Warehouse Scale Datacenters:
The case for a new approach to networking

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What is a warehouse scale datacenter?

- **Large datacenters being built today can accommodate over 120,000 physical servers**

- **These servers may be 24+ cores**
  - **Dual-slot 6-core Westmere + HT**
  - **With decent virtualization, this can mean 20+ VM's per physical server**
  - **That is 2,400,000 VM's in a single datacenter!**

- **This is today…**

- **Massive amount of east-west bandwidth**

- **Massive amount of cross-talk**

Other attributes of warehouse datacenters?

- **In large-scale deployments, companies have very extensive Inventory Management System, and they already know:**
  - **Graph of the network elements**
  - **Where every server is in the datacenter**
  - **Which switch/port every server is plugged into**
  - **IP address of every server**
  - **MAC address of every server**

Topology Discovery

Topology discovery

- **Today:**
    - **Routers spend 30%+ cpu cycles re-doing that topology discovery**
        - **Edge discovery**
            - **ARP/MAC bindings**
        - **Topology discovery**
            - **ISIS/OSPF/SPT/RSTP/TRILL/etc**
- **SDN:**
    - **We already have this info in a central DB!**
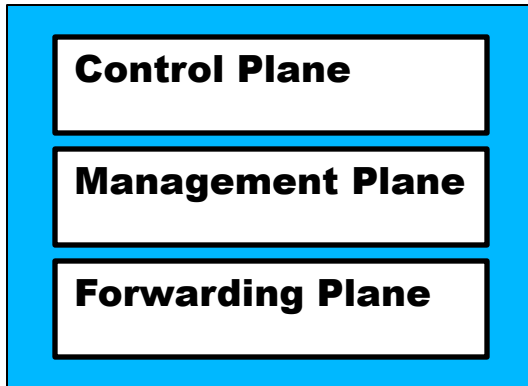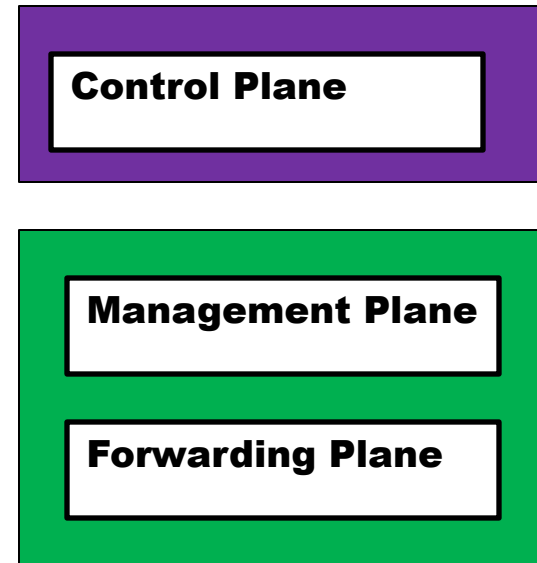   - **So, let's just program it!**

Faster/cheaper/better

It's all about the $$$$$

TODAY

SDN

TODAY box (blue):
- Control Plane
- Management Plane
- Forwarding Plane

SDN:
- Control Plane (purple box)
- Management Plane (green box)
- Forwarding Plane (green box)

Automation

Automation

- **Today:**
  - **Powerful configuration templating tools**
    - **Create config generators to translate those templates to every vendor/device/OS model syntax**
  - **Configuration deployment tools to push that out**
    - **They are absolutely archaic**
      - **Don't you just love expect?**
- **SDN:**
  - **General API**
  - **Easier to get stuff done..**

Faster Innovation

Customer: "I need a new feature X please"

Vendor: " But you are the only one asking for that, so, how much revenue will that bring in?"

Customer: "Give me that feature, or I won't buy *any* more of your products!"

Vendor: "That's nice, but not enough revenue behind that, we'll get to it when we can (ie never)"

OR

Vendor: "Oh crap, they are actually serious and big enough, ok, you'll get it in 18 months"

That's a lot of conflict!

Feature Development with SDN

- **Separates Control features from forwarding (hardware) features**

- **Allows for network "plug-ins" into the controller**

  - **Now _you_ can develop your own control features**

- **You can influence the whole system**

Questions?