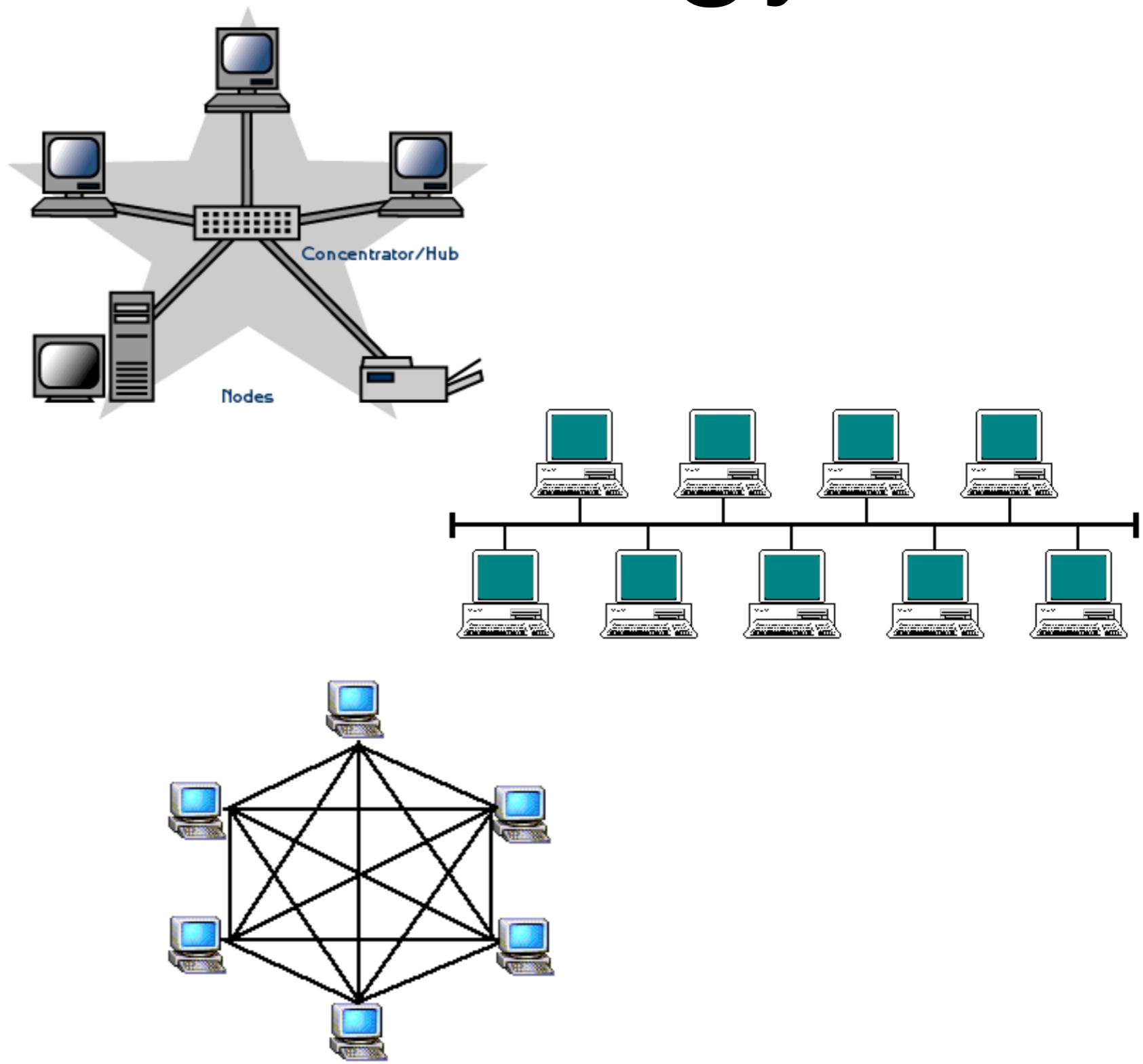


Building Networks in the Building

Michael Tsai
2019/03/17

Network Topology

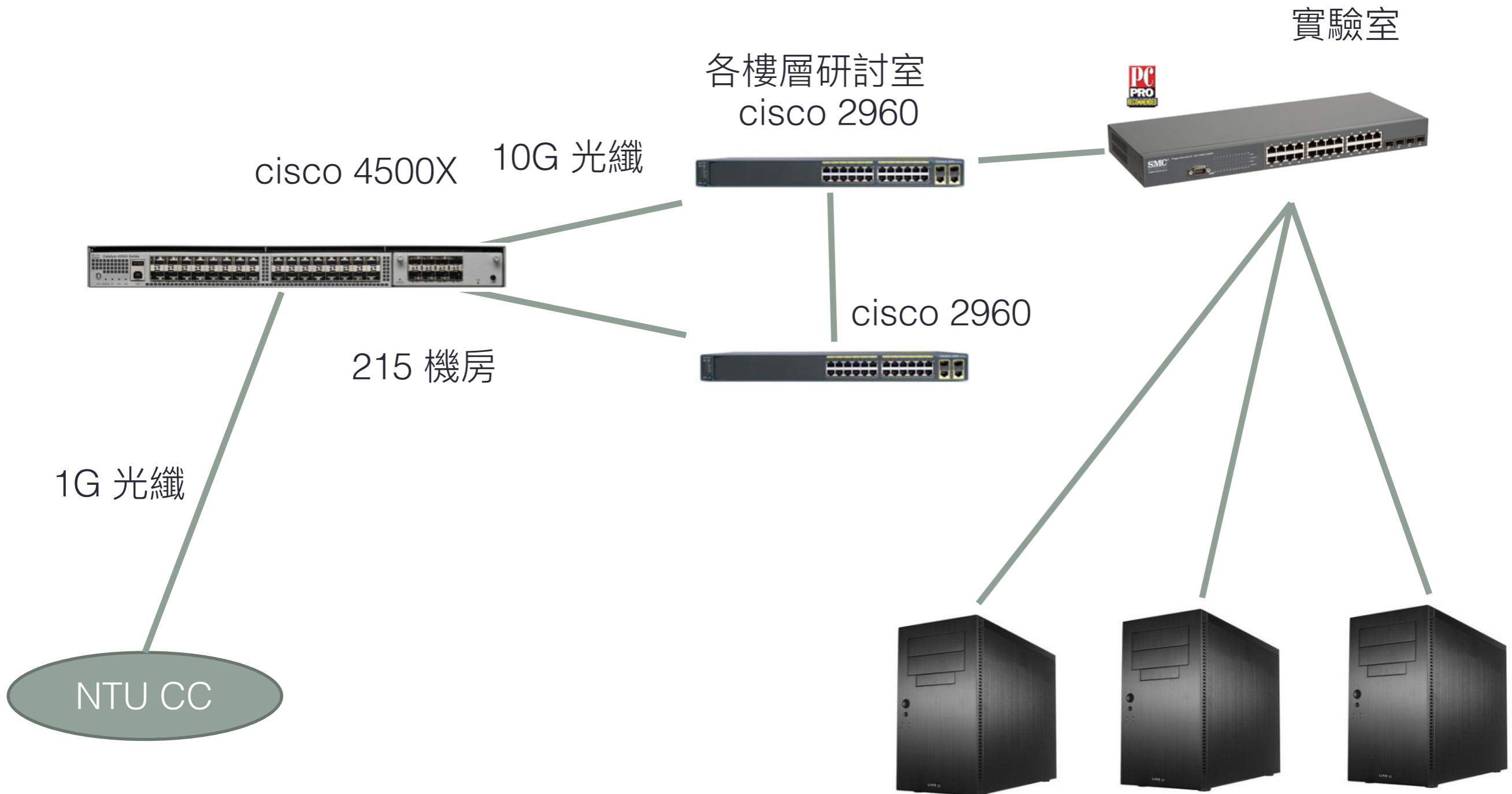
- Star Topology
- Bus Topology
- Mesh Topology



Point-of-Failure

- Start from star topology
- Everything can fail
 - “Capacitor explosion” (power supply failure)
 - Loss of electricity
 - Connection failure (network cable/fiber)
- How do you maintain connectivity?

例子：資訊系館網路



Where is the articulation point(s)?
How do we eliminate them?

PC

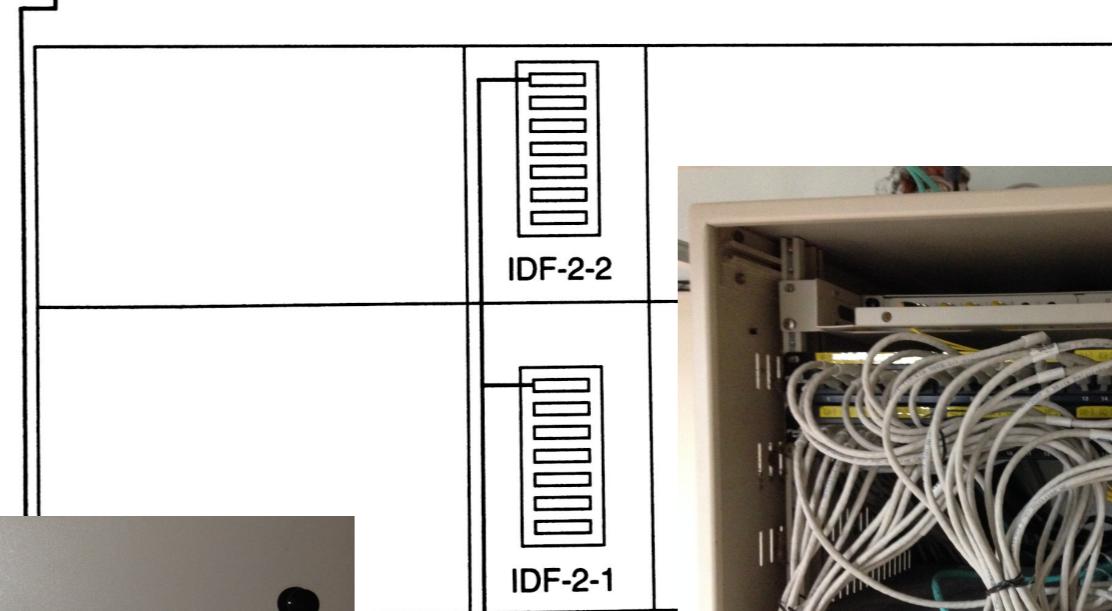
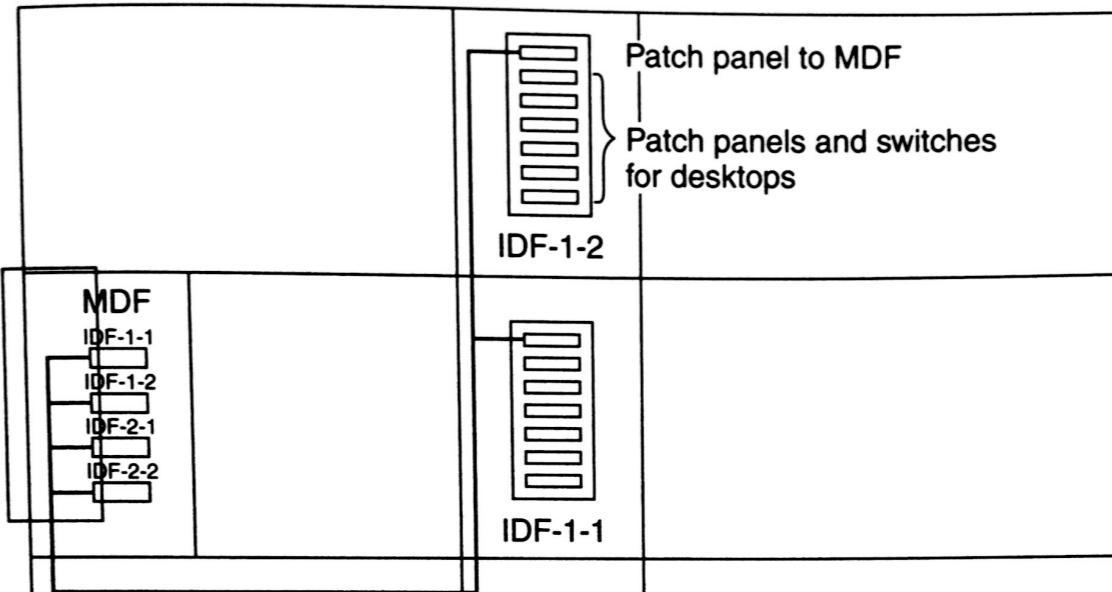
PC

PC



IDF and MDF

- Intermediate Distribution Frame (IDF): 網路機櫃
- Main Distribution Frame (MDF): 中央機房的網路機櫃
- Patch panel



Patch panel



A few patch panels in our MDF (R215 N-01).

Top: Patch panel to 2F (old)
Bottom: Patch panel to WiFi access points (deprecated)

Fiber Patch panels in our MDF (R215 N-01).

Both: Fiber patch panel to 3F-5F IDF

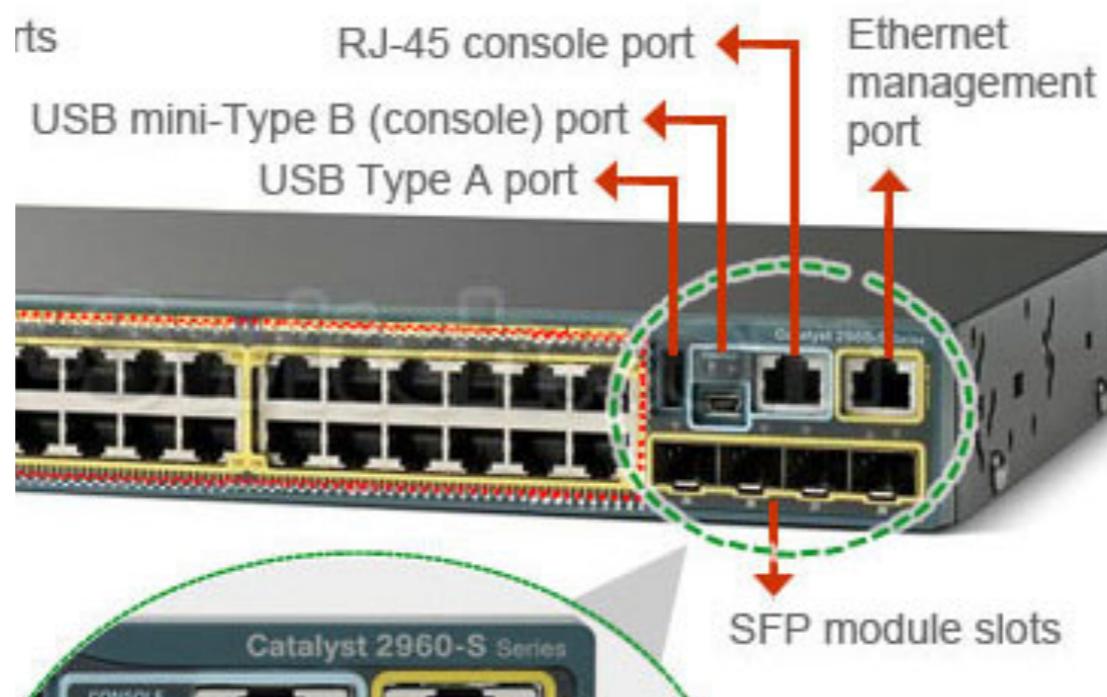


About IDF

- **Vertical alignment:** cabling between IDFs and MDF is simpler and cheaper to install
- Labeling and numbering:
 - Building/floor/closet numbers.
 - Network jacks: IDF number and location number (e.g., 2F-A-217-B)
- Lock and restrict access
 - Prevent security breach (snooping) and untrained people to access
- Size consideration

About IDF

- Protected power: UPS/generator.
- Cooling
(think about PoE switch and high-power core switch)
- Access to console (remote and physical)



Cost of deploying cable

- Construction time deployment versus afterwards
- Selection of cable class: cat.5e cat6 cat7
- “Dead president joke”: cost of installation dominates
- Location is not permanent: deploy the same # of cable
- Cable test
- Fiber termination
- Patch cable: from panel to switch
 - do not do-it-yourself.
- Network jack's direction



In-class Exercise

- Design a fault tolerant CSIE building network infrastructure (considering only 3F-5F), and draw the network topology.
- Estimate the cost of the network (switch & cabling)
 - New switches
(check cisco 29xx class gigabit switches)
 - Cabling cost (cat. 7? cat. 6?). Please consider the length of the cable.
 - (you can ignore the construction cost for the time being)