

Chapter 16



Data Centers

CompTIA Network+



Episode 16.01

Episode title: **Classic Data Center Architecture**

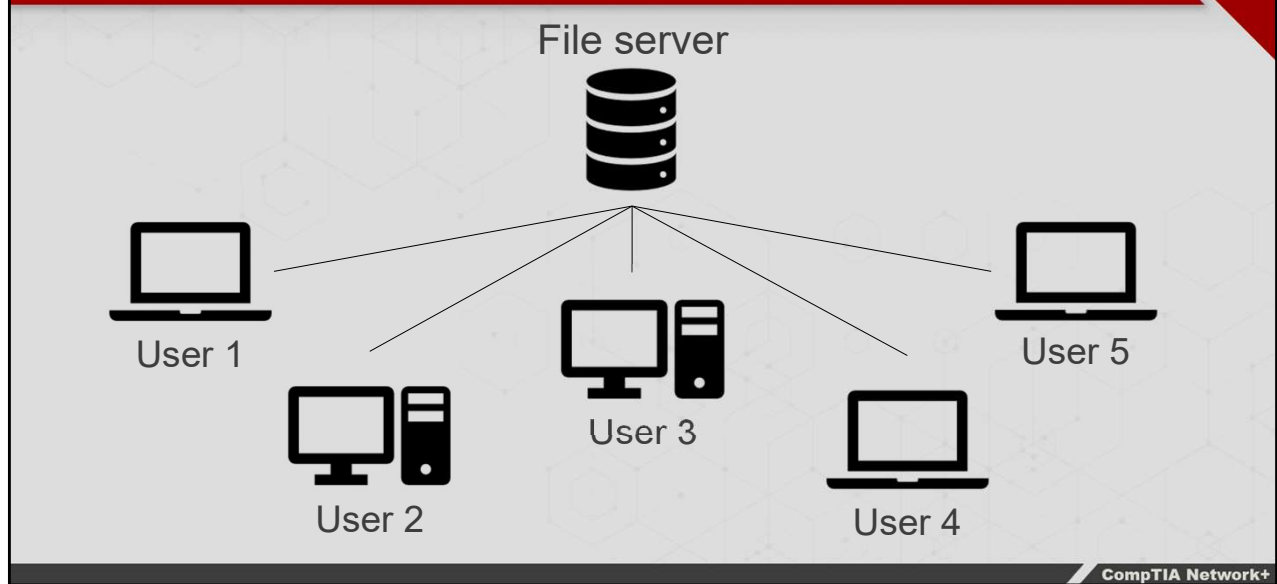
Objective: **1.7 Explain basic corporate and datacenter network architecture**

Key Terms

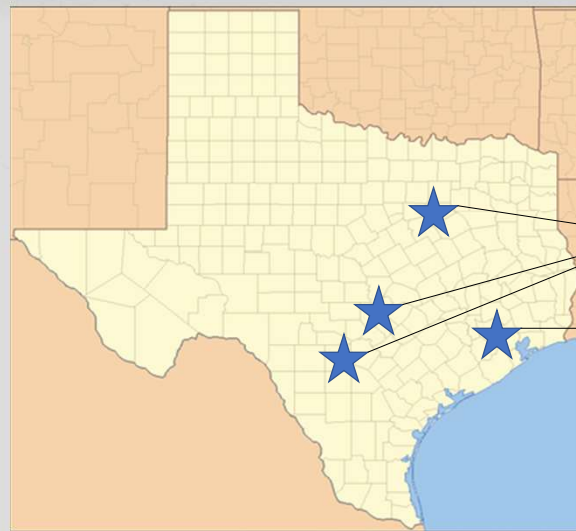


- Data center
- Co-location
- Network attached storage (NAS)
- Storage area network (SAN)
- SAN controller
- Fibre Channel over Ethernet (FCoE)
- Multipathing

Typical File Server Setup



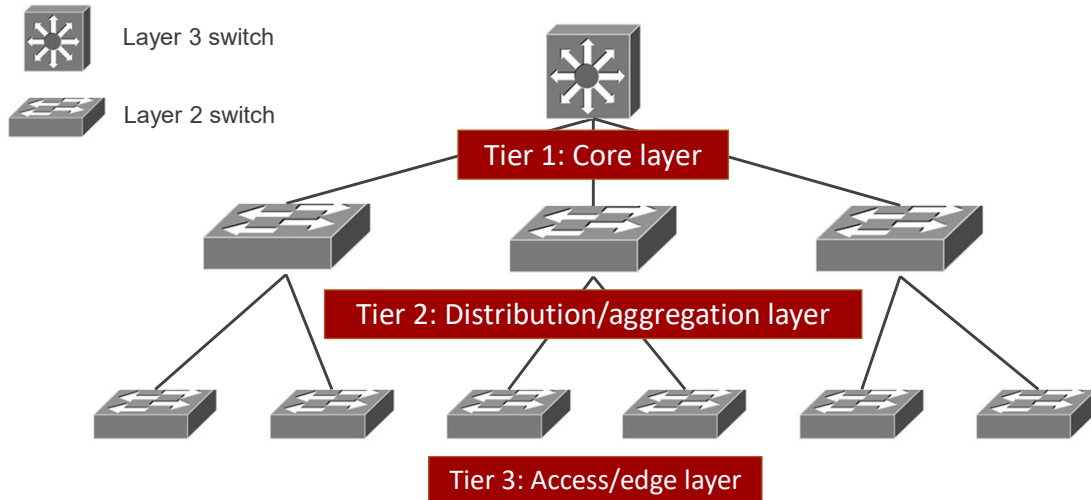
Branch Offices



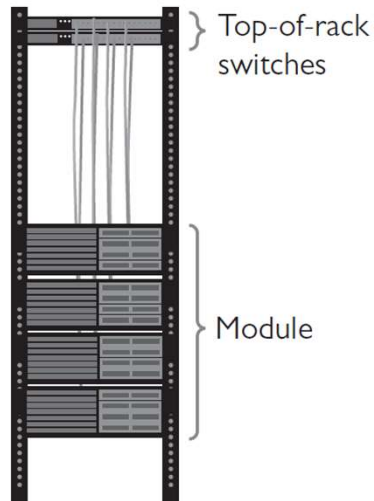
Branch offices

Headquarters

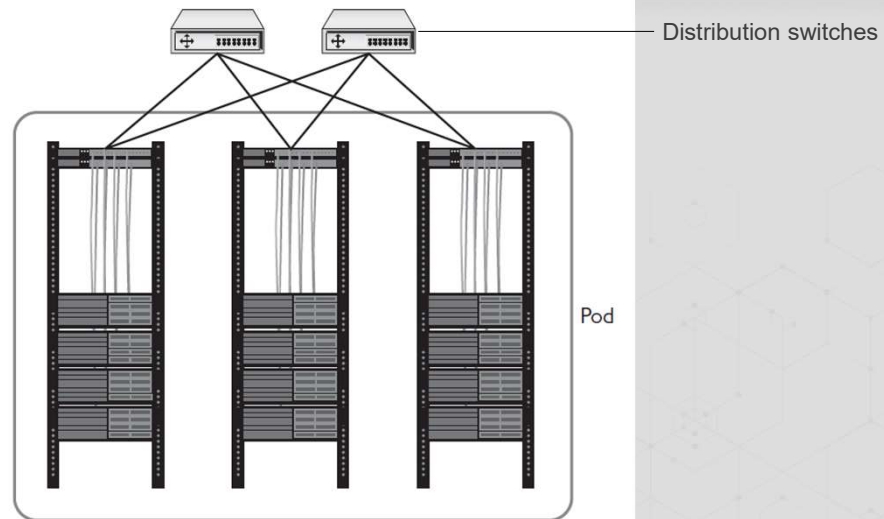
Three-Tiered Architecture



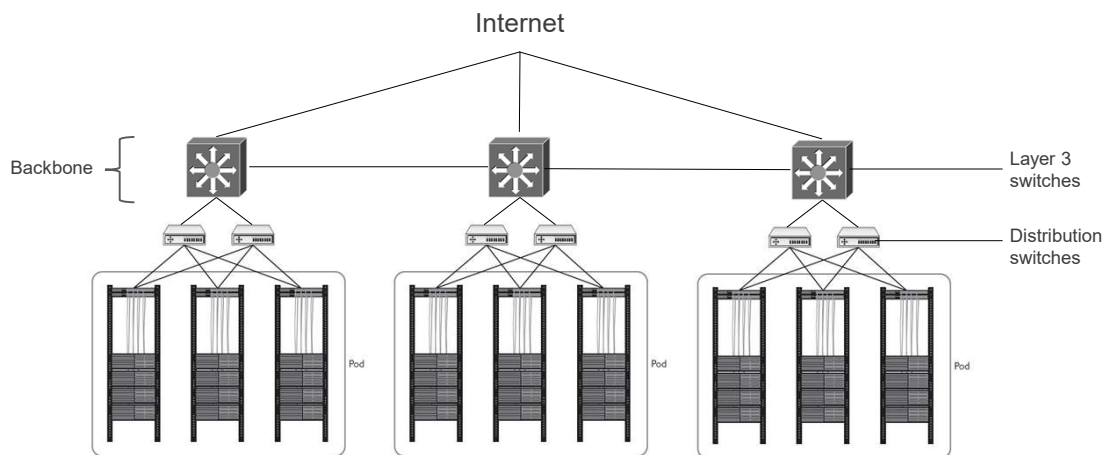
Typical Rack with Switch



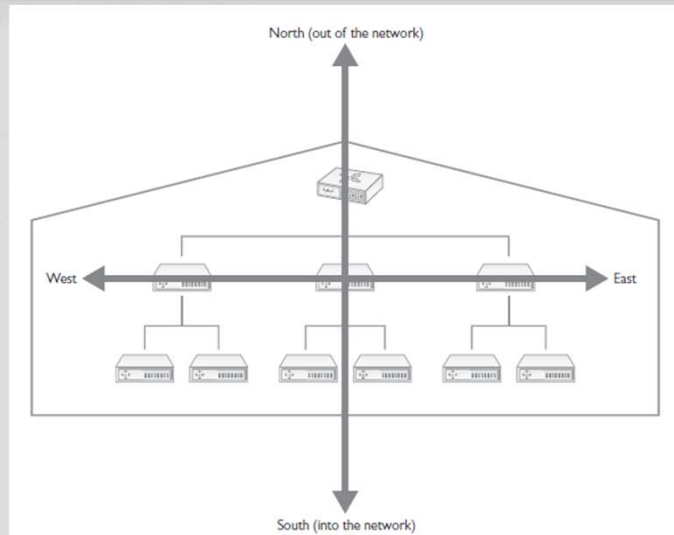
Distribution/Aggregation Layer



Core Layer



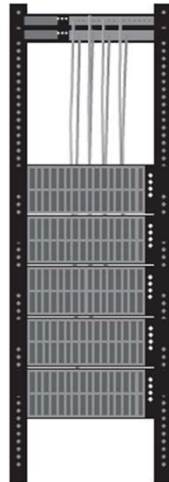
Traffic Flows



Storage Area Network (SAN)



iSCSI, Fibre Channel,
or Fibre Channel over
Ethernet (FCoE)
connection to servers



SAN controller
with backup

SAN storage array

Quick Review



- Three-tiered architecture has three layers: core, distribution/aggregation, and access/edge
- Pods consist of one rack with multiple servers connected to one top-of-rack switch (or two for redundancy)
- Traffic flows describe how traffic moves in and out of a data center
- A storage area network (SAN) is used in data centers to connect individual systems to a central bank of mass storage



Episode 16.02

Episode title: **NAS and SAN**

Objective: **1.2 Explain the characteristics of network topologies and network types**

NAS

- Runs over a standard network
- Shows up as normal shares on network

Key Terms



- SAN provides block-level storage
- Fibre Channel (FC)
- Host bus adaptor (HBA)
- iSCSI
- iSCSI initiator

Quick Review



- Network-attached storage (NAS) is file level
- Storage area network (SAN) is block level
- SAN uses either Fibre Channel or iSCSI



Episode 16.03

Episode title: **The Modern Data Center**

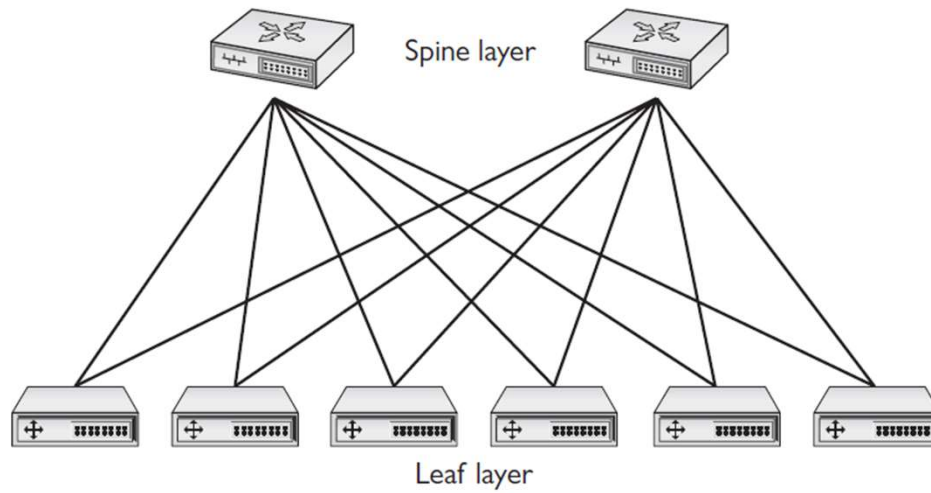
Objective: **1.7 Explain basic corporate and datacenter network architecture**

Key Terms



- Network function virtualization (NFV)
- Software defined networking (SDN)
- Forwarding plane/layer
- Infrastructure plane/layer
- Control plane/layer
- Application plane/layer
- Management plane/layer

Spine-and-Leaf Architecture



Quick Review



- Virtualization and software-defined networking (SDN) has helped data centers move from three-tiered to spine-and-leaf architecture
- SDN virtualizes much of the networking plane/layers
- With spine-and-leaf architecture, each top-of-rack switch is connected to the layer three switches on the spine layer



Episode 16.04

Episode title: **High Availability**

Objective: **3.3 Explain high availability and disaster recovery concepts and summarize which is the best solution**

Key Terms



- Load balancing
- Clustering
- Active-active
- First Hop Redundancy Protocols (FHRP)
- Virtual Router Redundancy Protocol (VRRP)
- Hot Standby Router Protocol (HSRP)
- Active-passive

Key Terms



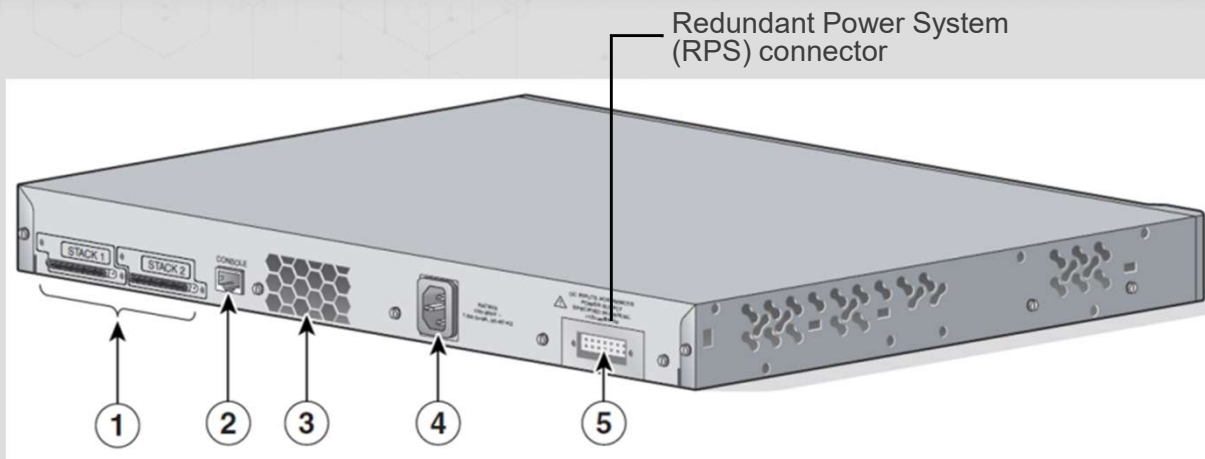
- Uninterruptible power supply (UPS)
- Power distribution units (PDUs)
- Generators
- Heating, ventilation, and air conditioning (HVAC)
- Fire suppression

Rack-Mounted UPS



CompTIA Network+

Cisco Switch with RPS Connector



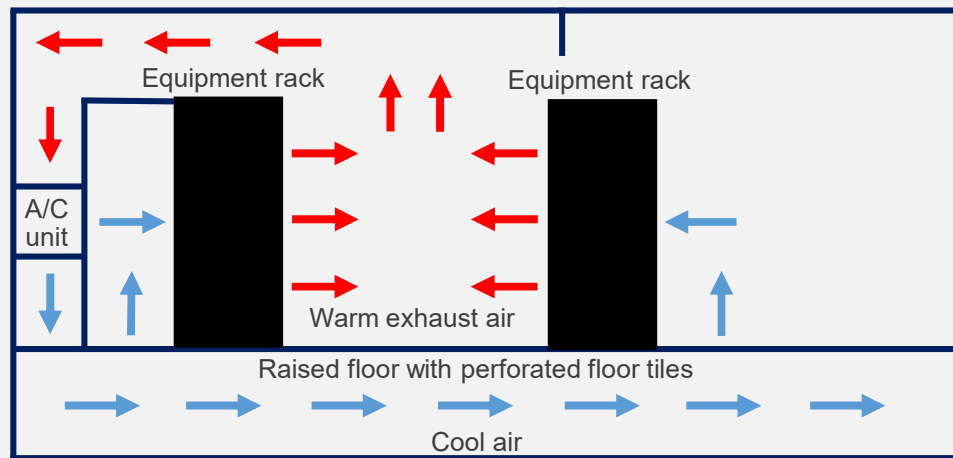
Source: <https://community.fs.com/blog/connection-guide-for-cisco-catalyst-3750-series-switches.html>

Generators



CompTIA Network+

Hot/Cold Aisles



Quick Review



- High availability means that services aren't lost, not how fast they are recovered
- Redundancy protocols, load balancing, clustering, uninterruptible power supplies (UPSes), and generators help ensure high availability



Episode 16.05

Episode title: **Documenting the Data Center**

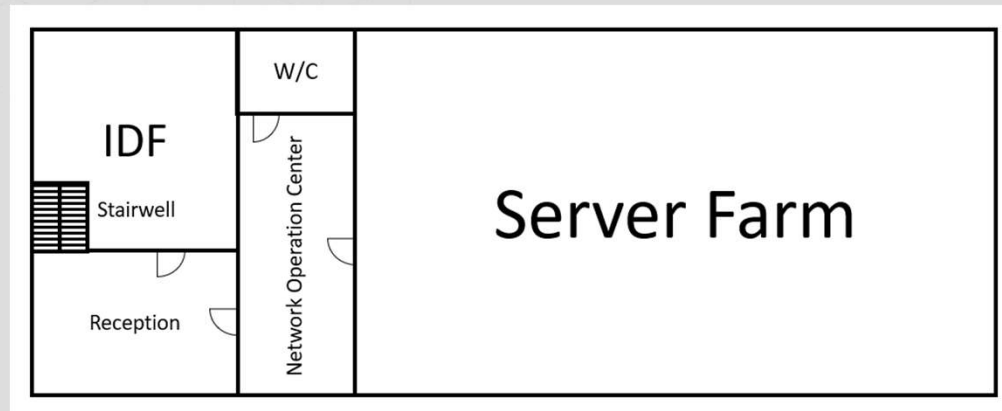
Objective: **3.2 Explain the purpose of organizational documents and policies**

Key Terms

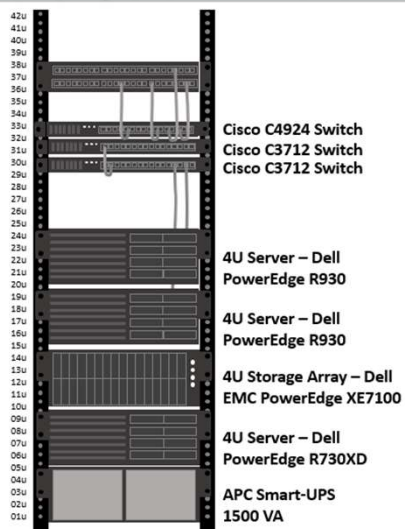


- Main distribution frame (MDF)/intermediate distribution frame (IDF) documentation
- Logical network diagram
- Wiring diagram
- Baseline configurations
- Site survey
- Audit and assessment reports

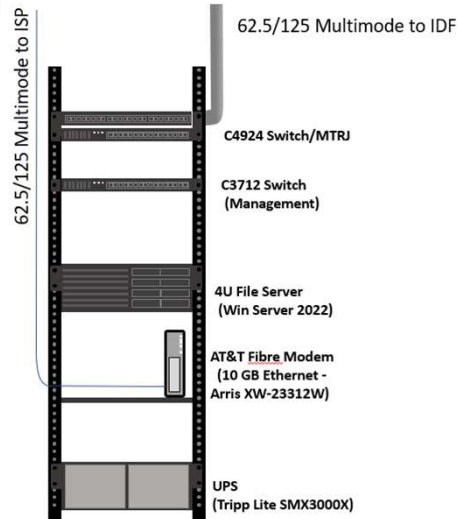
Floor Plan



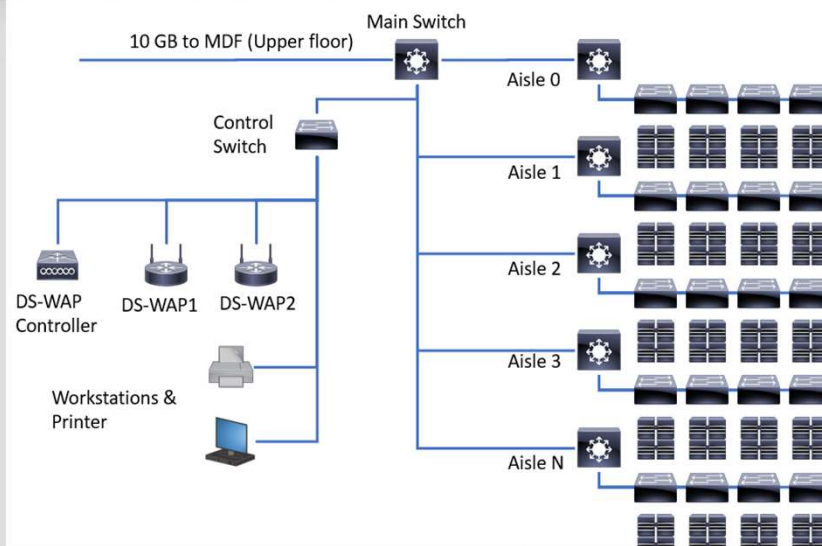
Rack Diagram



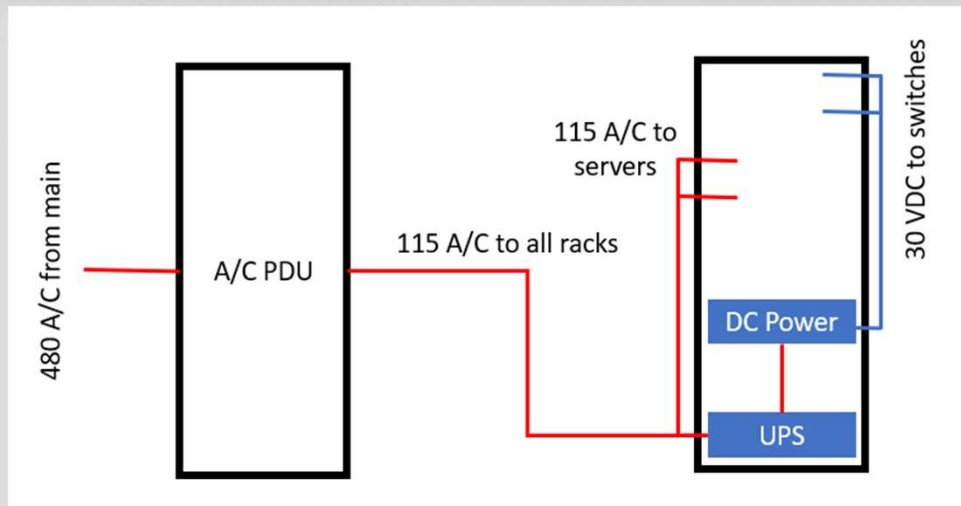
MDF/IDF Documentation



Logical Network Diagram



Wiring Diagram



Quick Review



- Floor plans include information about the rooms where the equipment resides, as well as details about the racks, servers, aisles, outlets, etc. that are in each room
- Rack diagrams focus on each individual rack and what is mounted to each
- Logical network diagrams show how devices communicate with each other and the flow of information through the network