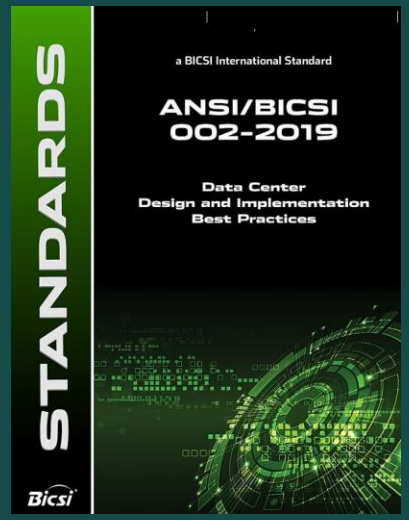
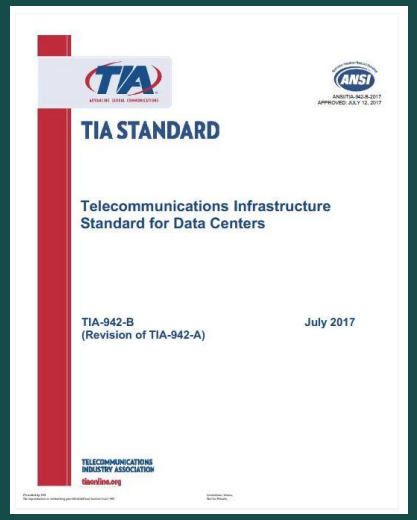
Data Center Overview

Present by Hein Htet Win

Global Design Standards for Data Center

- ANSI/BICSI 002-2019 – "Data Center Design and Implementation Best Practices"
- ANSI/TIA-942-B (2017) – "Telecommunication Infrastructure Standards for Data Center"
- EN 50600 (2012) – "Data Center Facilities and Infrastructure"



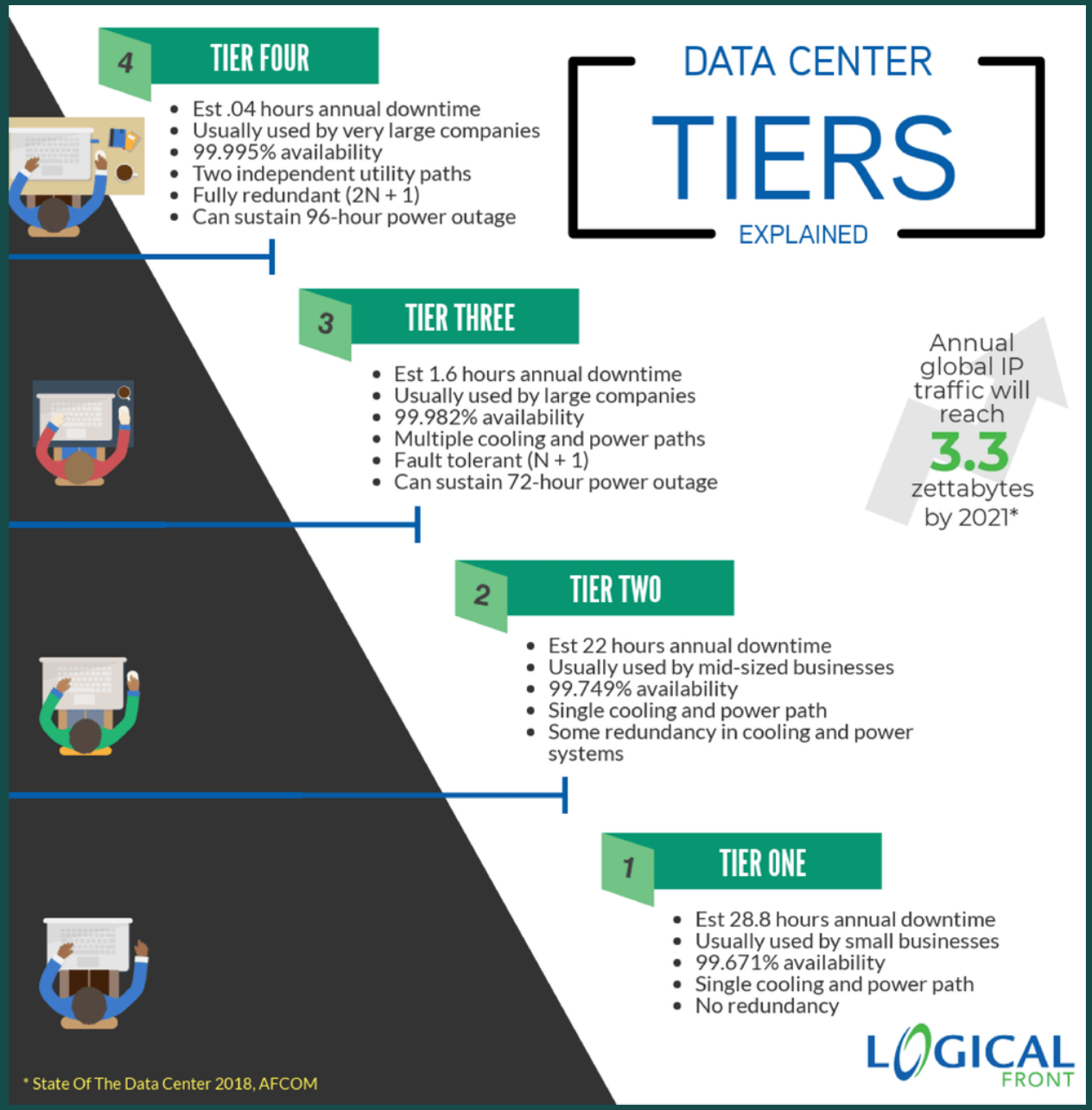


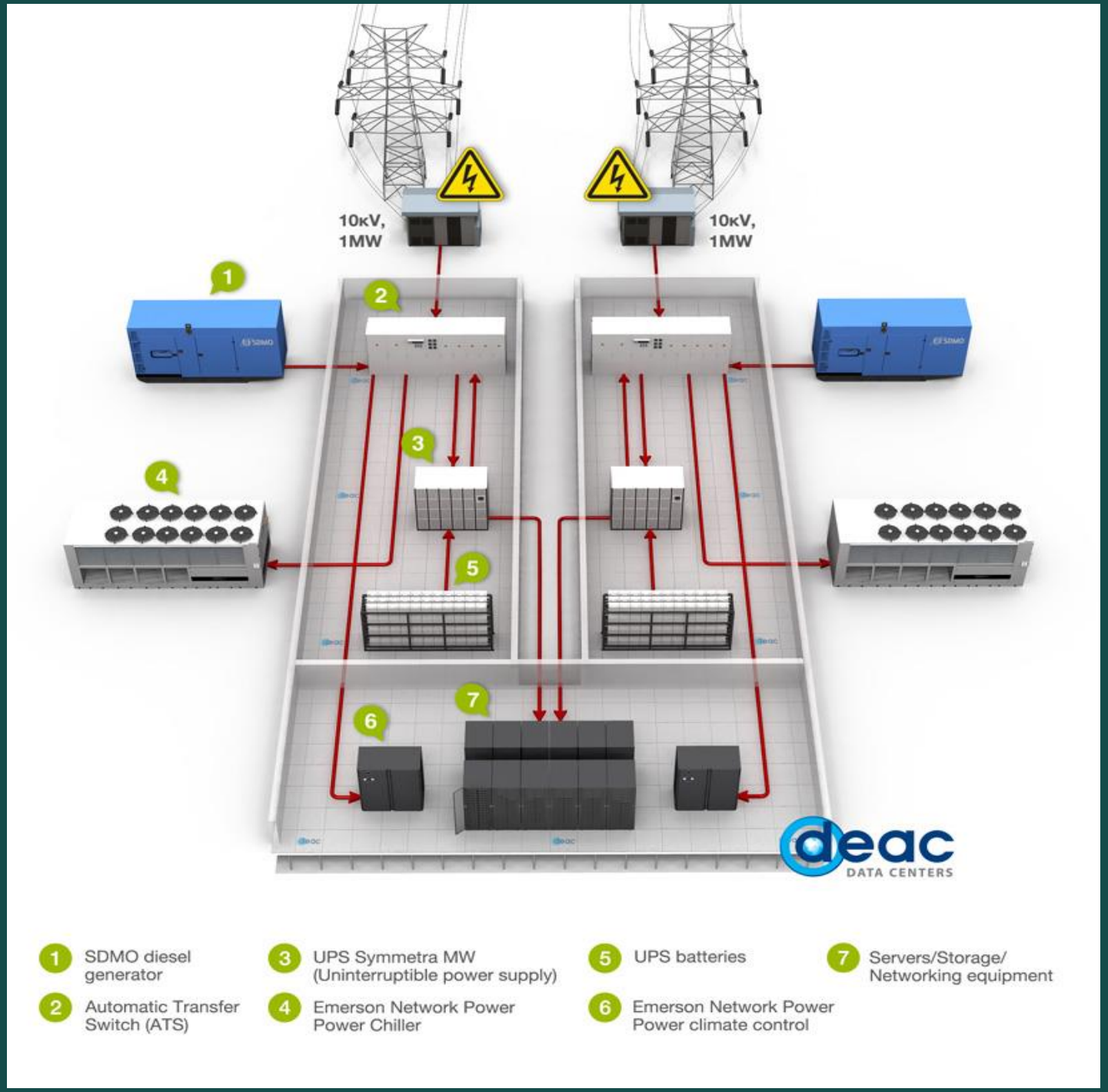
CENELEC

EUROPEAN COMMITTEE
FOR ELECTROTECHNICAL STANDARDIZATION

Types of TIERS

- *Tier 1*
- *Tier 2*
- *Tier 3*
- *Tier 4*





Example for Tier 4 Data Center

Five Senses of DCIM

Capacity Planning

- How much power, cooling, connectivity and space do I have?
- Should I build a new data center or can I stay in my existing space longer?
- Where is the most ideal place in the data center to put my new server?

Change Management

- How do I manage moves, adds and changes?
- How can I understand when work is completed?
- If I lose a power feed, what equipment does that affect upstream?

Power Monitoring

- How much power am I consuming?
- How much power do I have available to me?
- How can I be more proactive in dealing with power issues?

Environmental Monitoring

- Do I have any hot or cold spots in my data center?
- What is the temperature of my cabinets?
- Can I raise the set point in my data center?

Asset Management

- Where is my equipment on the floor?
- What switch is my server connected to?
- How much maintenance do I have left on this device?

Site Planning Data

Data Included for site planning consideration –

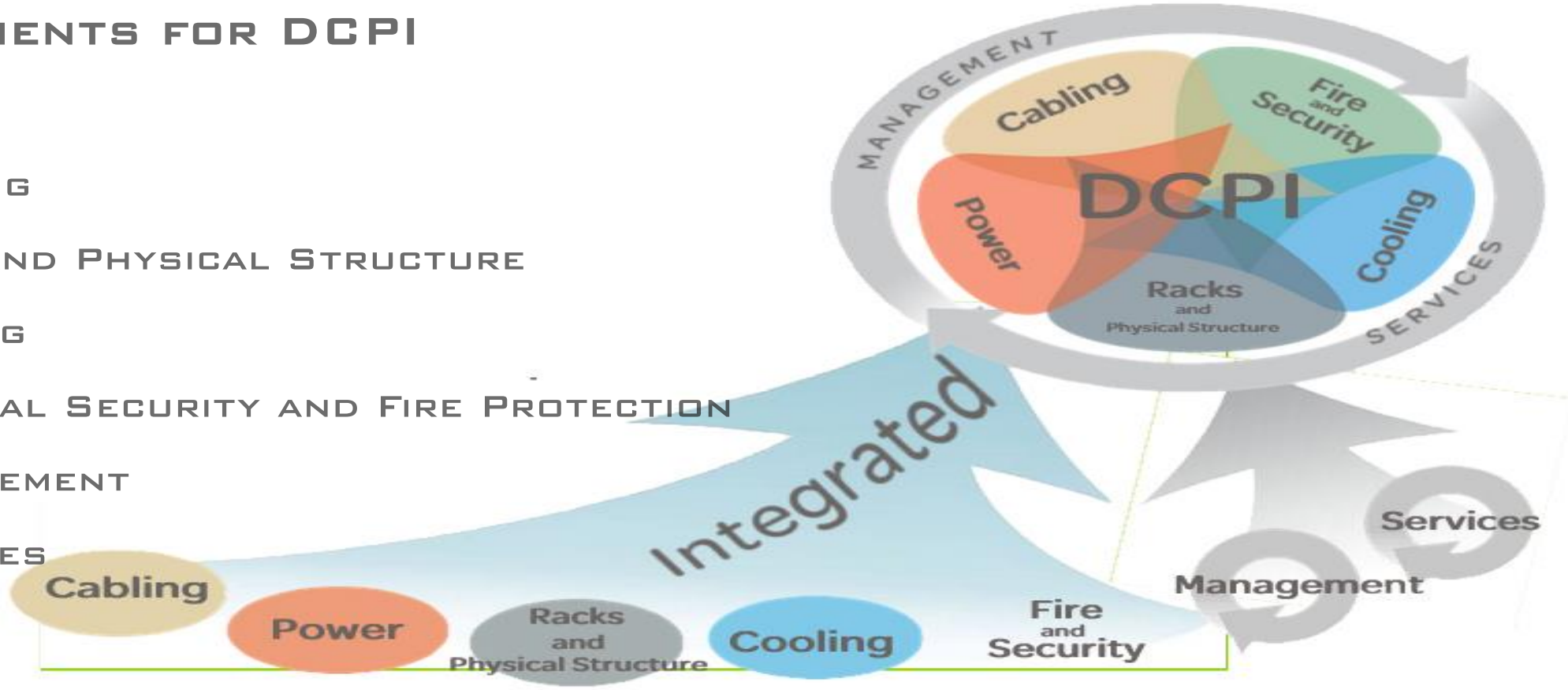
- Ground shaking hazard map
- Volcanic hazard map
- Landslide area map
- Aquifer types and water region maps
- Hurricane activity map
- Tornado risk map
- Historic flooding areas map

Data Center Physical Infrastructure(DCPI)

DCPI is the Foundation upon which IT and Telecom Networks Reside.

7 Elements for DCPI

- Power
- Cooling
- Rack and Physical Structure
- Cabling
- Physical Security and Fire Protection
- Management
- Services

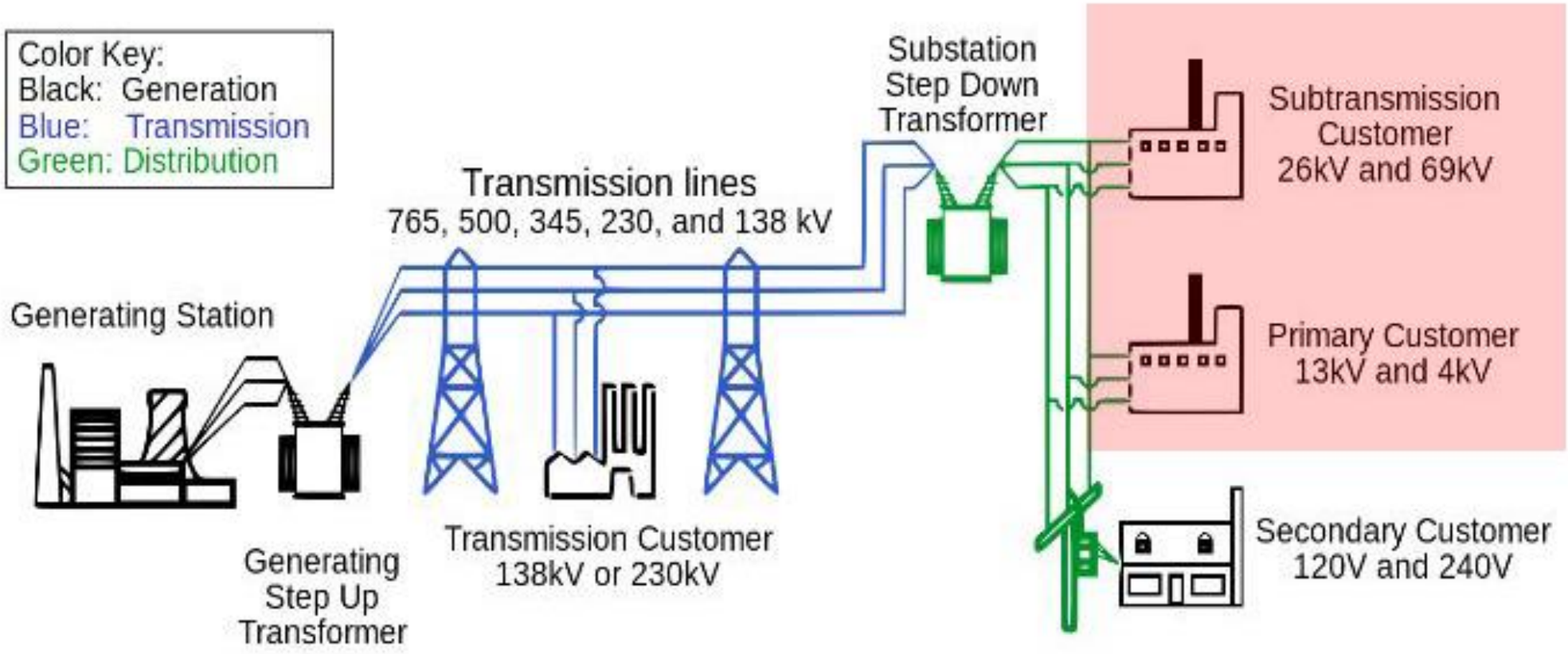


DCPI Element : Power

A solid power infrastructure

* POWER IS LIFE BLOOD OF THE DATA CENTER.

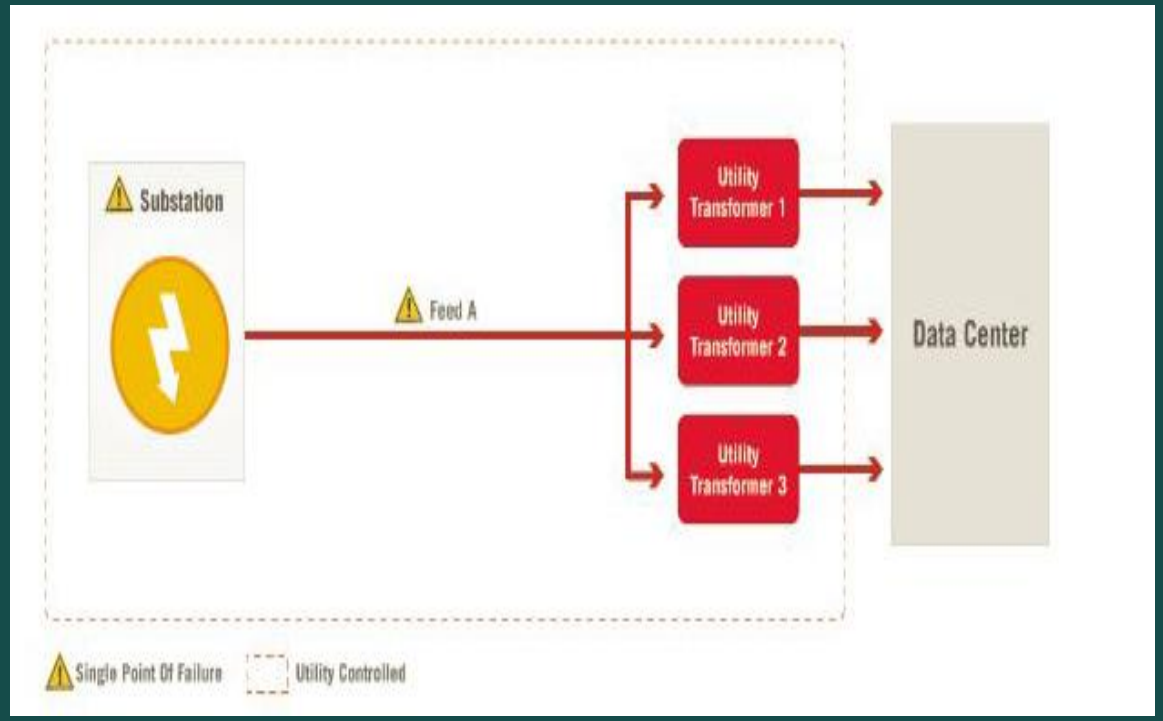
Power from the Utility to the Data Center



4 Types of Power FEED

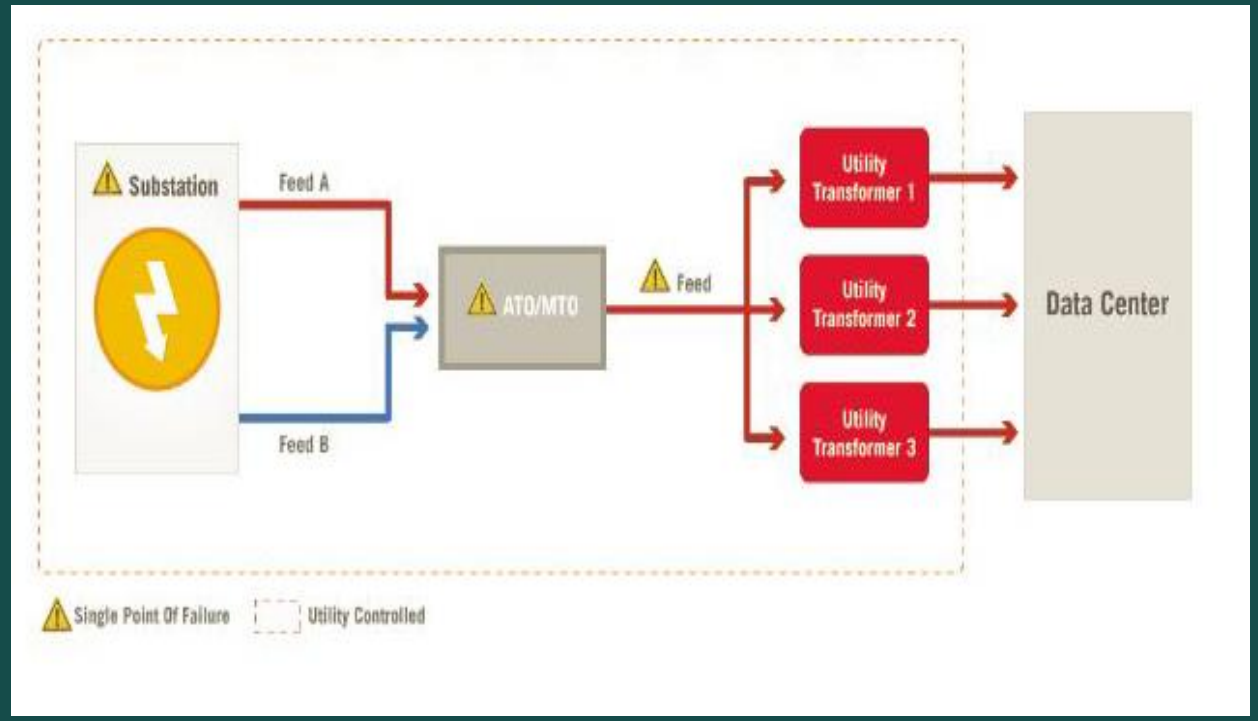
CLASS 1:

SINGLE FEED – SINGLE SUBSTATION



CLASS 2:

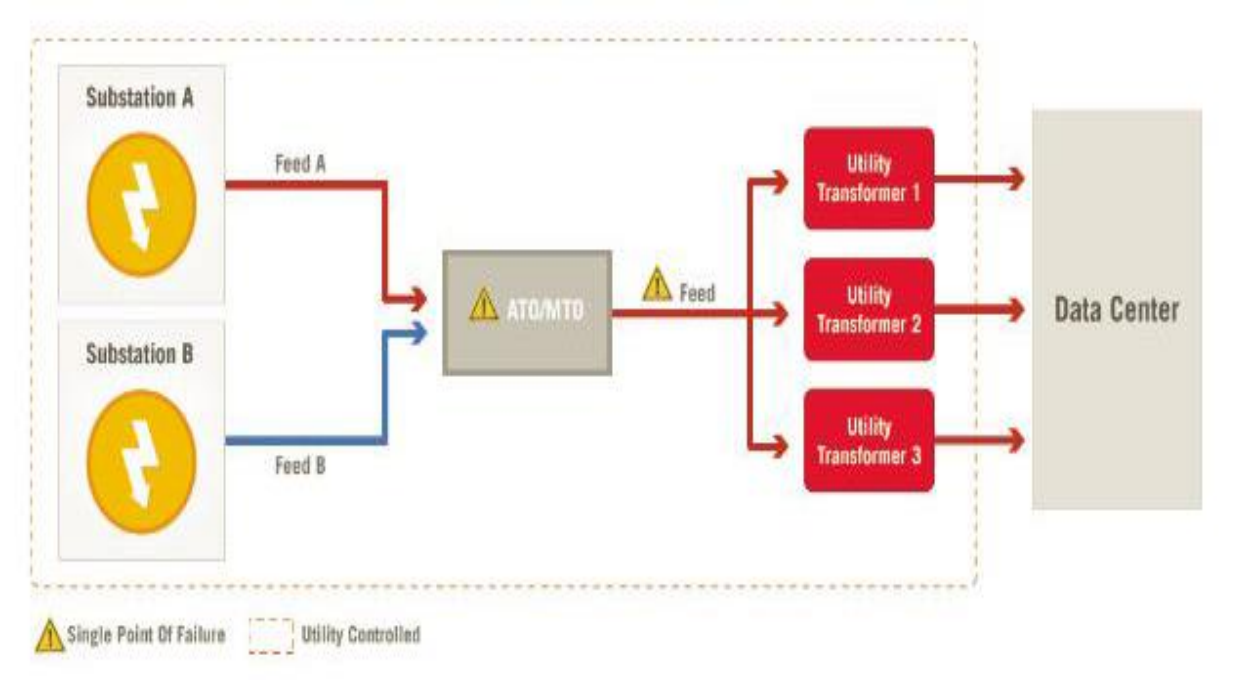
DUAL FEED – SINGLE SUBSTATION



4 Types of Power FEED

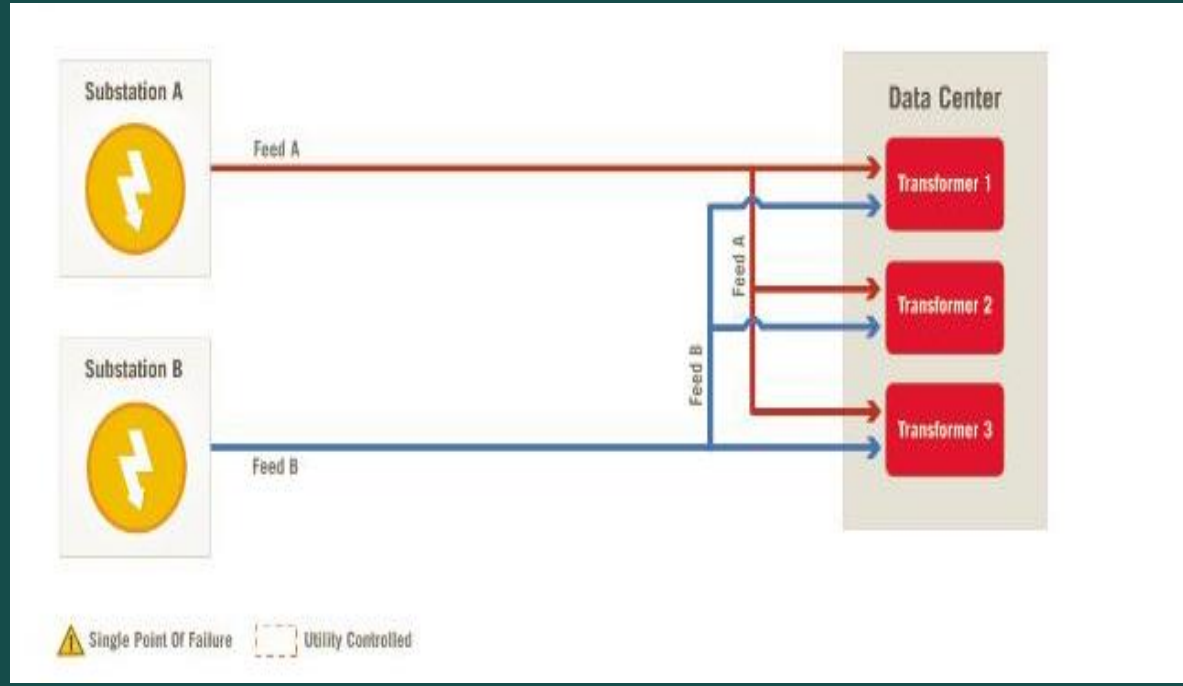
CLASS 3:

DUAL FEED – DUAL SUBSTATION



CLASS 4:

DUAL FEED – FULLY REDUNDANT

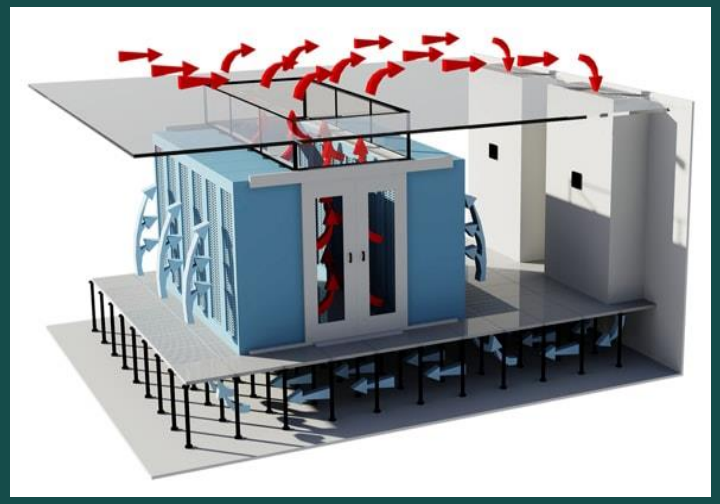


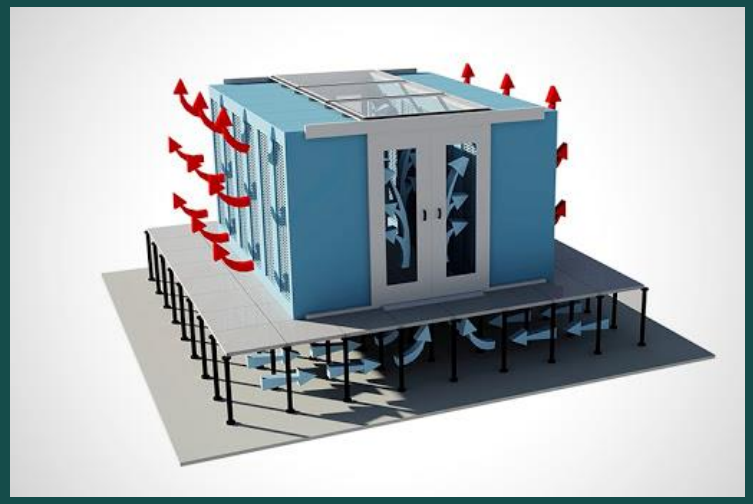
DCPI Element : Cooling

- Cooling Systems that are required to successfully remove heat from a data center.
- Computer Room Air Conditioners (CRAC)
- Associated subsystems that allow the CRAC to operate
- Chillers
- Cooling Towers
- Condensers
- Duct Work
- Pump Packages
- Piping
- Rack-Level distribution devices

Airflow Optimization: Types of Containments

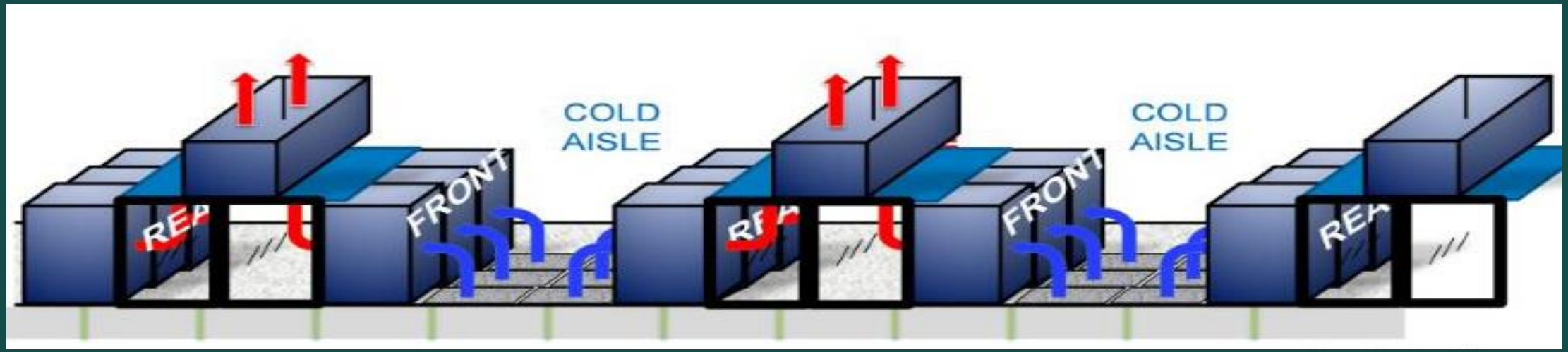
- Hot Aisle Containment
- Cold Aisle Containment
- Cabinet-Level Containment





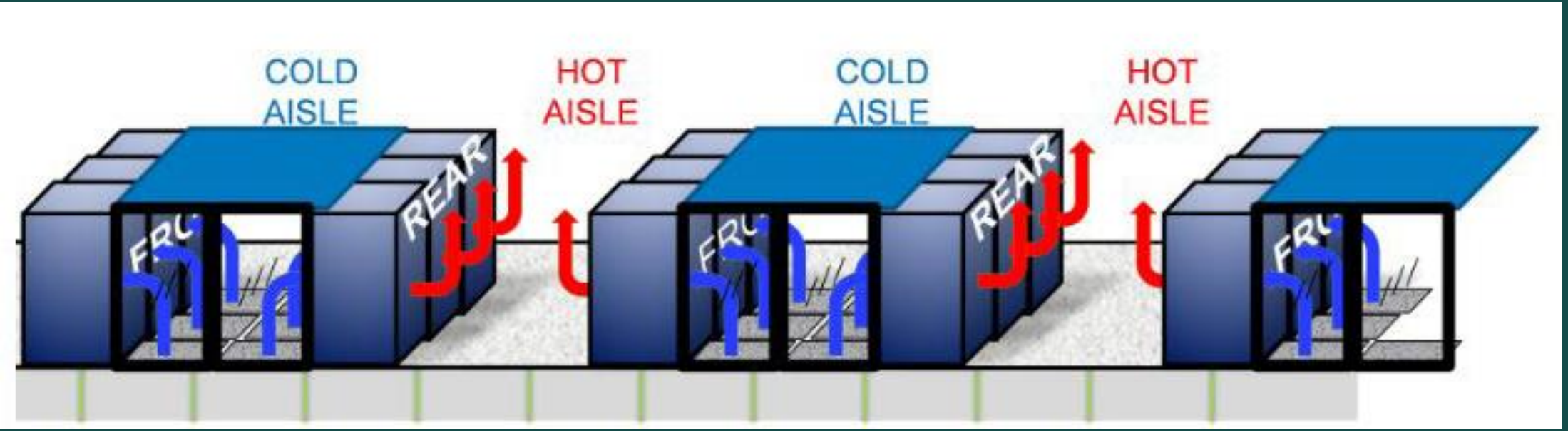
Hot Aisle Containment (HAC)

- Doors at end of hot aisle
- Ceiling system over hot aisle with duct connecting to drop ceiling
- Drop Ceiling
- Intake ducts connecting cooling units to ceiling
- Ambient room temperature is cool, working temperature within containment is warm



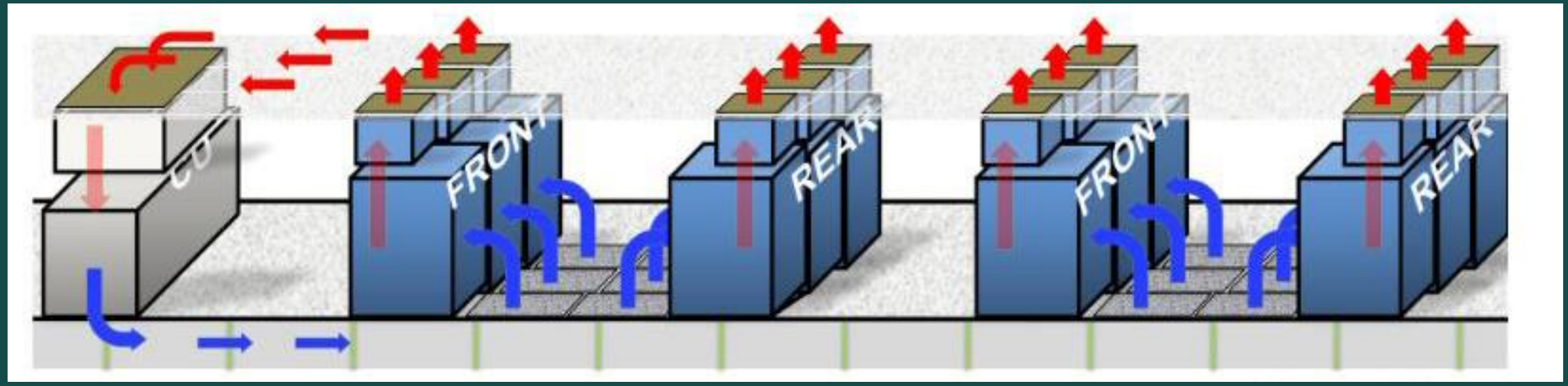
Cold Aisle Containment (CAC)

- Doors at end of cold aisle
- Ceiling over cold aisle
- No hot air ducting – return path across open room to CRAC
- Ambient room temperature is warm, working temperature within containment is cool



Cabinet Level Containment

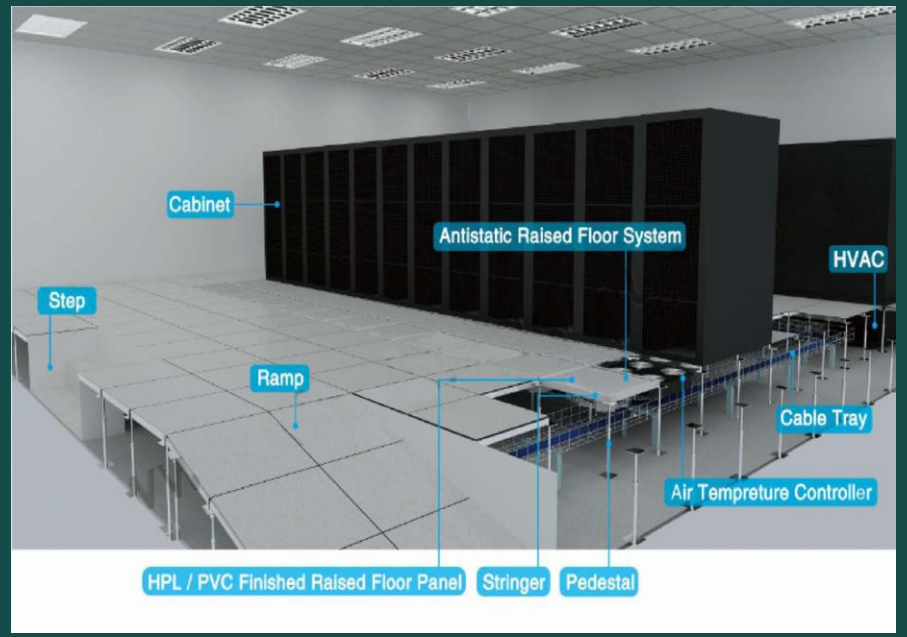
- Vertical exhaust ducts on cabinets
- Perforated front cabinet doors, solid rear cabinet doors, server fan noise reduction
- Drop Ceiling
- Return air ducts connecting cooling to ceiling
- Hot/ Cold aisle not necessary when exhaust ducts are used in entire room

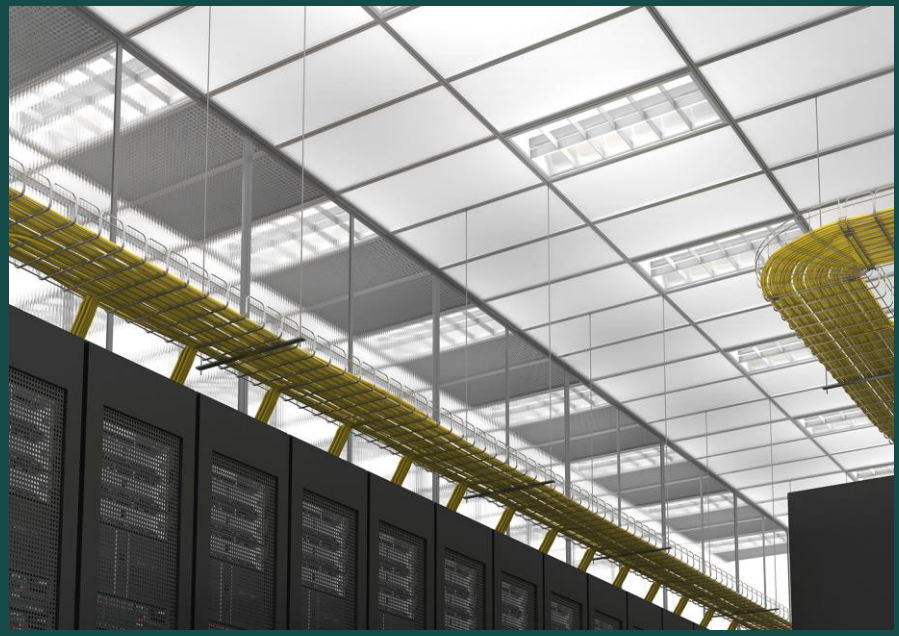


DCPI Element : Rack and Physical Structure

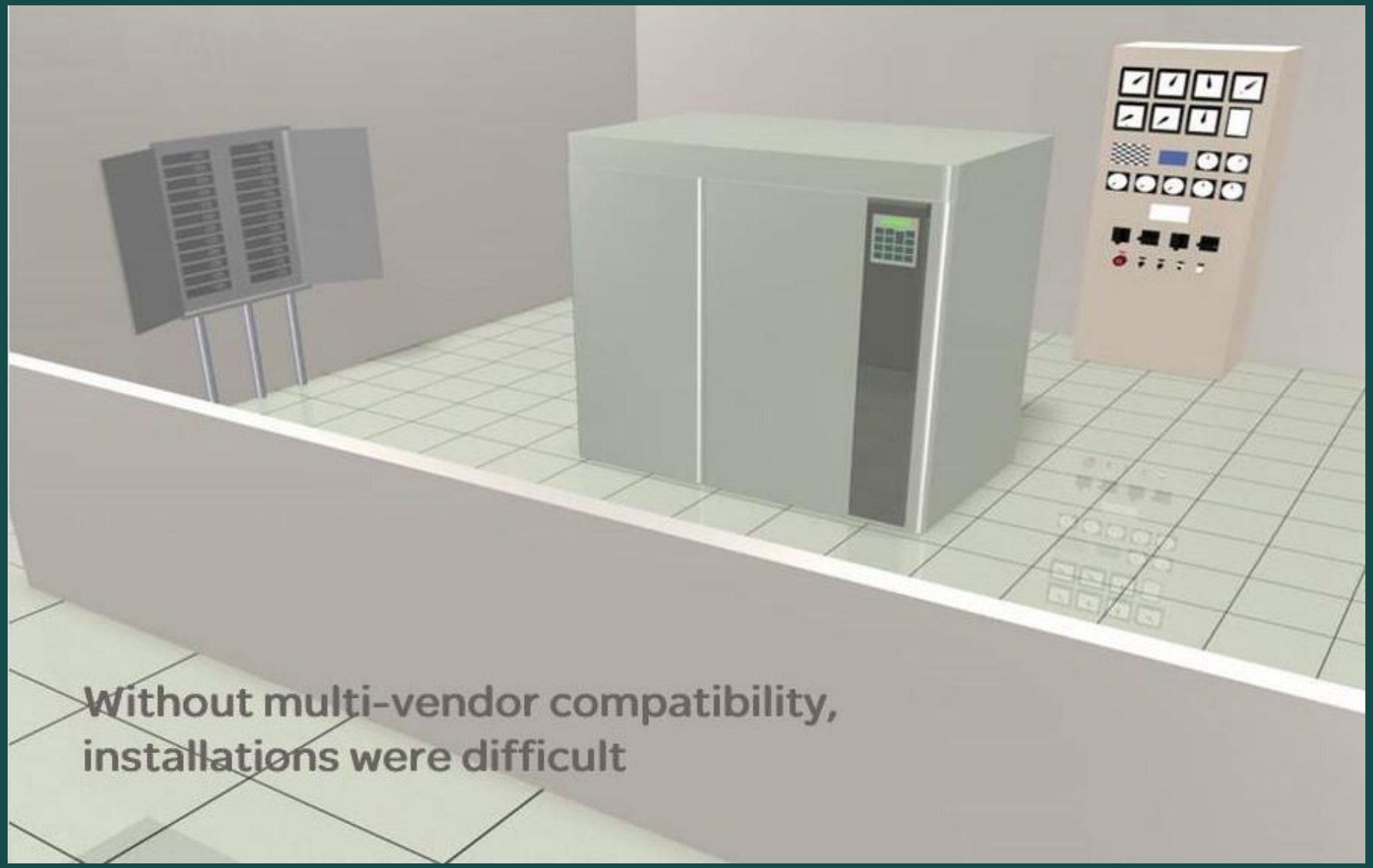
The most critical physical elements

- IT racks, which house the IT Equipment
- Physical room elements, such as dropped ceiling and floors





Multi-vendor Compatibility



Standards of Rack

- IEC approved the IEC 297-3 standard as a means to standardize the mechanical dimensions of 19-inch (482.6 mm) enclosures
- EIA 310 provides future standardization to rack mounting telecommunications and IT equipment

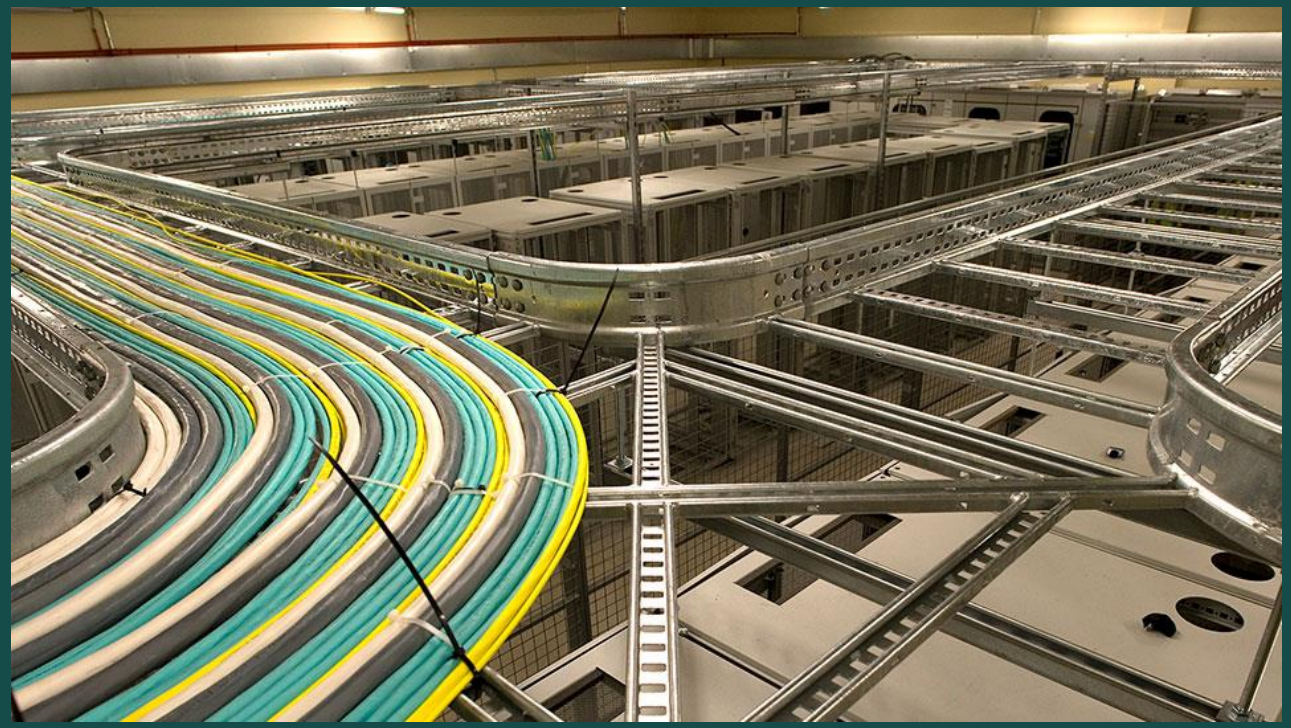
Slab Vs. Raised Floor

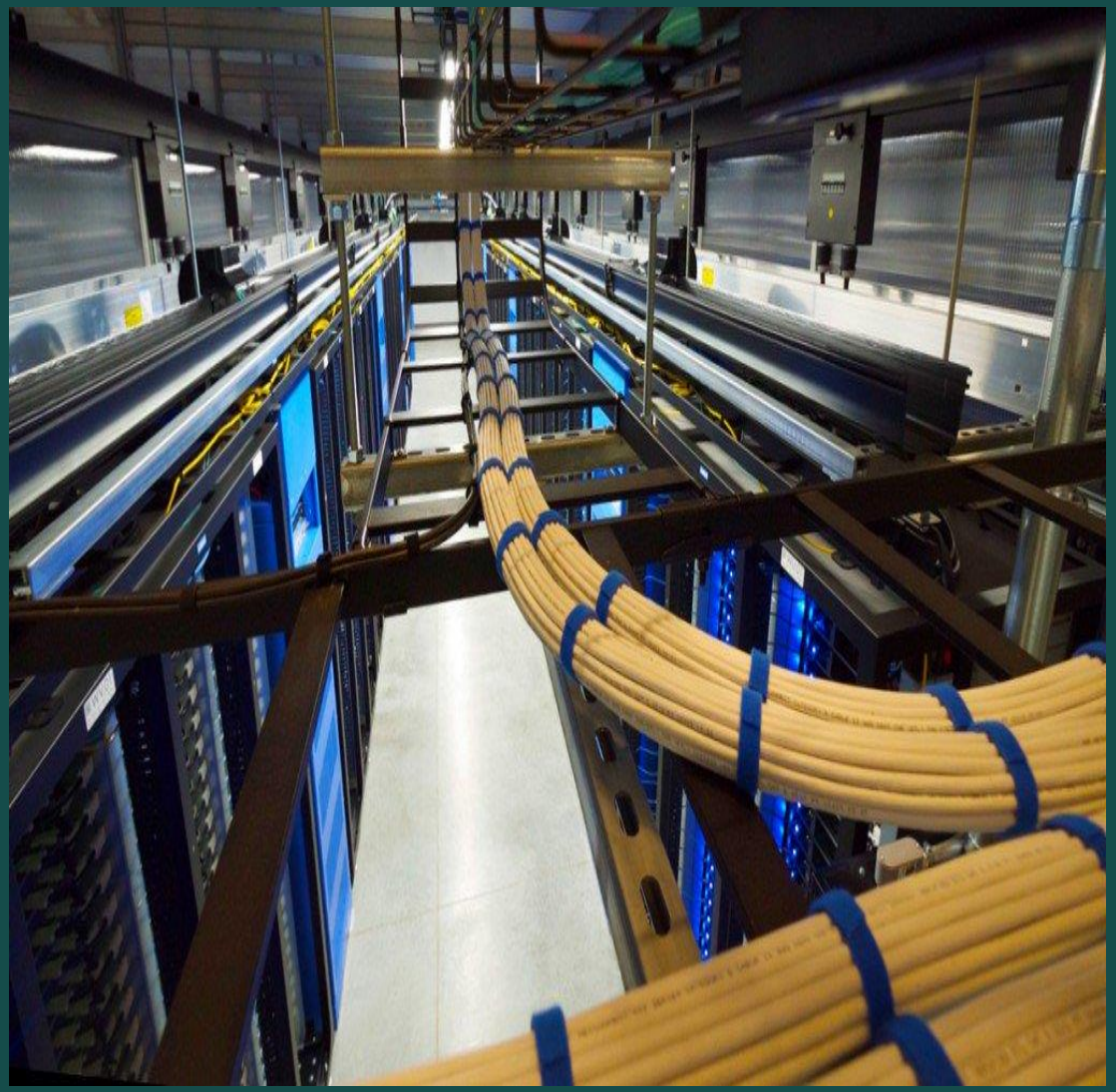
- Cost – Driven by size, Room Architecture, Power and cooling design and requirements
- Flexibility
- Floor Loading
- Density
- Growth
- There is no right or wrong decision
- Both slab and raised floor architecture are very feasible, but require a decision early in the design process

DCPI Element : Cabling (Data & Power)

The Key to Success

- Proper Design
- Core Components



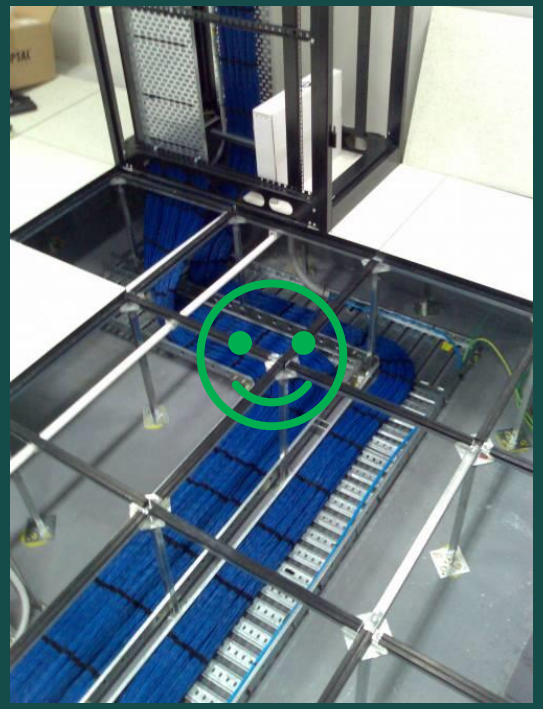


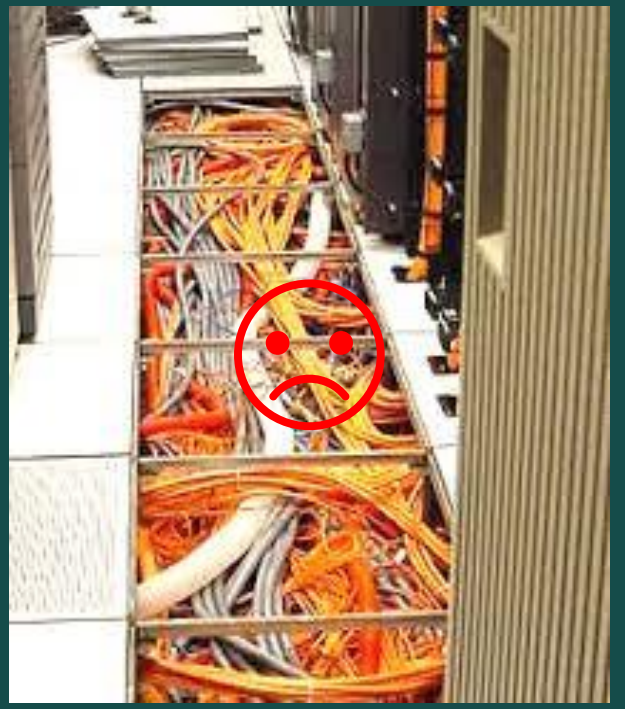
Cable Trays and management devices reduce downtime due to human error and overheating.

Data Cabling Installation Practices

- Overhead deployments

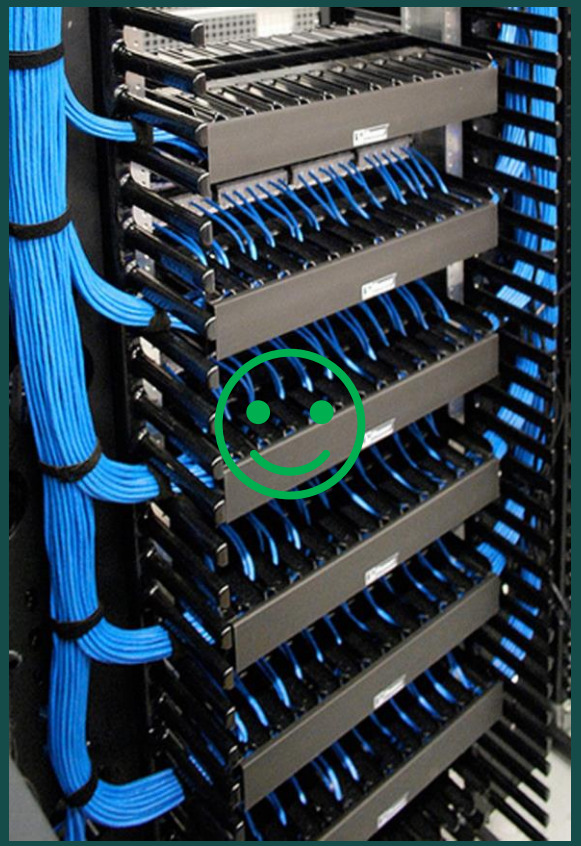
- Underfoot(underfloor) deployments

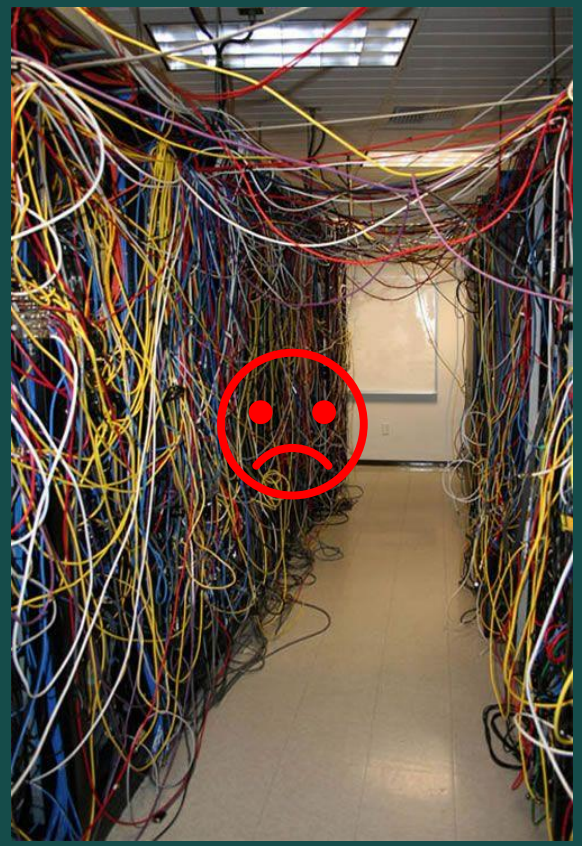




Cabling Installation Practices

- Rack Installations

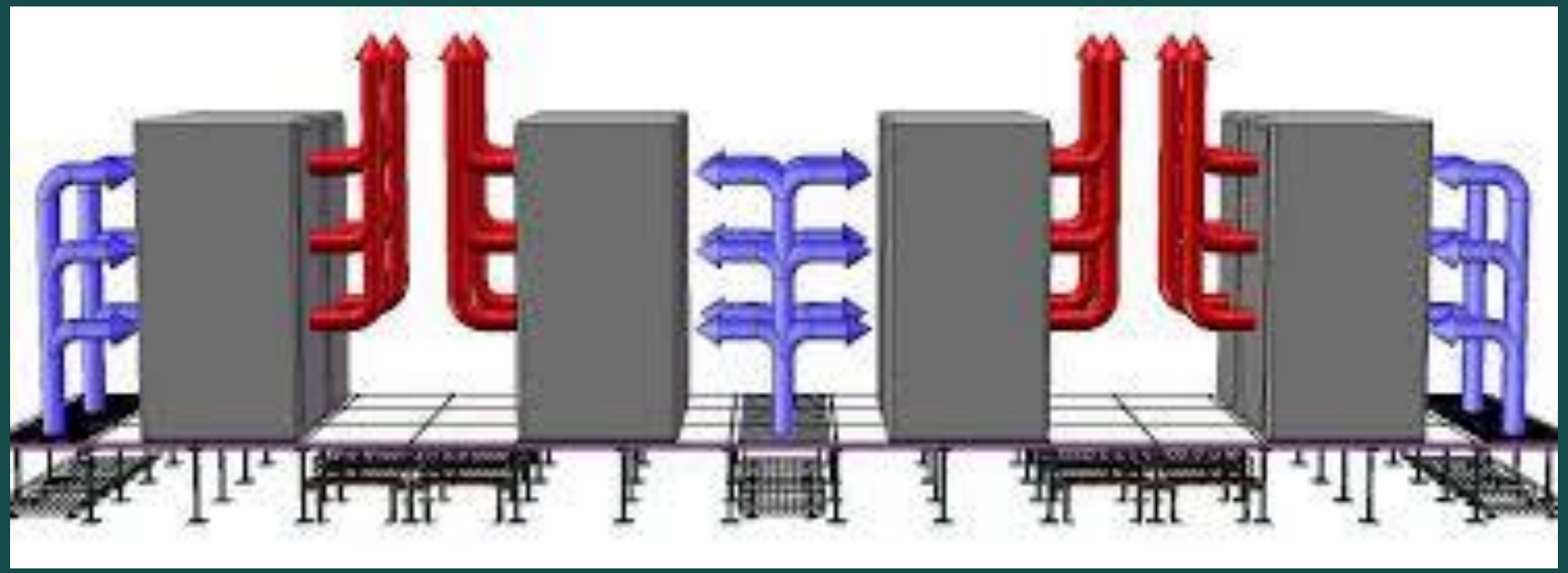




- Testing Cables

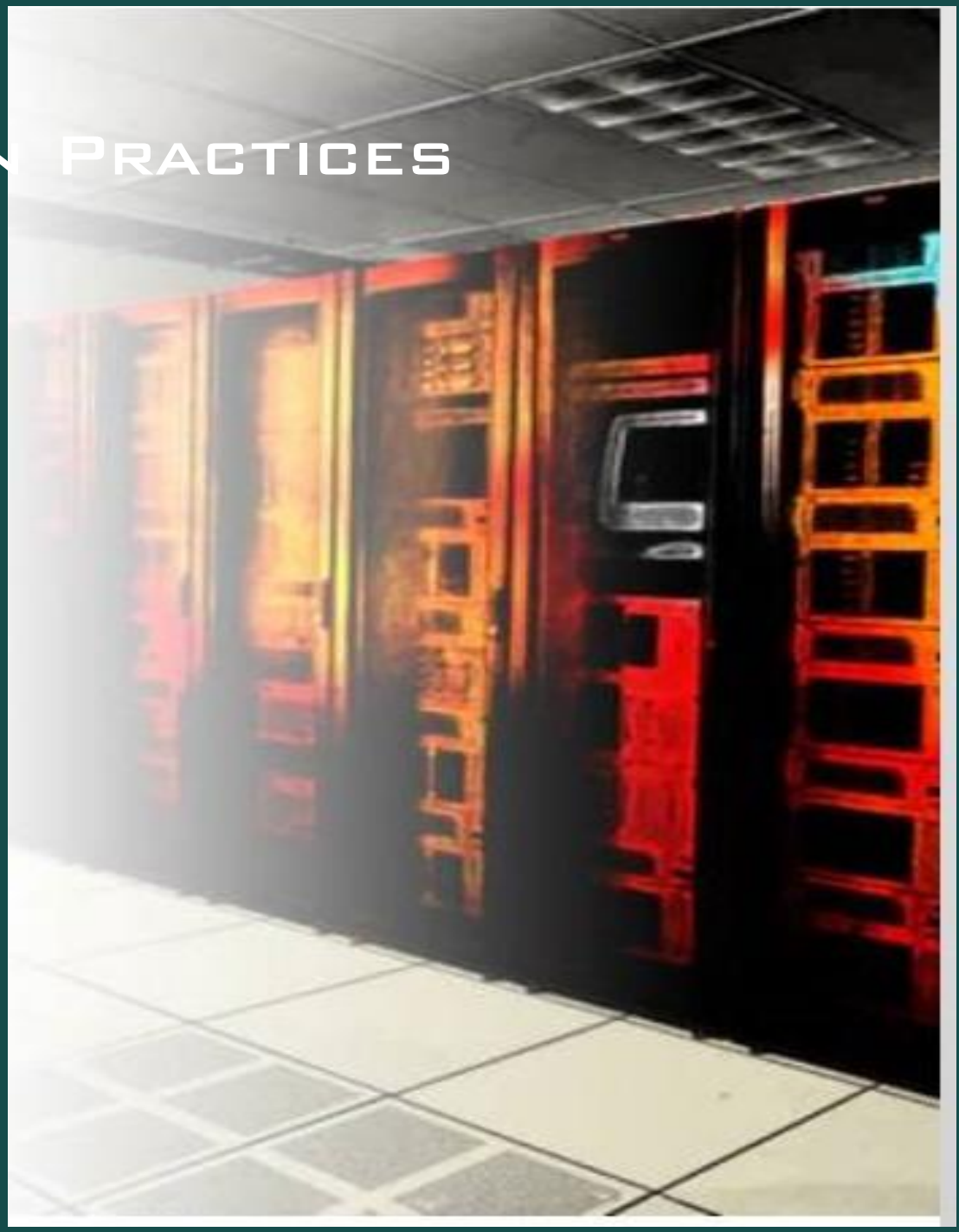
Underfloor Best Practices

- If all cabling is under floor, Communications cabling pathway should be under the hot aisle and power cabling pathway should be under the cold aisle.

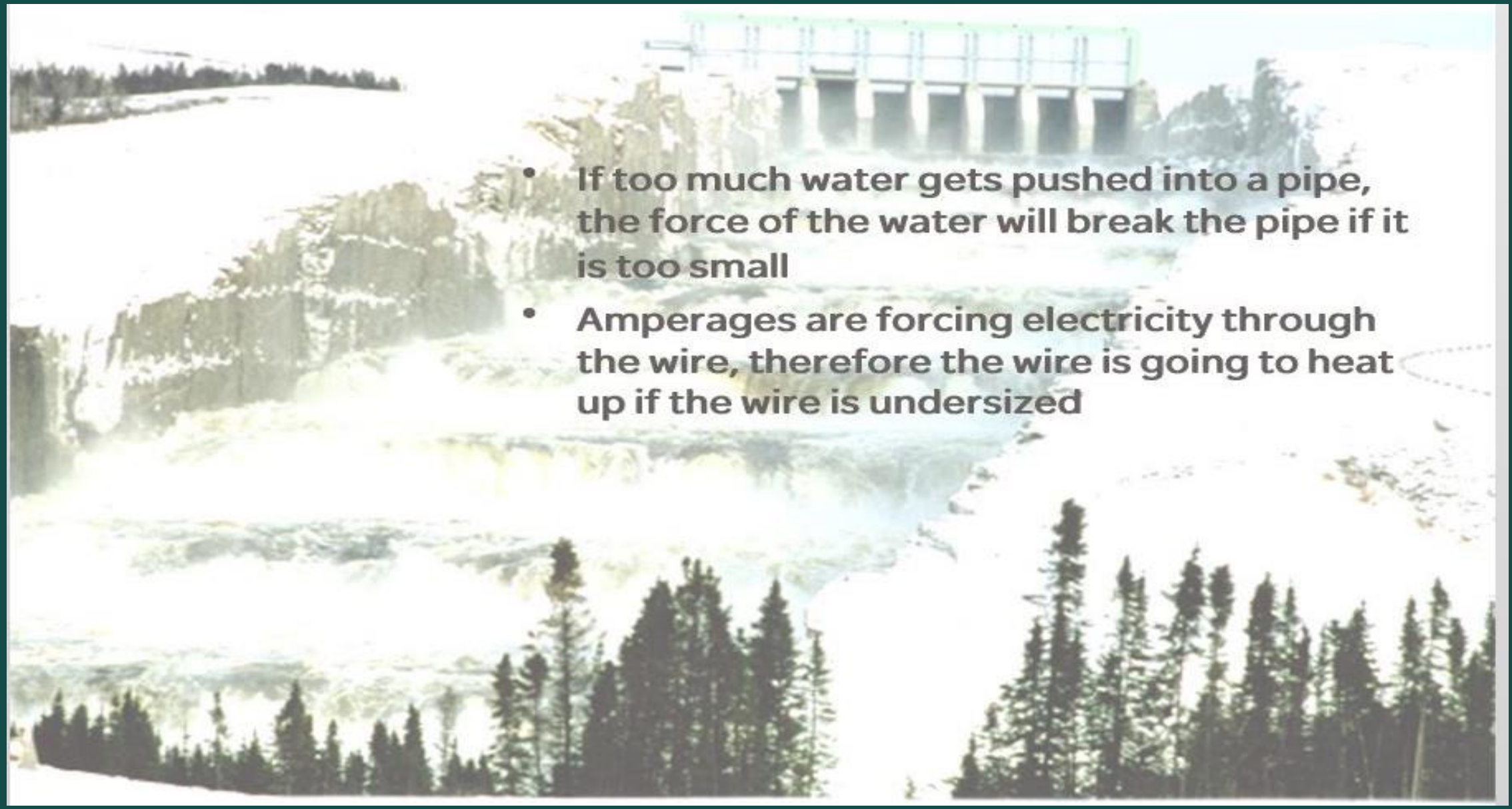


Power Cabling Installation Practices

- Described in the National Electric Code
- Continuous load – Any load left on for more than 3 hours
- De-rate amperages and wired sizes by 20%
- The de-rating approach helps avoid overheated wires, shorts and fires
- If the copper is insufficient for the amperages required, the insulation will melt



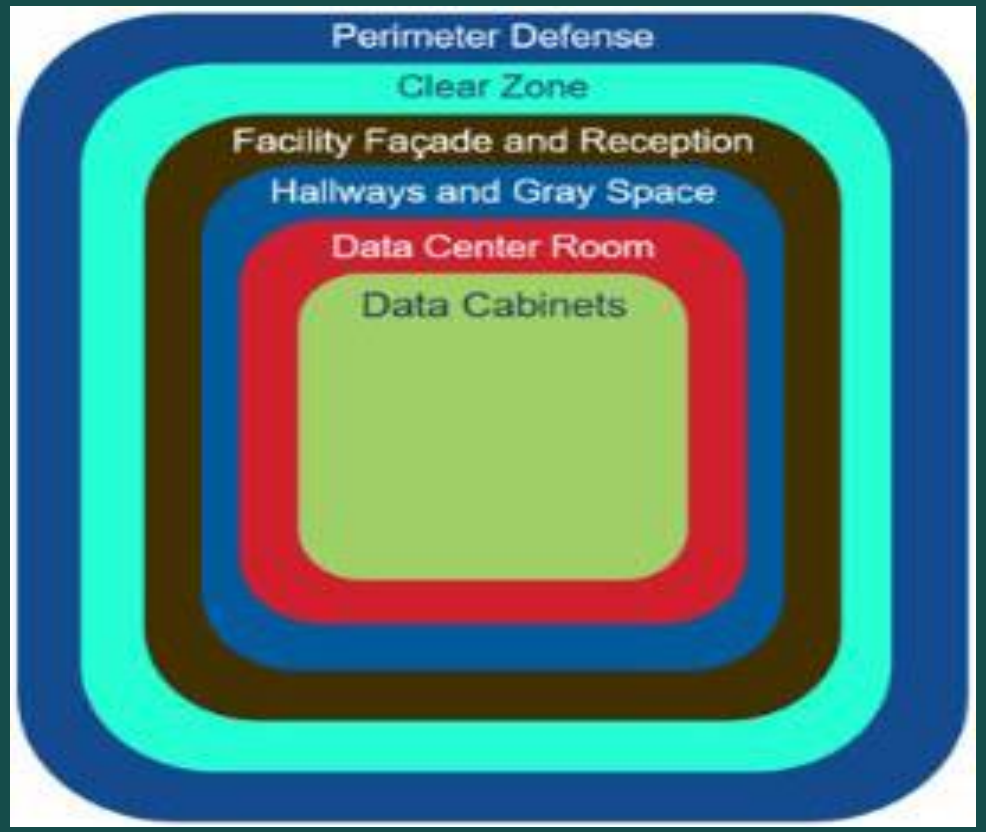
Power Cabling Installation Practices

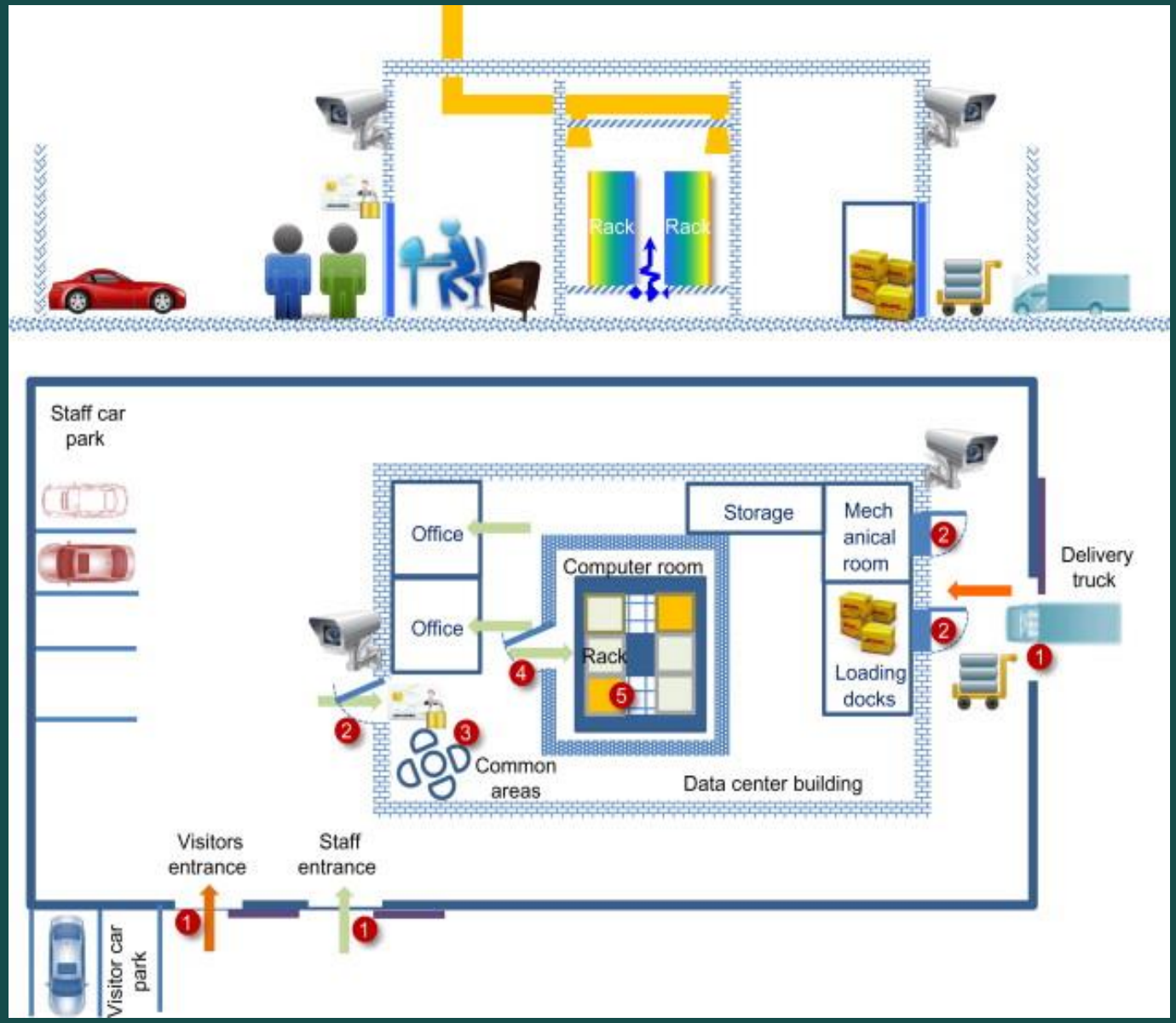


DCPI Element : Physical Security & Fire Protection

Physical Security

- Access Control System
- Video Surveillance System





4 Levels of Access Control System

Level 1

- Restricted and high-security key systems

Level 2

- Standard-alone access control with no audit, access levels or time zones

Level 3

- Stand-alone access control with audit, access levels and time zones

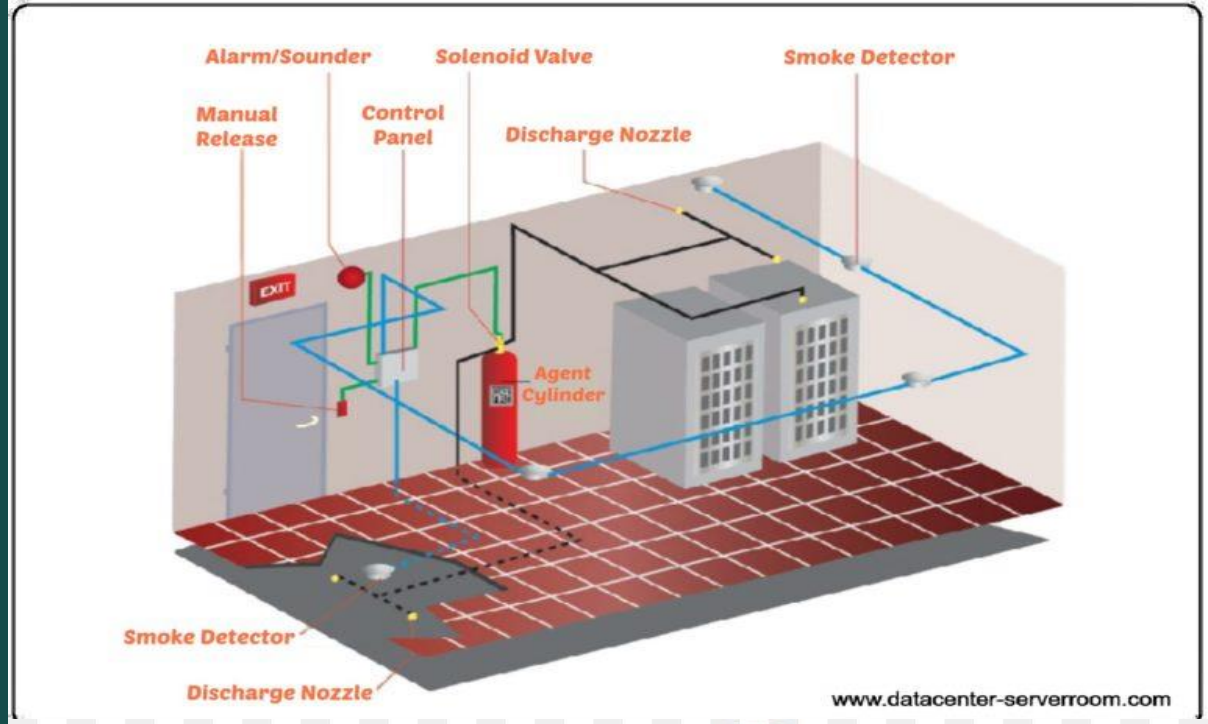
Level 4

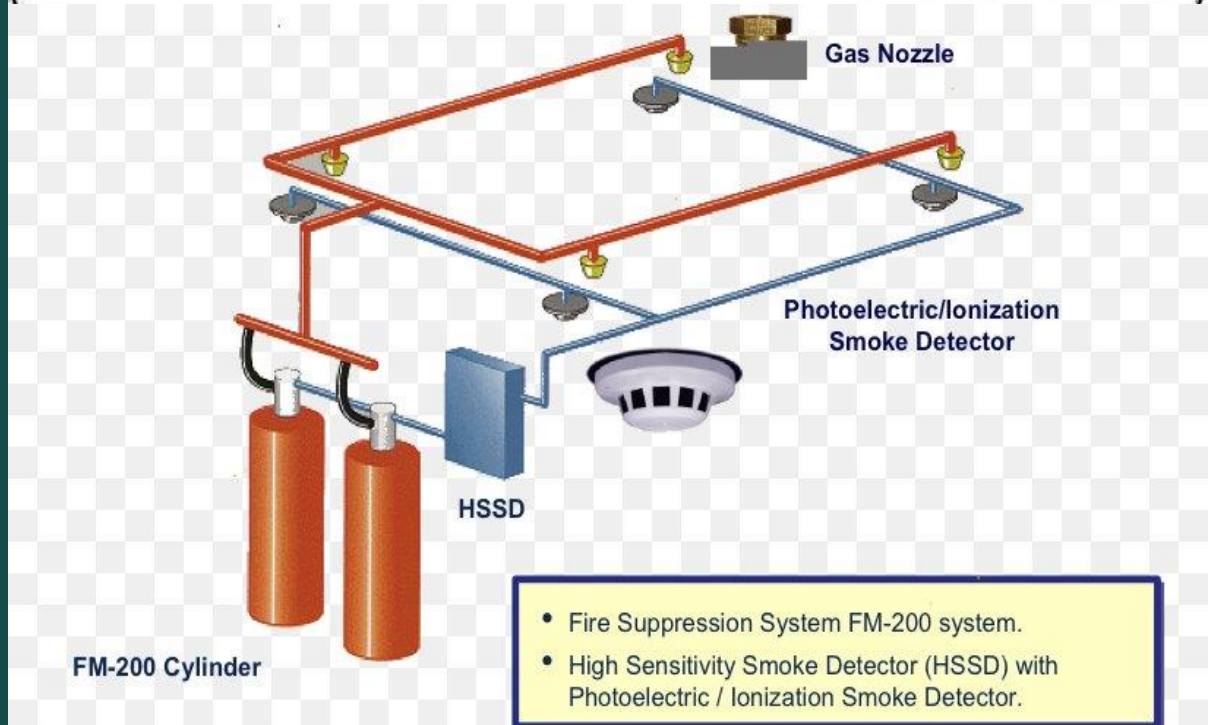
- Integrated online access control with real-time monitoring and advanced capabilities

Fire Protection System

Fire Suppression System

- Intelligent smoke detector
- Gas Nozzle
- Gas Cylinder (FM200, Novec 1230)
- Main Control Panel
- Bell, Sounder, Beacon





DCPI Element : Management

Management includes system such as –

- Building Management System(BMS)
- Network Management System(NMS)
- Element Managers
- Other monitoring hardware and software

DCPI Element : Management

Essential categories of management for DCPI include -

- Incident Management
- Change Management
- Capacity Management
- Availability Management

DCPI Element : Services

- Consulting and design services
- Installation services
- Maintenance and repair services
- Monitoring services
- Decommissioning services

Services Solutions

The services needed to design, install, operate, and maintain DCPI systems with these characteristics will reflect the best-in-class practices needed in the modern data center


Questions
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Answers
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Thank you