



# Digital Transformation - What role do Data Centres play?

WheelHouse Solutions by Siemon

PRESENTED BY

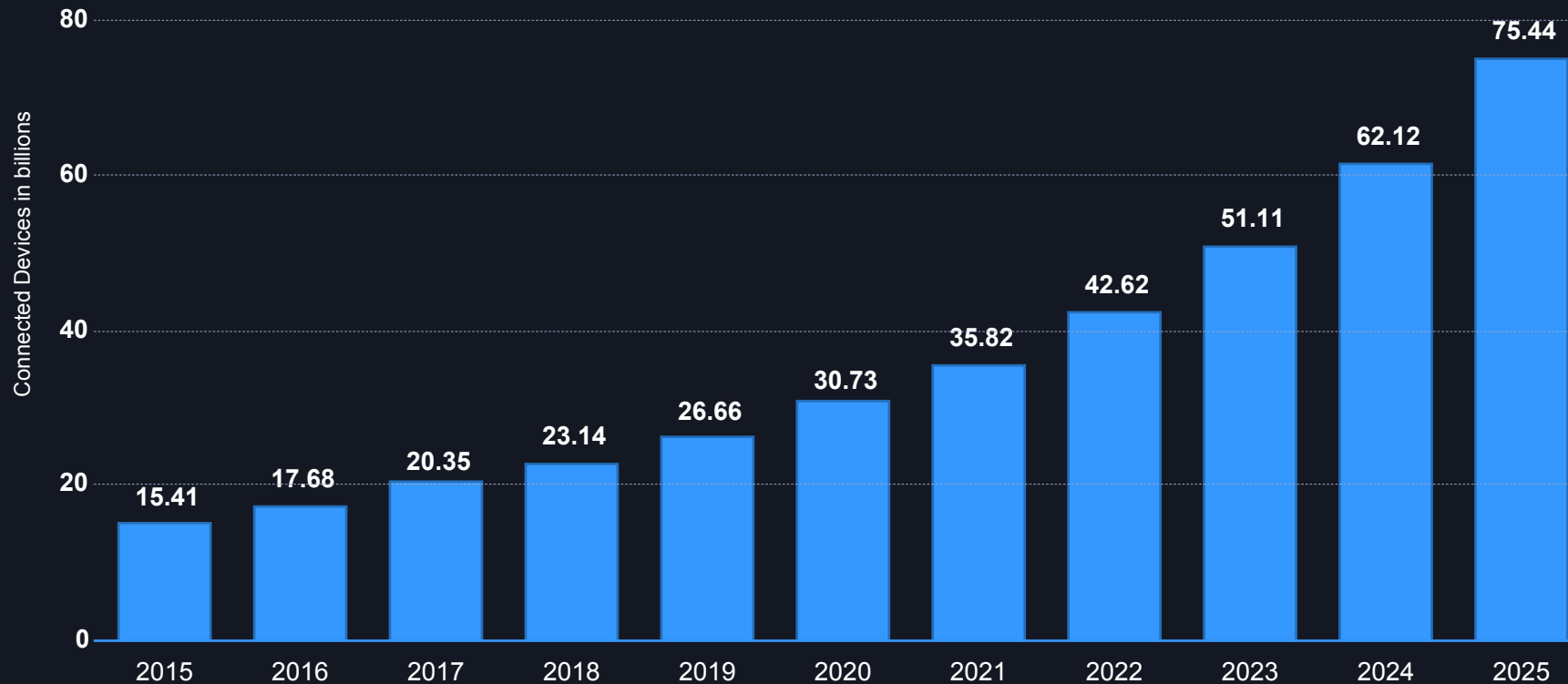
LEE FUNNELL | TECHNICAL MANAGER – ERA

# Agenda

- The "Internet of Everything" explosion!
- Physical Infrastructure consideration
  - DC Architecture
  - Cabling
  - Cabinets
  - PDU
- Wheel House

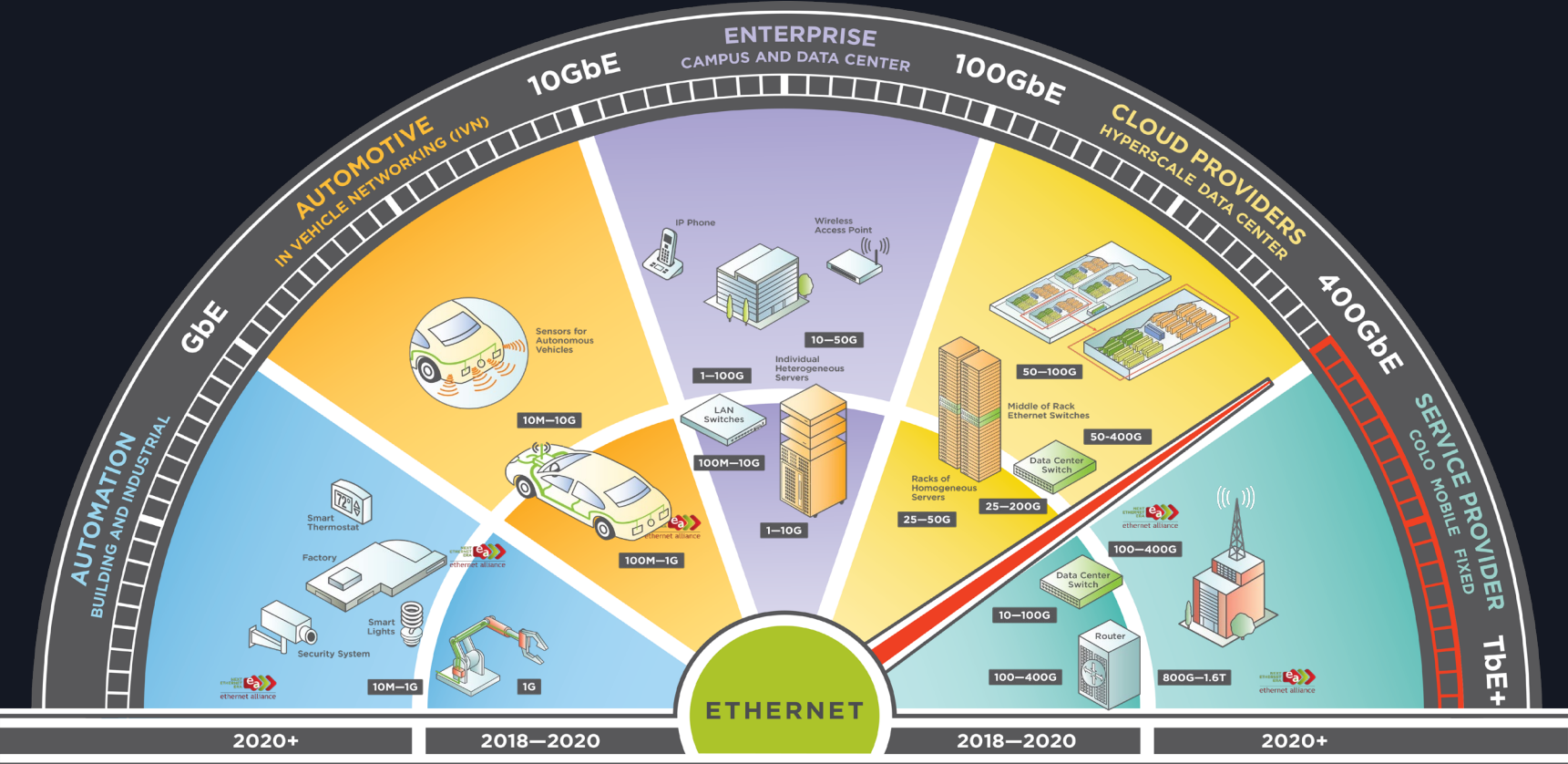
# IoE – Internet of **EVERYTHING**

IoT connected devices installed base worldwide from 2015 - 2025  
(in billions)



Source  
HIS © Statista 2018

# Ethernet Roadmap



# In the next 5-10 years, we expect:

- Direct attach twinaxial
  - 400 Gb/s over 8 lanes of 50 Gb/s
- Singlemode Optical Fiber
  - 400 Gb/s over 2 or 4 WDM lanes
- Multi-mode Optical Fiber
  - 400 Gb/s over 8 lanes
- Balanced Twisted-Pair
  - 50 Gb/s (TBD) over four pairs
- Wireless
  - Real world speeds greater than 2 Gb/s



# Pressure for Data Centers



- Fast development of IoT
- Big Data
- Cloud-based business
- Storage Solutions

# Physical Infrastructure Consideration

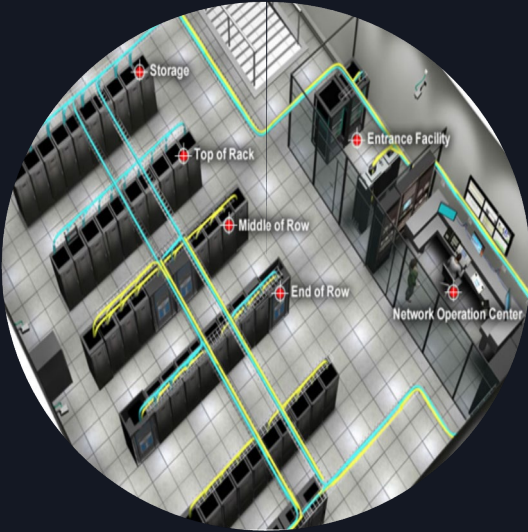
**DC Architecture**

**Cabling**

**Cabinets**

**PDU**

# DC Architecture



Traditional architecture

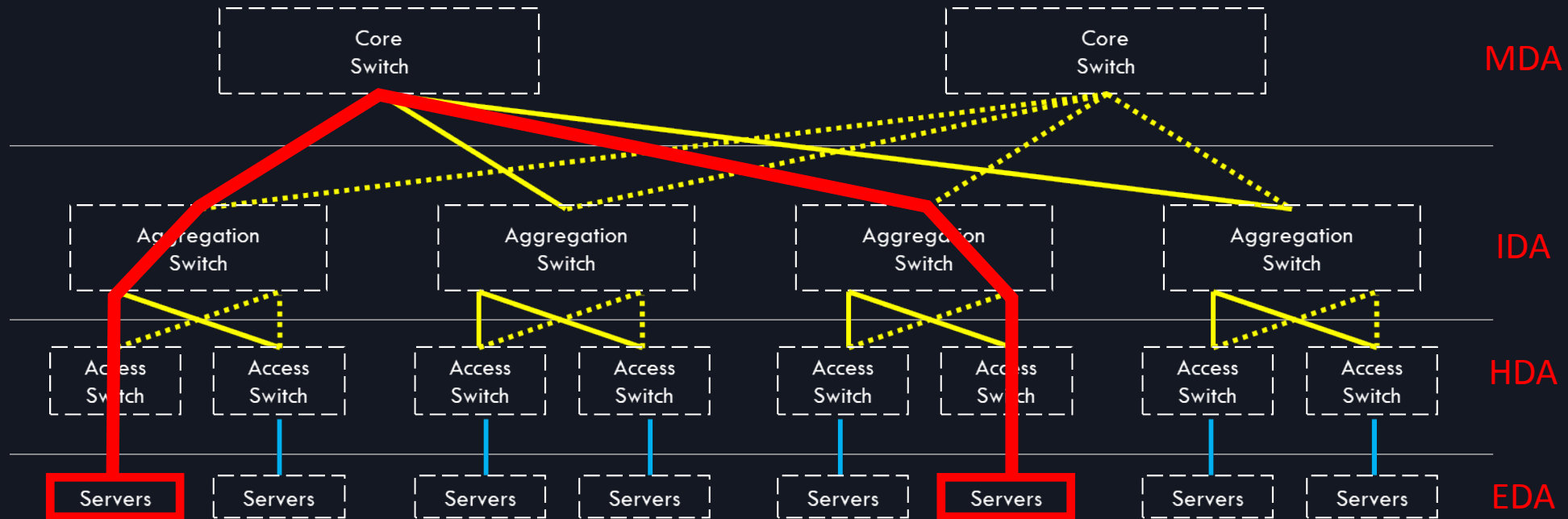
Spine-Leaf

Top of Rack / Any to All



# Traditional architecture

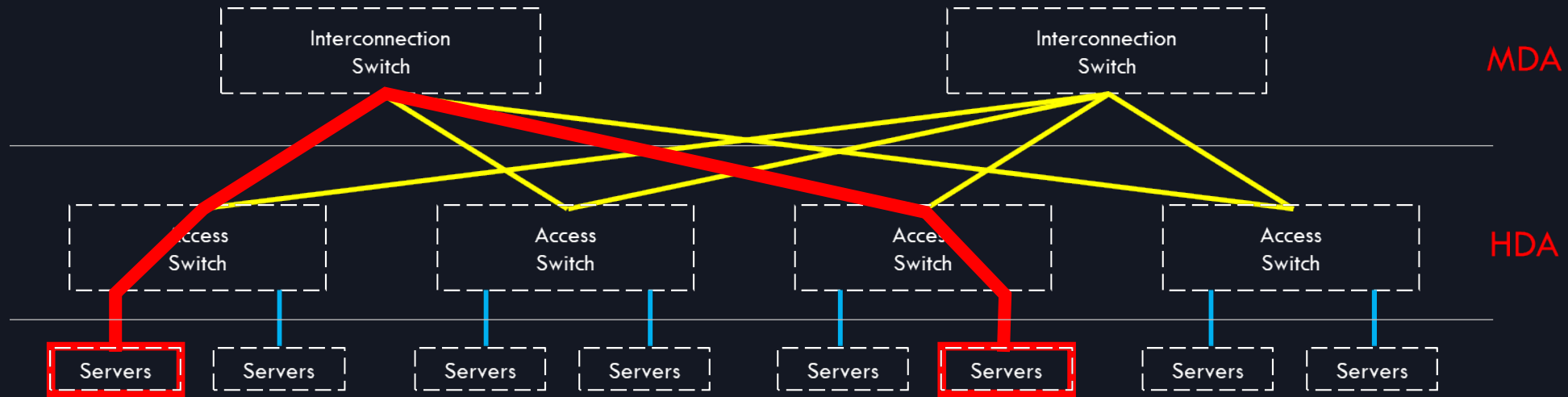
Traditional 3-tier switch architecture (North-to-South)



- Active Switch-to-switch connections (Optical Fiber)
- ..... Inactive backup Switch-to-switch connections (Optical Fiber)
- Server Connections (Typically Copper)

# Leaf-Spine architecture

Fat-tree (leaf-spine) switch fabric architecture East-to-West



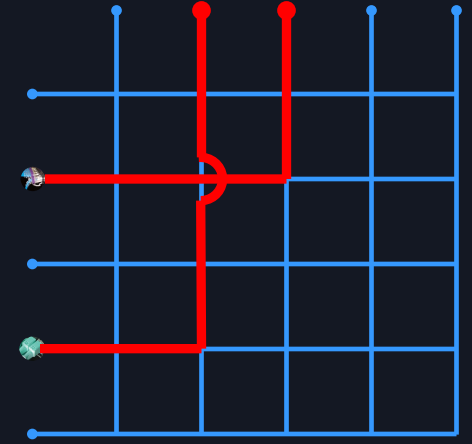
ARISTA

- Active Switch-to-switch connections (Optical Fiber)
- Server Connections (Typically Copper)



# Evolving DC Architecture

- Large virtualised DC
  - Physical servers = Multiple isolated virtual environments
  - **Need for non-blocking, low latency, high bandwidth DC**
  - Equipment located **anywhere** in the DC
    - Increased number of switch hops
    - Increased latency
- Switch fabrics
  - **Lower latency**
  - Greater **bandwidth** (40, 100G)
  - Dynamic **East-to-West** «server-to-server» traffic - no need of north-south traffic through multiple switch layers



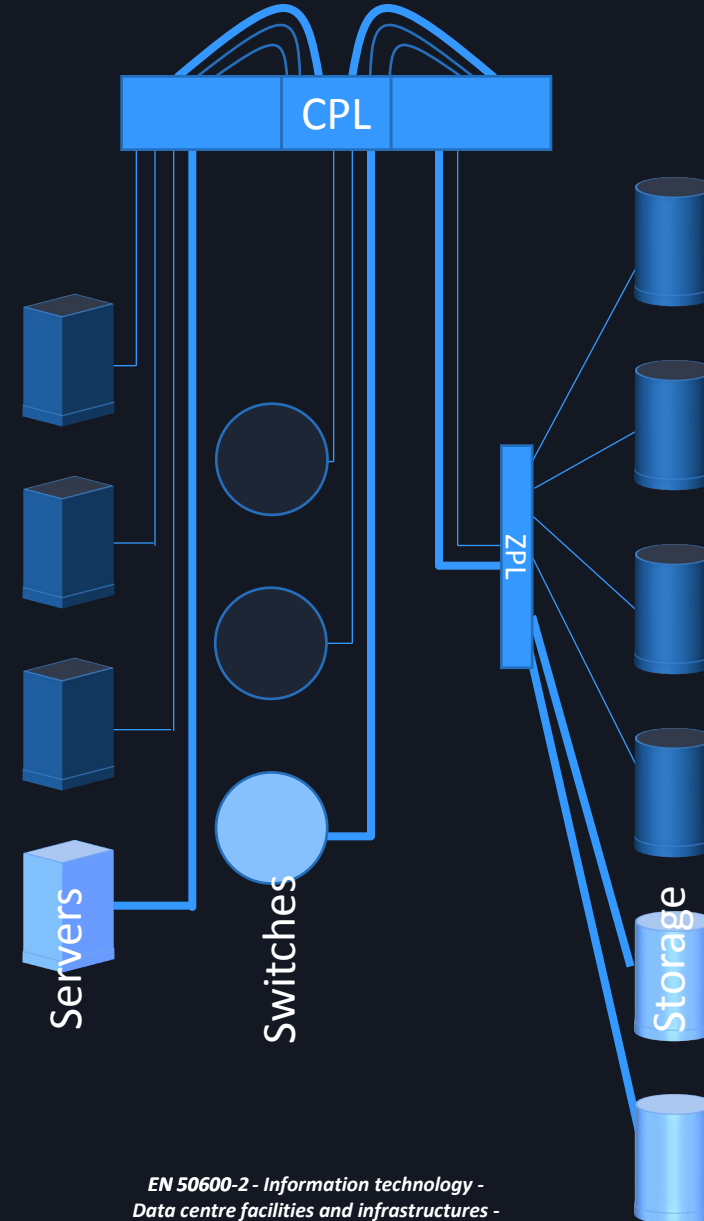
# Cabling



- EN 50600
  - quick and easy reconfigurations at any point in time during the lifecycle of a data centre facility
- High performance cabling solutions
  - 40/100G-ready
  - Factory terminated and tested trunking solutions:
    - Maximum channel throughput without the performance variability of field terminations
- Convergence / Hyperconvergence

# Cross-connects for new DC

- Multiple mated pairs pros:
  - flexibility and manageability
  - ease deployments and upgrades
  - limit access to critical switches
- Distribution points or convenient Fiber and Copper patching areas (cross connects)



# Multiple options for connectivity

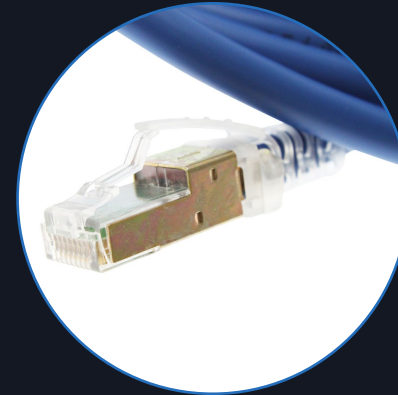
## Fiber

- Multi-strand connectivity
- Plug & Play

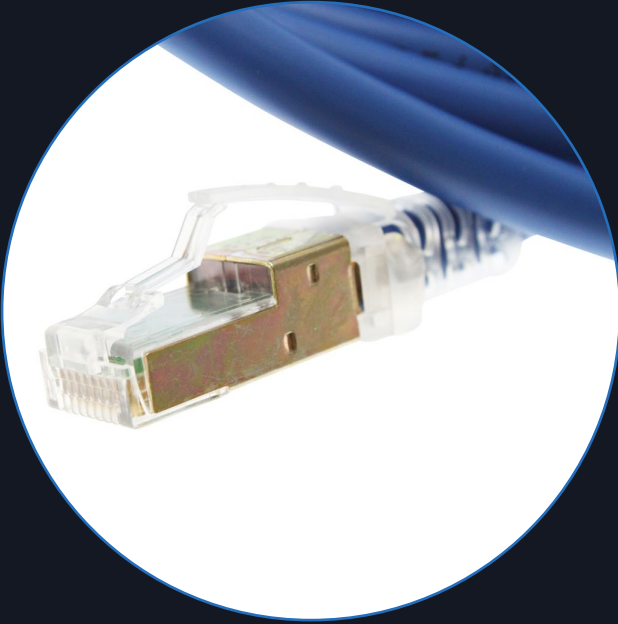


## Copper

- In-rack / In-row
- Twisted pair / twinax



# In-rack copper patching



- High speed (up to 10G+)
- Good management
  - Smaller diameter with C6A performances
  - Min bend radius
  - Improved airflow for high density
- Shielded for best EMI immunity

# In-rack / Inter-rack High Speed Interconnects

- CXP, SFP, QSFP, SFP+, QSFP+....
- Passive and active (DAC, AOC)
- 10G, 25G, 40G, 100G
- Infiniband, FiberChannel, Ethernet
- Interoperability
- Administration





# Cabling - Fibre Strands

## 10 Gigabit (Duplex)

2 strands -> MMF or SMF (1x10G)

## 40 Gigabit

8 strands -> MTP-12 or MTP-8 (4x10G)

2 strands -> BiDi (MMF  $2\lambda \times 20G$ ) or  
WDM (SMF  $4\lambda \times 10G$ )

## 100 Gigabit

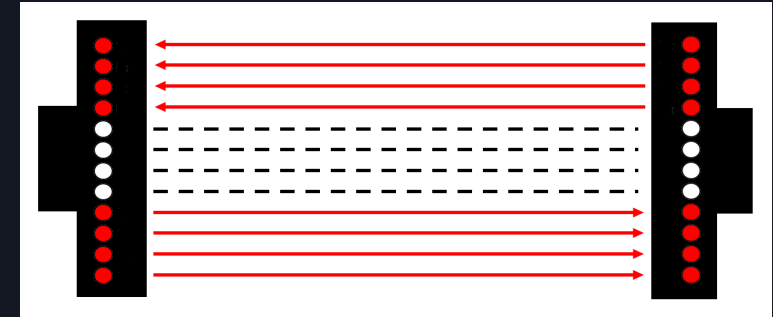
8 strands -> MTP-12 or MTP-8 (4x25G)

*20 strands of MTP-24 (phasing out)*  
*(10x10G)*

2 strands -> BiDi (MMF  $2\lambda \times 50G$ ) or  
WDM (SMF  $4\lambda \times 25G$ )



2 strands



8 strands (of 8-12)



# PDU

Intelligent units  
for optimisation  
Efficiency check  
Troubleshooting



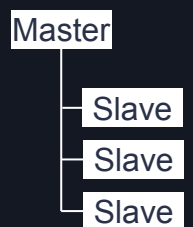
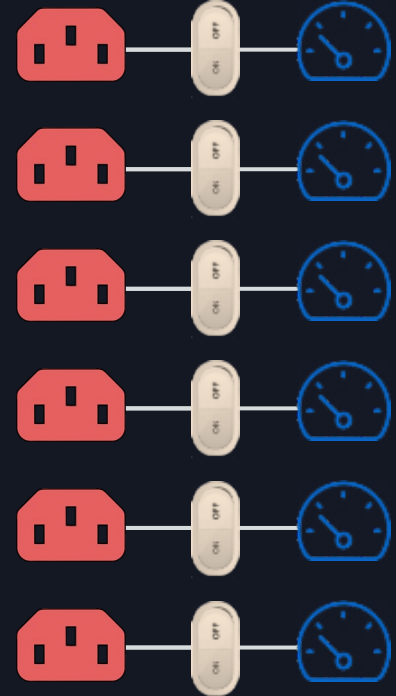
# Intelligent PDU

- Efficiency and PUE
- Power usage trends over time
- Temperature, humidity, airflow etc.
- Restart or shut down equipment remotely



# PDU Families

- Basic PDUs- Power up the device
- Metered PDUs – That Little Something More
- Monitored PDUs – When You Can't Be There
- Smart PDUs – When Individual Power Usage Matters
- Switched PDUs – When Remote Control Matters Most
- Managed – When You Want It All



# Cabinets



- Impact on DC management, scalability and operational costs
- Simplified management
- Multi-purpose

# Using your space wisely



High density  
Smart arrangement  
Additional U



## V-BUILT



# CASE STUDIES



J.P.Morgan





# DataCenter Design Services

550.0  
[13.78]  
(BOTH ENDS)

Ø4.5 [.18]  
TYP

35.0  
[1.38]

135.0  
[5.31]

X



| SIEMON PART NUMBER | COMPATABILITY | ASSEMBLY |
|--------------------|---------------|----------|
| VC-DR-SAB-CB       | V800          | 2.0 kg   |

PROPRIETARY  
INFORMATION  
THIS DOCUMENT  
CONTAINS PROPRIETARY  
INFORMATION OF THE  
SIEMON COMPANY AND  
IS DELIVERED ON THE  
EXPRESSED CONDITIONS  
THAT IT IS NOT TO BE  
REPRODUCED OR  
TRANSMITTED IN ANY  
MANNER WITHOUT THE  
WRITTEN PERMISSION  
OF THE SIEMON COMPANY

THE SIEMON COMPANY  
101 SIEMON COMPANY DRIVE  
WATERTOWN, CT 06795  
(860) 945-4200



TITLE  
**CONTAINMENT**

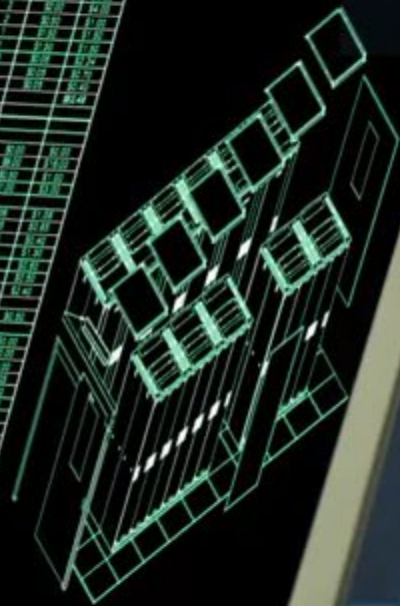
SERVICE REPRESENTATIVE FOR ADDITIONAL INFORMATION.  
BLACK POWDER PAINT.





## DataCenter Design Services

- ✓ COMPREHENSIVE SITE SURVEYS
- ✓ SCOPE OF WORK
- ✓ THOROUGH DOCUMENT REVIEW
- ✓ THERMAL ANALYSIS
- ✓ DETAILED FLOOR PLANS
- ✓ CABLING AND PATHWAY LAYOUTS
- ✓ BILLS OF MATERIALS

[illegible]





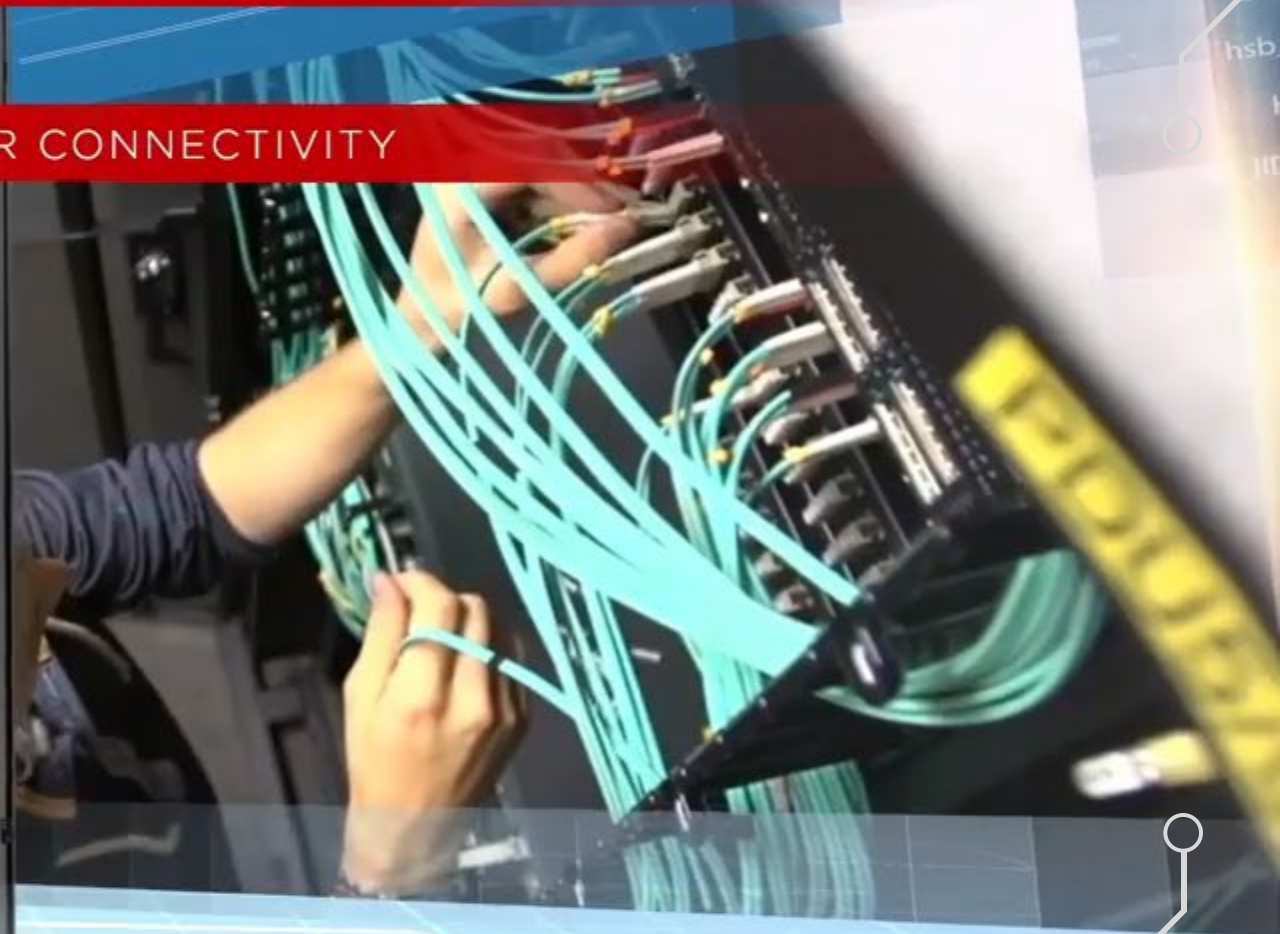
**V-Built**



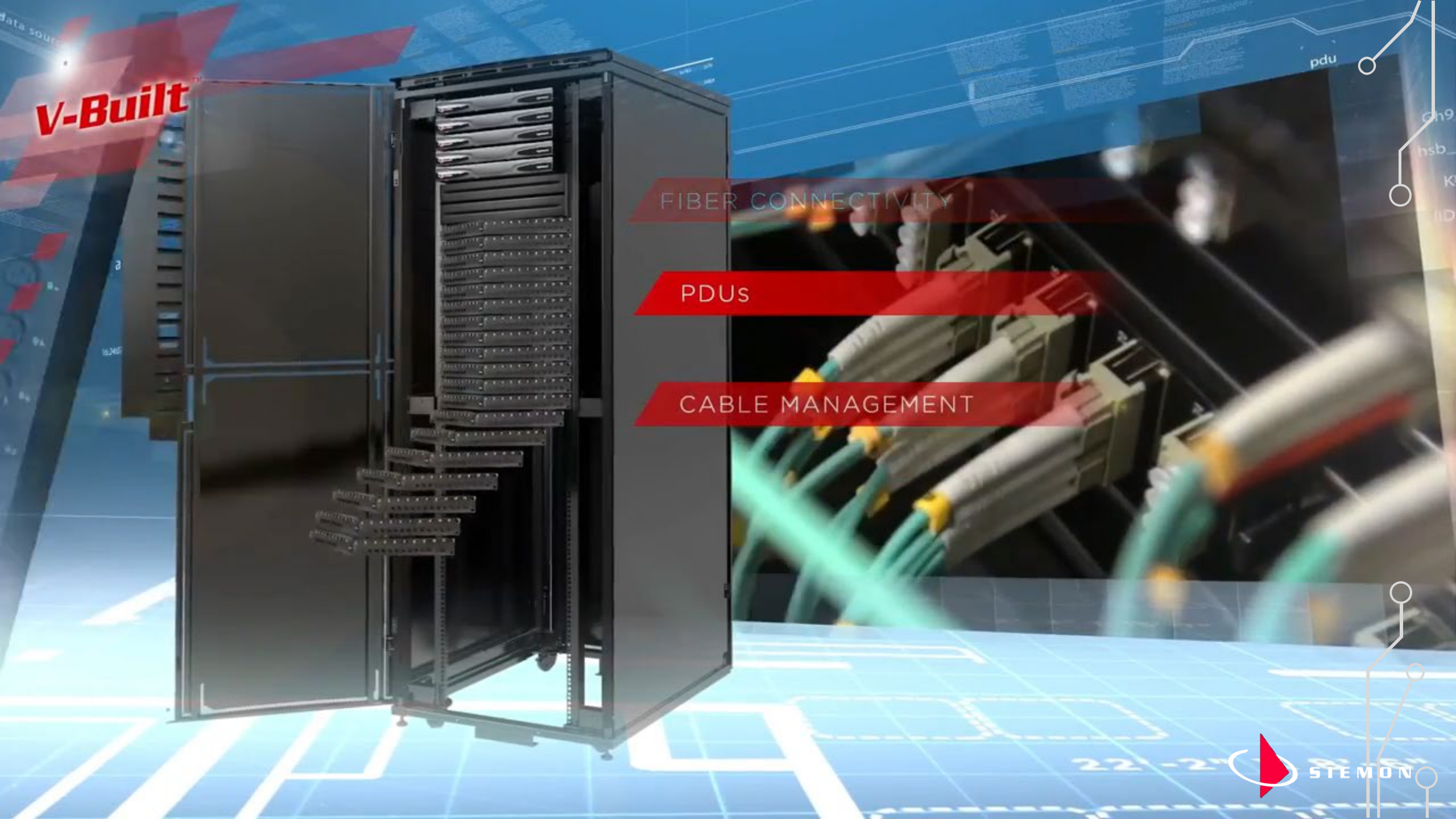
**V-Built**

COPPER CONNECTIVITY

FIBER CONNECTIVITY







**V-Built**

FIBER CONNECTIVITY

PDU's

CABLE MANAGEMENT



**V-Built™**

Thank You

SAVES  
**30%**  
TIME & LABOR

Connecting the World to a Higher Standard ▶▶▶

REDUCED PACKAGING  
& WASTE