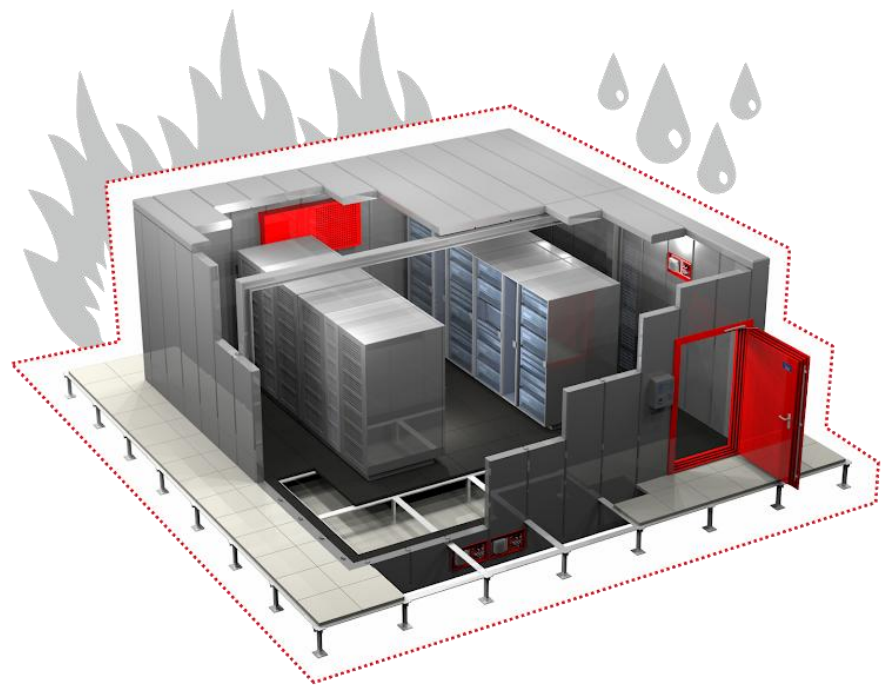
High-tech solutions in
Modular Data Center

DATA CENTER – IT ROOM

Expandable from a mini data center to a large data center or with a move to an outdoor data center



DATA CENTER – IT SECURITY



Admissible Values to EN 1047

	Temperature Rise	Relative Humidity
Hardware	50 Kelvin	85 %
Data Media	30 Kelvin	85 %

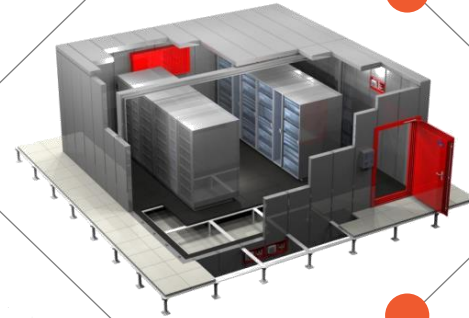
360° Protection

- 
 Noise
- 
 Dust
- 
 Fire
- 
 Fire-fighting water
- 
 Explosion
- 
 Vandalism
- 
 Eavesdropping / Radiation
- 
 Corrosive gases
- 
 Unauthorized access
- 
 Debris

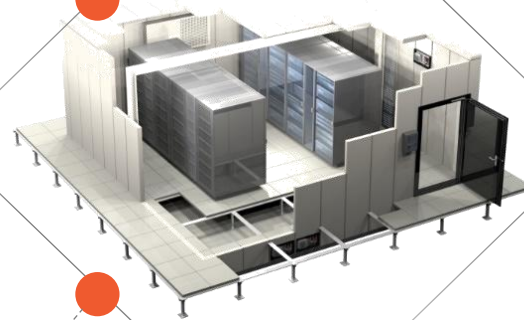
DESIGNED FOR EFFICIENCY

Embrace Modular Approach for Space Optimization

1. Aisle Containment for better airflow management and improved PUE

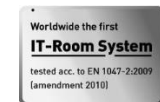


3. Both horizontal and down flow air supply mode can be used for variable power density environment



4. Independent POD deployment could be one of the options for co-location environment

2. Modular design and deployment increases usable white space



TEST CERTIFICATES GRANITE-ROOM

System Test

50 K temp & rel. humidity <85% threshold acc to EN 1047-2 t	30 min compliance within limit acc. EI 90 as per EN 1363 & EN 13501
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Component Test

EI180 Certified from the outside acc. to EN 1363-1 & EN 13501-2	EI120 Certified from the inside acc. to EN 1363-1 & EN 13501-2
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Worldwide the first
IT-Room System
tested acc. to EN 1047-2:2009
(amendment 2010)

Protection Test

Burglary protection RC 3 acc. to EN 1630	Protection against falling debris acc. per DIN 4102 - 2	IP 56 Type test against water & dust, acc. to EN 60529	Protection against stagnant water (500 mm)
Type test for smoke gas tightness acc. to EN 1634-3 (only for 9.3)	Type test for acoustic insulation acc. to DIN 4109, DIN EN ISO 354, DIN EN ISO140 & DIN EN ISO 717	Explosion protection classes EXR-2 and EXR-3	Door system WK3 or RC2 (optional)

PROJECT SNAPSHOTS

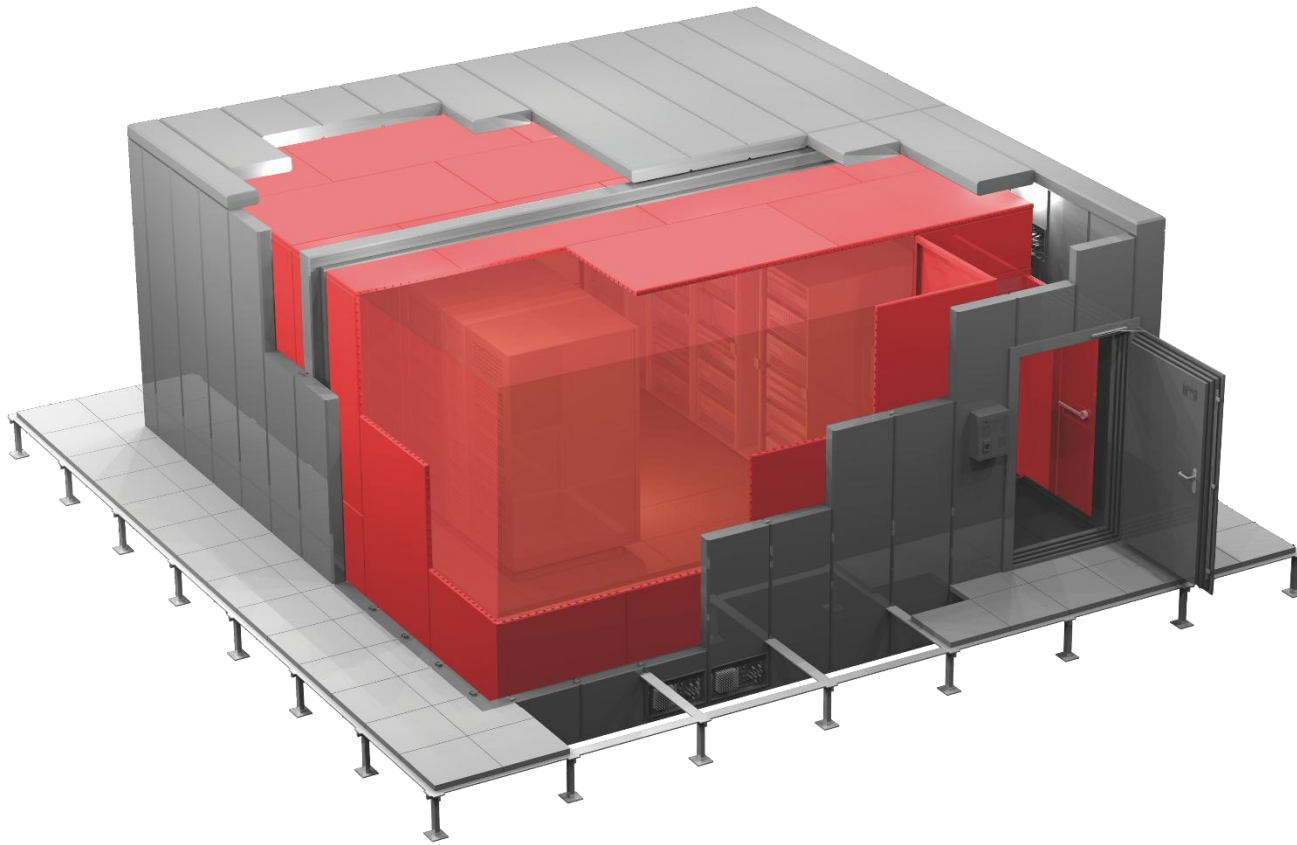


PROJECT SNAPSHOTS





ROOM – IN ROOM DATA CENTER PROVIDES BETTER EFFICIENCY



Flexibility & Adaptability

To building requirements by fully modular cell design



Easy and fast assembly

Disassembly and reassembly based on patented interconnection elements



Floor space saving

No assembly/installation distance to the building walls required



Improved security

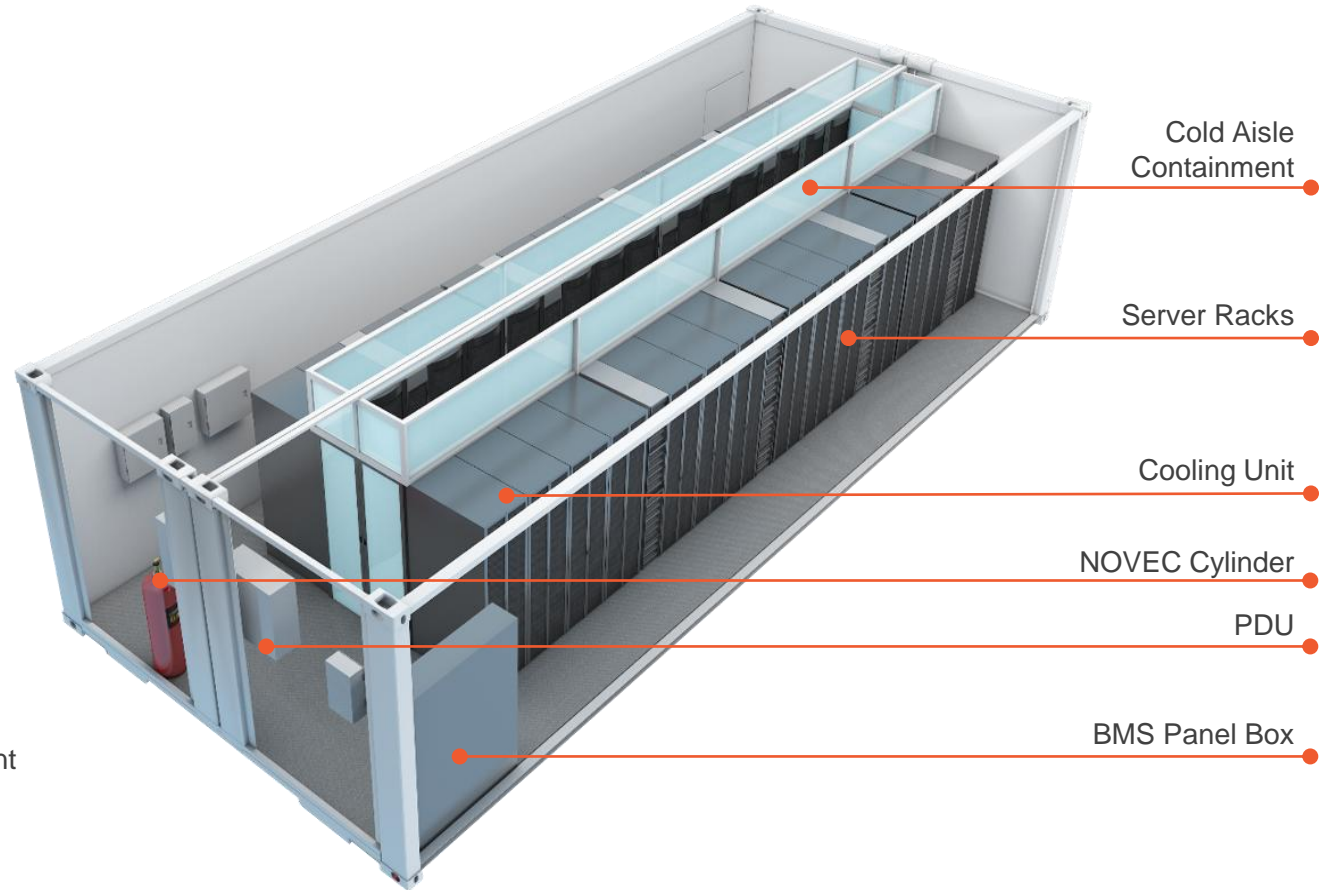
Interlinking elements are invisible and exclusively accessible from inside



CONTAINERIZED DATA CENTER

CUSTOM DC DESIGN – Sample 1

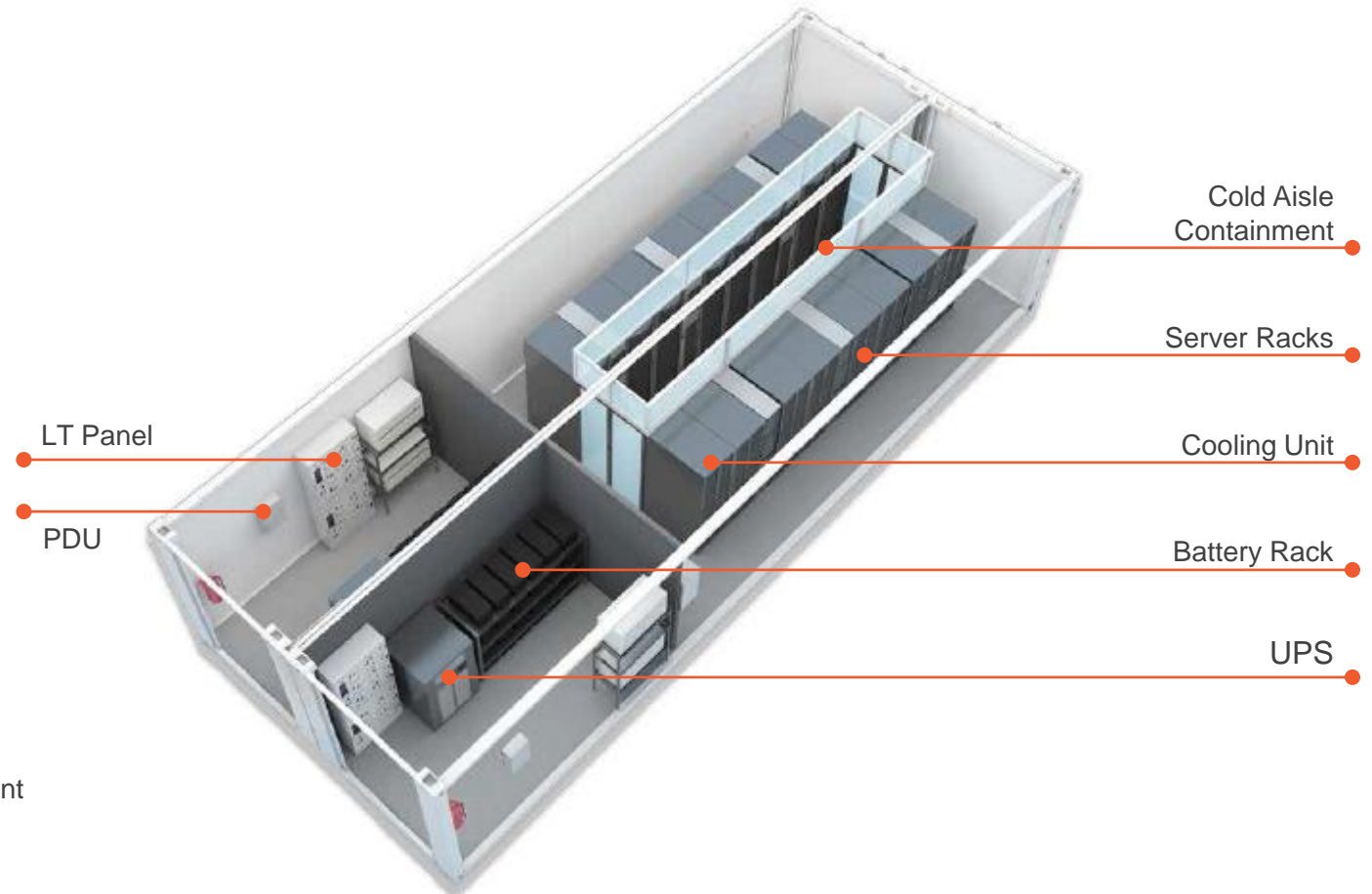
Separate Modules of IT & Power



- 28 racks in a single module of two 40 feet containers
- Power Module in separate container with redundancy
- Air conditioning with in-row cooling and cold aisle containment
- Complies to Tier IV level

CUSTOM DC DESIGN – Sample 2

Integrated Modules of IT & Power



- 16 racks in a single module of two 40 feet containers
- Built-in Power Module with separate Diesel Generator
- Air conditioning with in-row cooling and cold aisle containment
- Complies to Tier IV level

CONTAINER DATA CENTER BENEFITS



Save Money

- Shorter depreciation period
- Lower taxes
- Reduced labor costs
- Higher efficiencies
- Reduced operating cost



Save Time

- Reduced installation challenges
- Eliminates storage
- Speeds construction
- Easy to redesign



Provides Flexibility

- Requires less space than conventional site-built construction
- Provides portability

APPLICATION SCENARIOS - CDC



SHAPOORJI PALLONJI - GROUP COMPANIES



Reputed construction company in India providing services to Industrial, Commercial and Residential sectors



AFCONS INFRASTRUCTURE LIMITED

Leading provider of construction services to the infrastructure industry



Offers global support in turnkey projects for MEP and EPC space across sectors
Or Provides commendable leadership/ interventions across MEP and EPC space



Engineering, Procurement and Construction solutions for Minerals, Metals & Power sector



Leading real estate company in India, with presence in residential and commercial (including IT / ITES) segments



Infrastructure developer with presence in power, roads and ports



Businesses spanning, Engineering and Automation



Leading domestic provider of water purification and cleaning products / systems

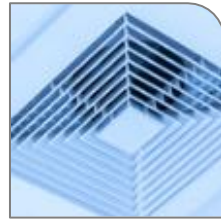


Manufacturer of textiles including industrial yarns, fabrics and garments

Turnkey MEP Services



Electrical



HVAC



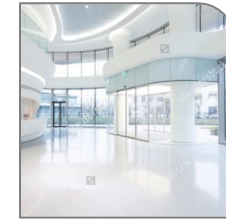
Plumbing



Fire Fighting



Security and Fire Alarm Systems



MEP Service and O&M

Renewables



Solar EPC



Roof Top Solar



Wind Energy



Storage and Hybrid Energy Solutions

SW Manufacturing



Diesel Generators



HT/ LT Panels

BUSINESS VERTICALS

Turnkey Data Centers



Power and Cogen Solutions



Transmission and Distribution



Mechanical EPC



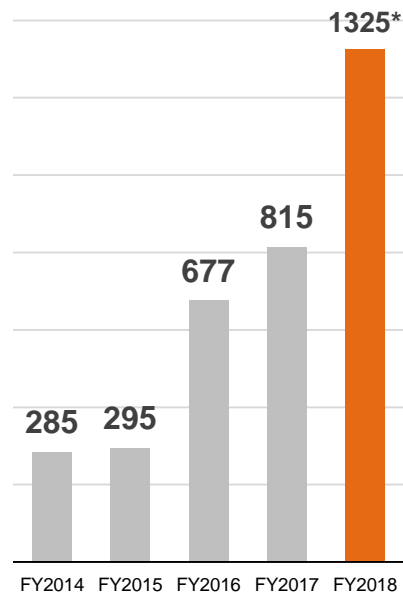
IPP



Turnover & Manpower



Annual Turnover (USD Mn)



Exchange Rate - USD:INR = 67 *Projected

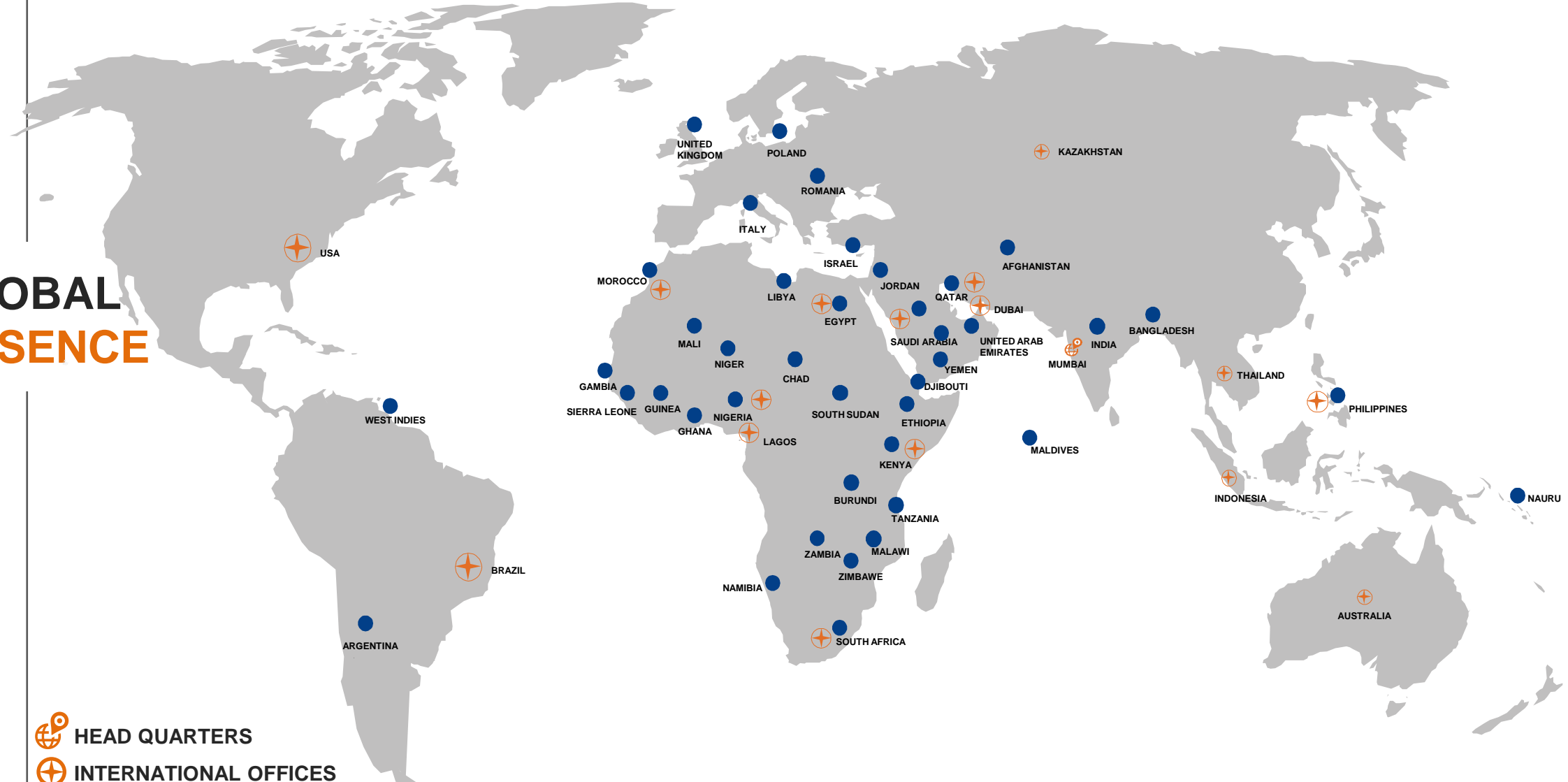
*FY17 numbers are unaudited




Manpower Strength Core of Project Execution



Total Manpower - 3560

GLOBAL PRESENCE



-  HEAD QUARTERS
-  INTERNATIONAL OFFICES
-  OUR PROJECTS

ONGOING PROJECTS - Turnkey

Bhamashah State Data Center, Jaipur



Green field project



Design and Build



USD 80 Mn



Jaipur



- Data Center Building of G + 6 floors
- Technical Hub building G + 8 floors
- Total built up area ~ 3,64,000 sqft
- Civil, Electrical, HVAC, IBMS, FF & Plumbing
- Design expandable up to 600 Racks
- Operation & Maintenance for 5 years



PROJECT DETAILS

Bhamashah State Data Center, Jaipur

Applications



City Surveillance



Server storage for Internal Government departments



Public Grievance Redressal Mechanism



BHAMASHAH Card

- BSDC will be **10th in the world, 2nd in Asia and 1st in India** to have all three certificates:
 - Design Certification
 - Constructed facility certification
 - Operational Sustainability certification
- **1st Government Data Centre in the WORLD** to achieve three levels of Uptime Certification
- Data Centre of ~ 4 MW IT load to be completed in the shortest time compared to equivalent and others

Annexe Block Design



EXECUTED PROJECTS – National Securities & Depository Ltd.(NSDL),Bengaluru



Ground + 7 storey building



Construction & Development



USD 10 Mn



Bengaluru



- Construction
- Ground + 7 storey building as per Seismic requirement
- Green field project – Design and Build
- Civil, Electrical, HVAC, IBMS, FF & Plumbing
- 380 racks design
- Architecture of the entire building LEED Platinum Certification
- 9 MVA ultimate power and 1950 TR Chillers



INTERIOR SNAPSHOTS



EXECUTED PROJECTS –Vodafone, Chennai



Telephone exchange (MTX) development, Area – 1 acre



Design and Build



USD 7 Mn



Chennai



- Building of G + 4 floors with floor plate 15,000 sq ft in phased manner
- Civil, Electrical, HVAC, IBMS, FF & Plumbing
- Min. 250 racks design - expandable up to 700 Racks with modular fit-out option over 3-5 years
- Energy efficiency measured as PUE Category 2 of 1.6 or less
- Peer design review by Royal Haskonings
- “HSE Champ” Safety Award
- Featured in “India’s Best Jobs” by Discovery Channel



INTERIOR SNAPSHOTS



EXECUTED PROJECTS –National Stock Exchange (NSE), Chennai



Tier - IV Data Center with 150 racks



Construction & Development



USD 7 Mn



Chennai



- Construction
Basement + Ground + 3 Storied building
- Architecture of the building with LEED Platinum Certification
- 1 MVA ultimate power with all statutory approvals and power sanctioning



INTERIOR SNAPSHOTS



EXECUTED PROJECTS -Siemens Industry Software, Pune



Tier III Data Center



Design Build Turnkey



Pune



- Testing & Electricals – UPS Panels & Electrical AC works
- Installation and Commissioning of along with batteries
- LT PDUs along with allied works
- HVAC - Precision systems
- Civil Interiors and Relocation of servers



INTERIOR SNAPSHOTS



EXECUTED PROJECTS – MULTIPLE DC'S ETISALAT



AHMEDABAD

Completion
in
5 months



JAIPUR

Completion
in
4 months



LUCKNOW

Completion
in
5 months



AMBALA

Completion
in
4 months

OVERALL CLIENTELE

 Shopping & mall	 Residential	 Manufacturing Automobile	 Chemicals	 Textile	 Pharmaceutical	 Engineering	 Infrastructure
		 Mercedes-Benz	 The Chemical Company	 Bombay Rayon Fashions Limited			
 CELEBRATE EVERYDAY			 asianpaints	 ADITYA BIRLA GROUP			
	 BUILDING A BETTER LIFE		 For Lasting Beauty and Protection				
 LIVE THE MOVIE				 ACTIVE THINKING			

OVERALL CLIENTELE

IT & ITES	BFSI	Hospitality	Commercial & Corporate	Institutions	Governments & PSU	Health Care	Telecom

KEY DATA CENTER CLIENTS

 <p>NSDL Technology, Trust & Reach</p>	 <p>DoIT Department of Information Technology & Communication</p>	 <p>STTelemedia Global Data Centres</p>	 <p>vodafone</p>
 <p>NTT Communications Transform. Transcend.</p>	 <p>CtrlS</p>	 <p>WIPRO Applying Thought</p>	 <p>Hewlett Packard Enterprise</p>
 <p>IBM</p>	 <p>SIEMENS</p>	 <p>NSE National Stock Exchange of India Limited</p>	 <p>sify</p>



THANK
YOU



