Services:

Monitoring and Logging

Recall: Server vs. Service

- A **server** is a computer.

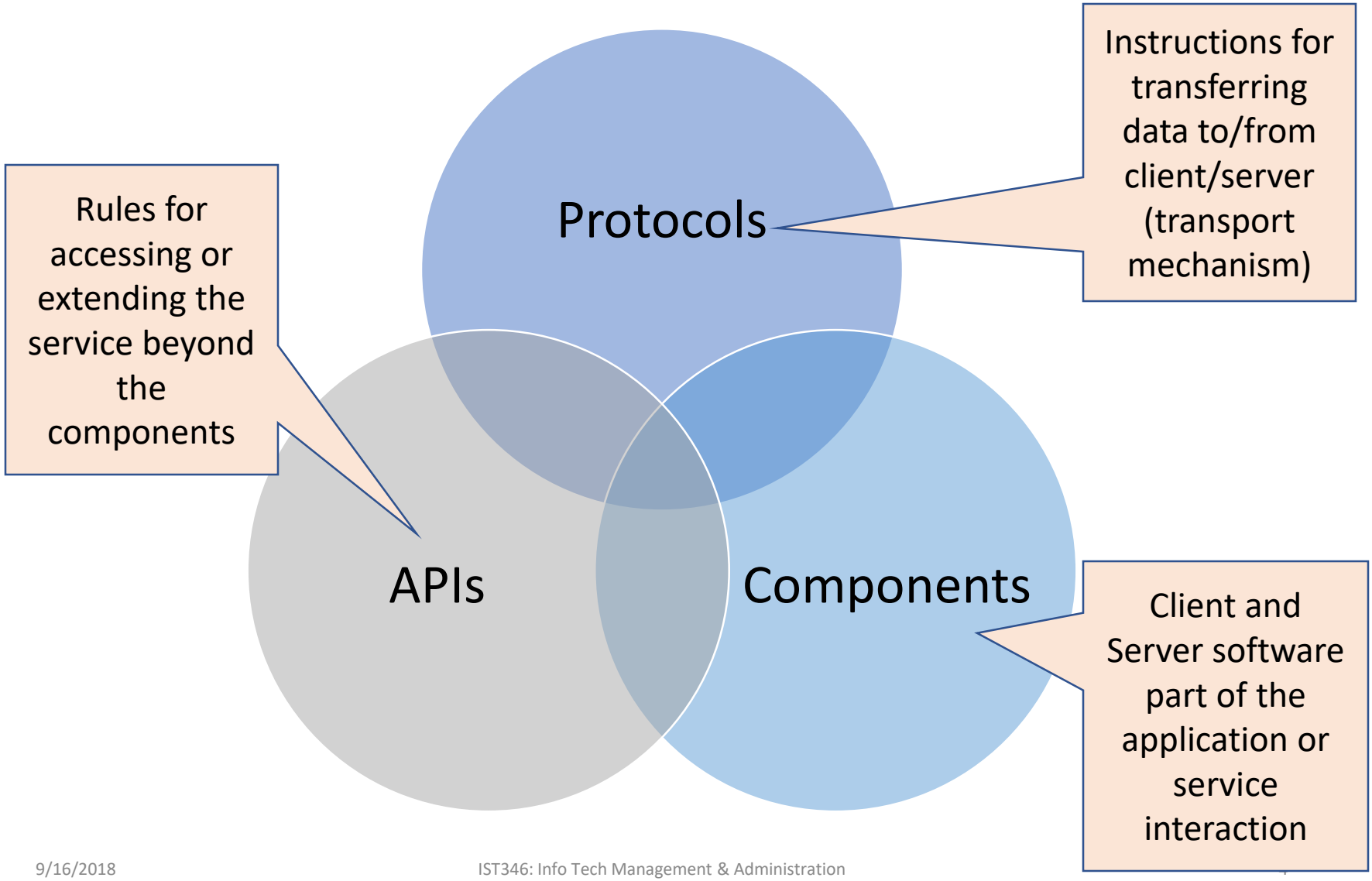
- A **service** is an offering provided by server(s).

- HTTP

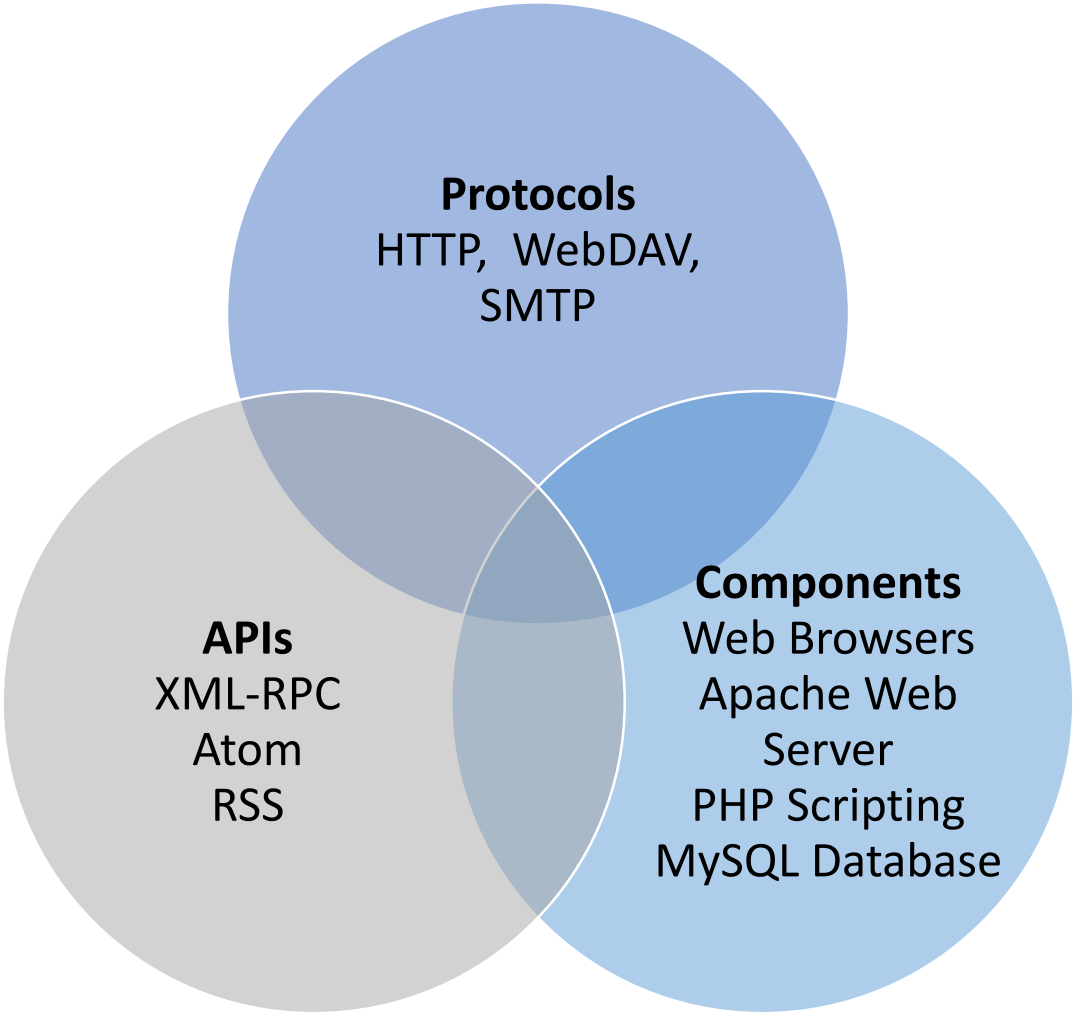
Services

- Unify a set of workstations into a ***distributed computing environment,*** since they share common resources.
- Typical environments have several services, and services often depend on other services.
- Some services are simple, and have no interaction's on the user's part. (network time, or NTP for example)
- It is best to think about any given service in terms of its ***components*** and ***interdependencies***.

Components: An Anatomy of a service

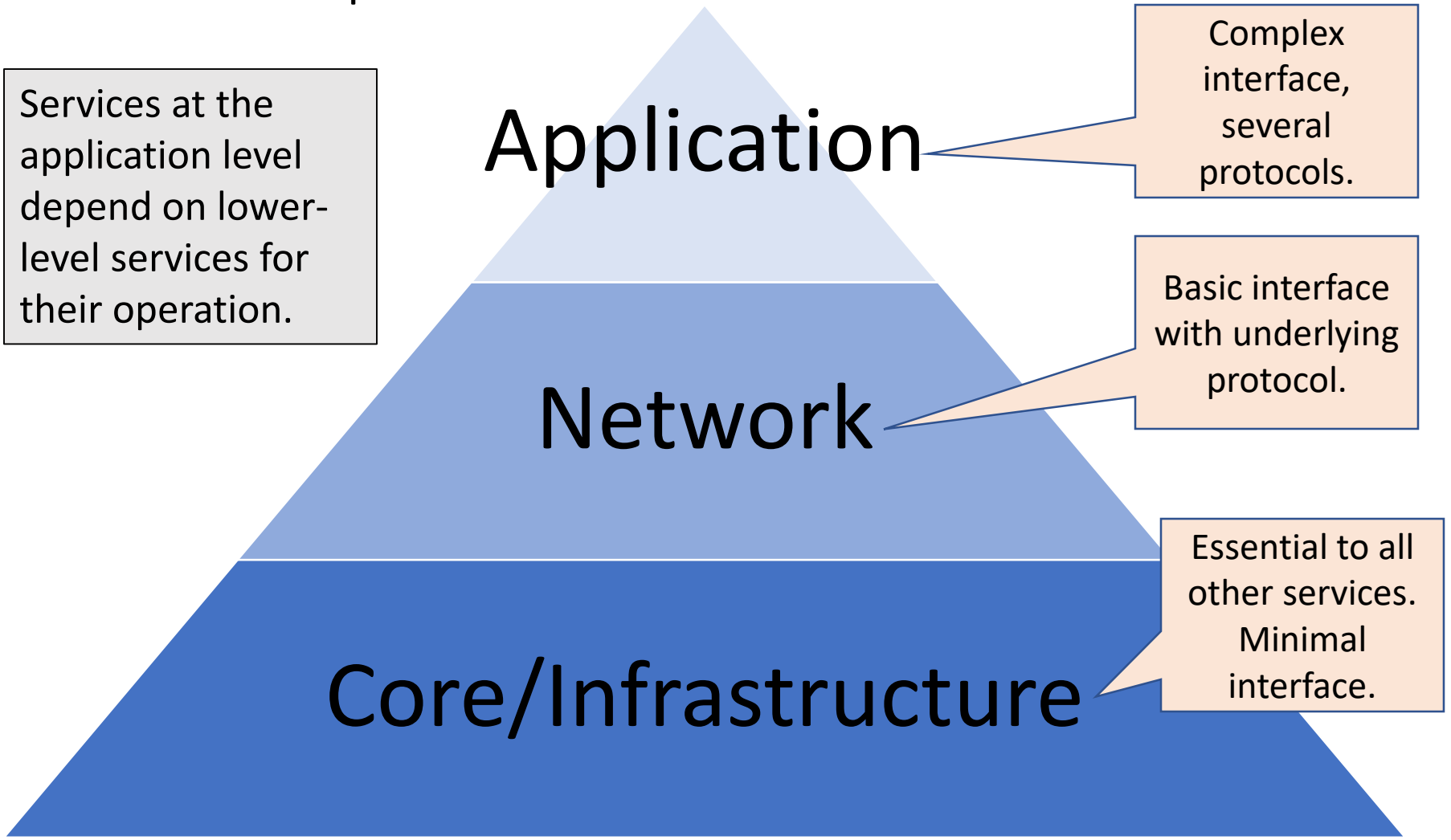


Example of a service anatomy: Wordpress

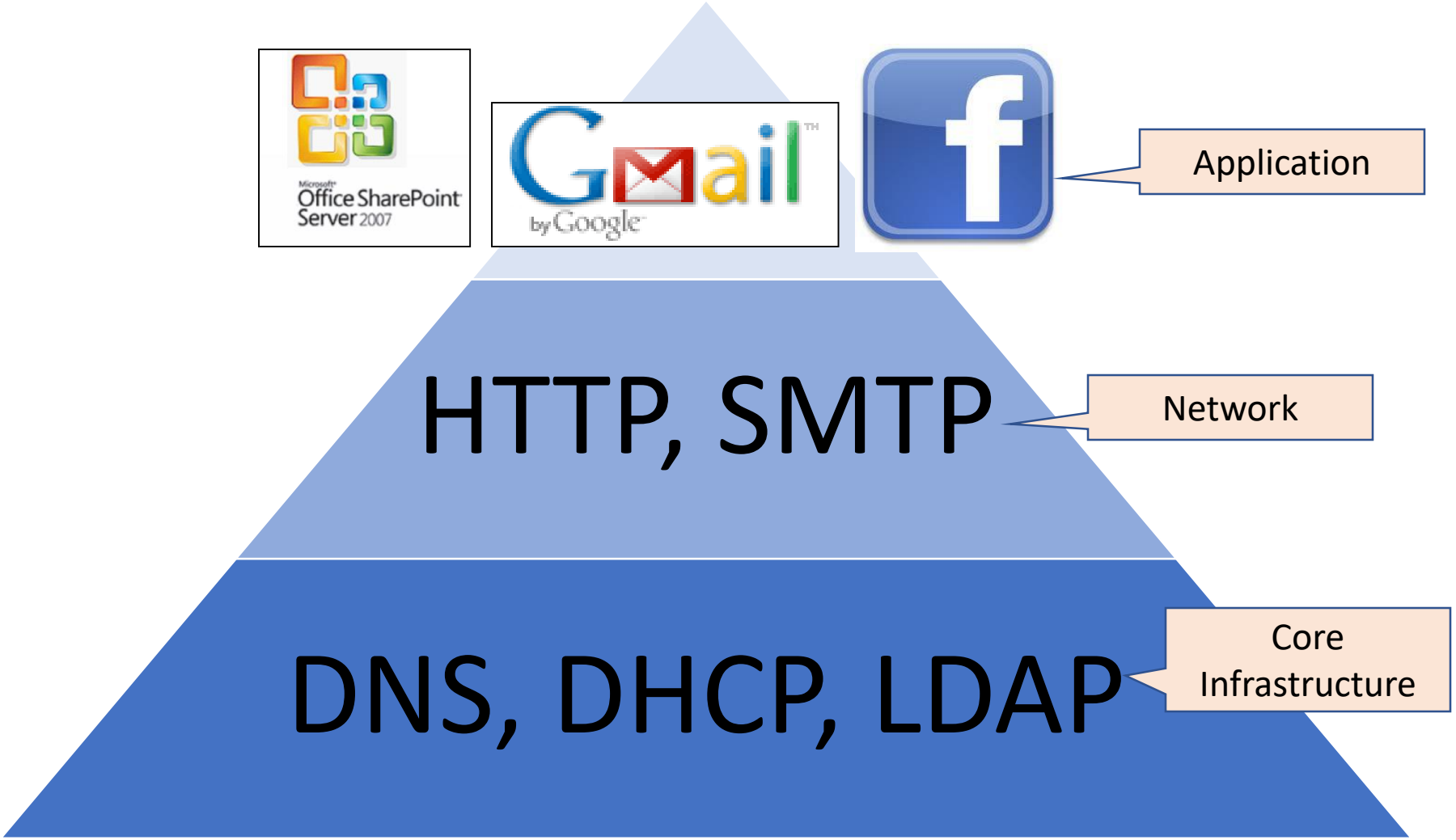


Service Dependencies

Services at the application level depend on lower-level services for their operation.



Service Dependencies: Example



Services every IT professional should know

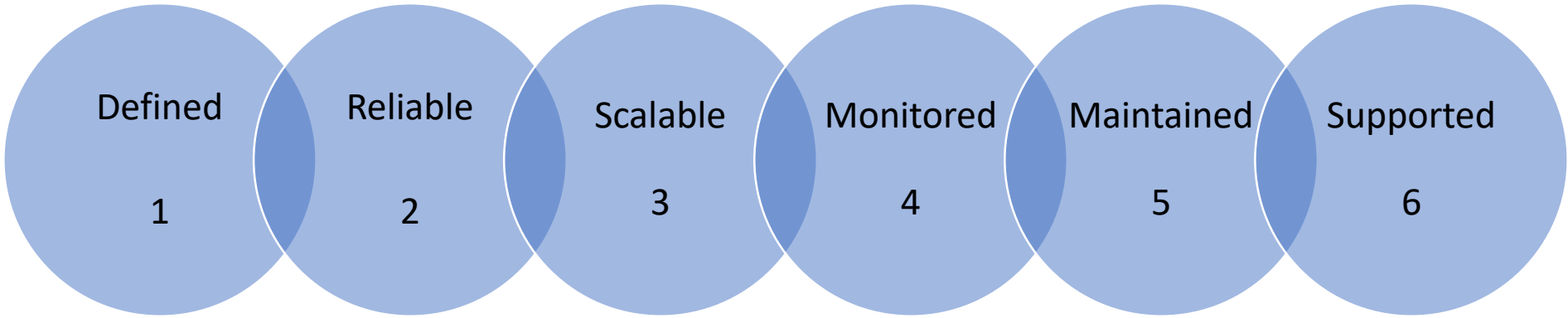
- Core
  - **NTP** – Network time protocol. Keeps the clocks in sync on several hosts
  - **DNS** – Domain name system – a method of IP address to host name resolution.
  - **DHCP** – Dynamic Host configuration Protocol – a method of assigning IP information over the network.
  - **LDAP** – Lightweight Directory Access Protocol – a hierarchal database of directory information (users, groups, organizations, etc)
  - **Kerberos** – A network authentication protocol, used for securely evaluating identities over a network

Services every IT professional should know

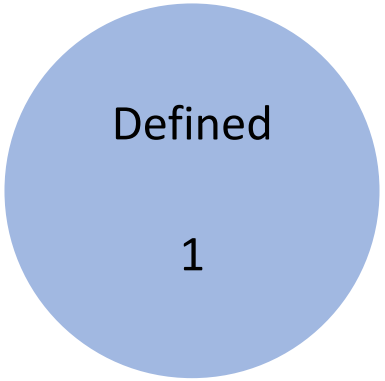
- Network
  - **HTTP** – Hypertext transport protocol. The application protocol for the WWW
    - **SSL** –Secure Sockets Layer – an encrypted channel for HTTP traffic
  - **SSH / SCP** – Secure Shell, Secure Copy. Unix/Linux remote shell and remote file copy protocols.
  - **NFS** – Network File System – File sharing for unix-like computers.
  - **RDP** – Remote Desktop protocol. A proprietary protocol for accessing Windows hosts over a network.
  - **SMTP** – Simple Mail Transport Service. Mail routing protocol.
  - **OAuth2** – for account authentication and authorization.

Providing a Service

- Any service you provide must be:



Defining your Service



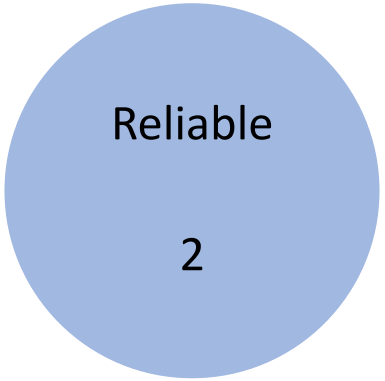
Customers are the reason for your service

- How will they use it?
- What features do they need? Want?
- How critical is this service?
- What are the required levels of availability and support?

Formulate a SLA (Service Level Agreement)

- This will define the service being offered
- Clarify the expectations for support levels and response time

Service Reliability



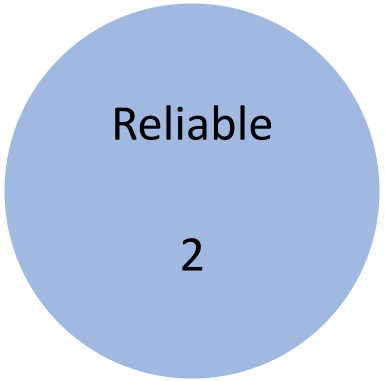
Keep it simple

- Simple systems are more reliable and easier to maintain
- Make the trade-off between features and reliability
- Use reliable hardware, of course!

Take advantage of vendor relationships

- Have them provide recommendations (they should be the experts!)
- Let multiple vendors compete for your business
- Choose a vendor based on not only features but the stability of their company and product

More Reliability



Use Open Architecture:

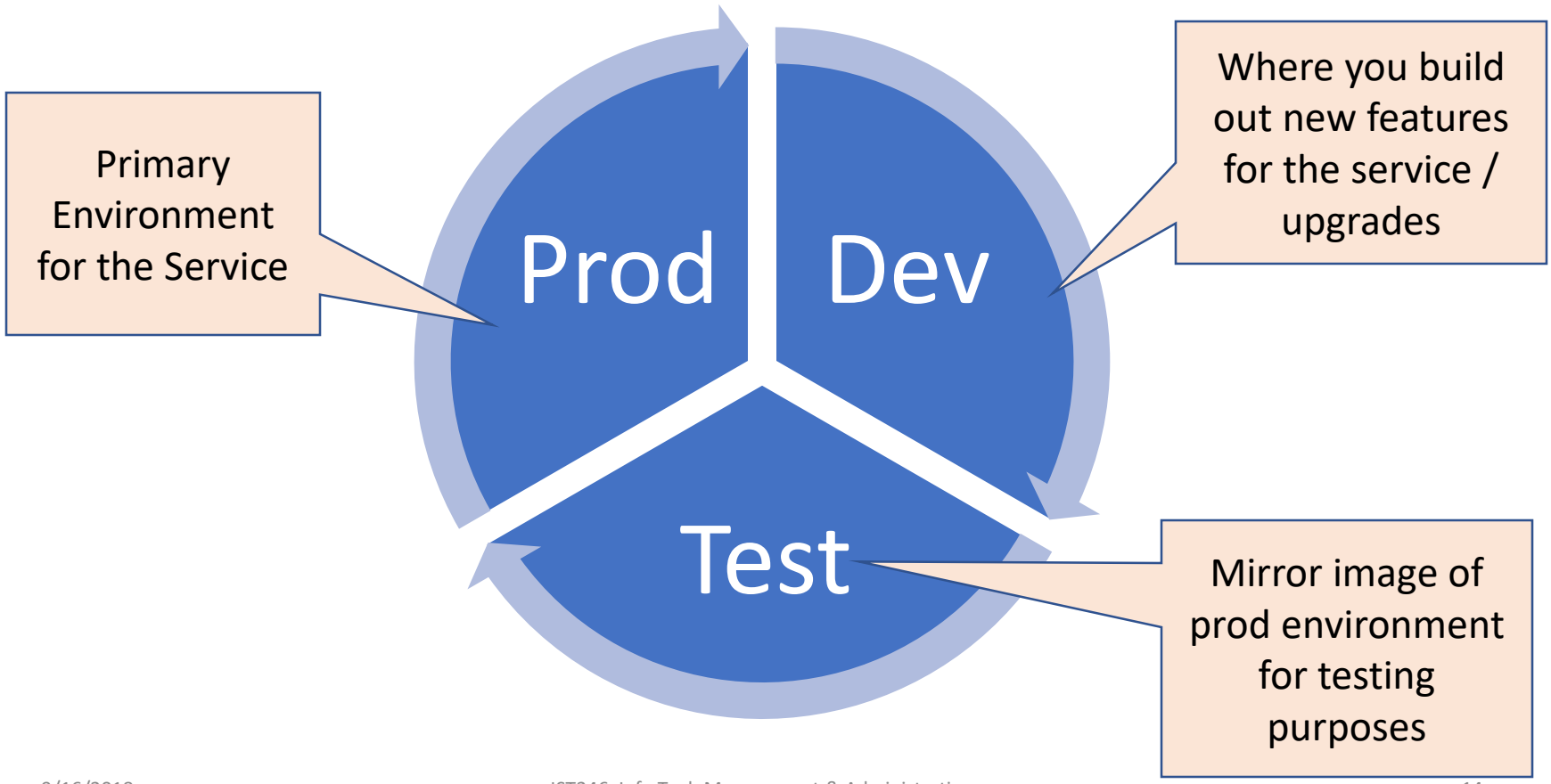
- Open protocol standards and file formats
- RFC's from the IETF http://www.rfc-editor.org
- Pros
  - Bigger selection of products and vendors to choose from
  - Decoupled client and server selection
  - Avoids being locked in to a specific platform or vendor
- Con
  - Sometimes open standards don't go far enough
- Google-Worthy
  - ***Service-Oriented Architecture*** is changing the game a bit, as most services are gravitating towards interoperability (working with each other)

Last Slide on Reliability

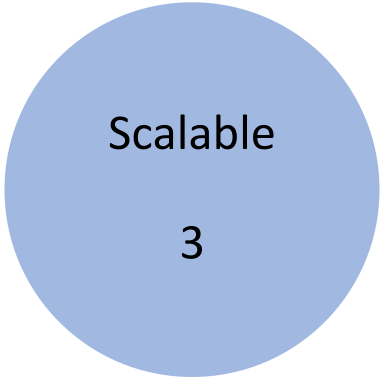
Reliable

2

- Any service should have 3 environments
- Usually, each environment is on separate hardware



Scalability



Scalability

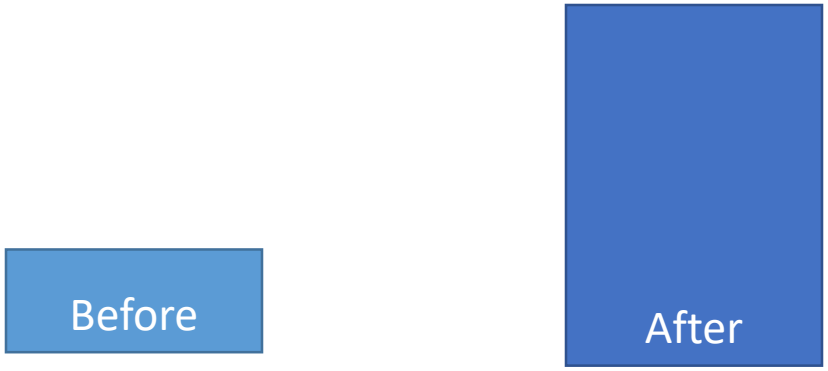
- A service's ability to grow with its demand.
- Helps maintain performance levels.
- You should try to plan for scalability when designing your service.
- Two types of scalability:
  - Vertical (scale up) – Increasing the size of the node.
    Eg. add more RAM or an extra CPU to a server, buy a bigger washing machine,
  - Horizontal (scale out) – Adding more nodes to the service.
    Eg. purchase three more servers and balance their load, buy another washing machine, but keep your old one.

Scalability: H vs. V

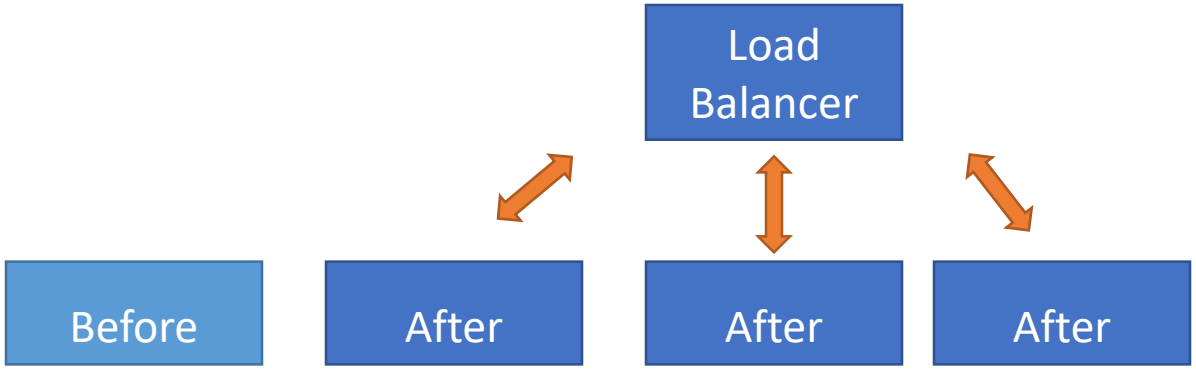
Scalable

3

Vertical Scalability:



Horizontal Scalability:



Scaling your Laundry

Scalable

3

You've got more laundry than your current washing machine can handle!!

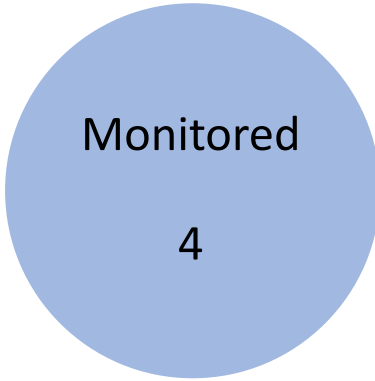
Vertical

Use a bigger, faster washing machine

Horizontal

Use more than one washing machine

Service Monitoring



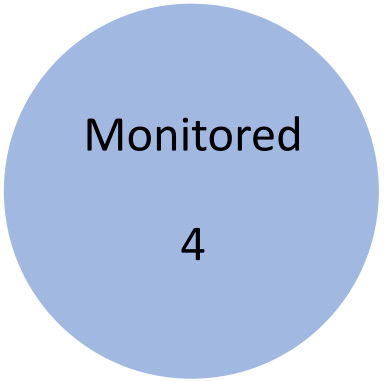
Layered Monitoring: **PPS!**

1. Ping: Monitor the host
2. Port: Monitor the port for the service
3. Service: Connect to the port; verify the response

- A Monitoring agent should send an alert to the IT team when things aren't right.
  - What, When, Where

Without adequate monitoring you cannot offer good service!

Monitoring and Logging



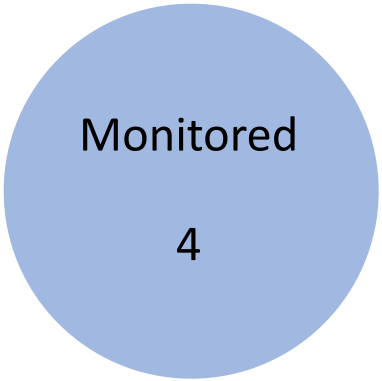
Service Monitoring

- Observing service activity in real-time
- This is done by a computer, not a human.
- Important events are passed on to a human (notification).

Service Logging

- Keeping ***historical records*** of service activity
- This data grows over time and can become quite large.
- Only referred to when needed to troubleshoot a problem or trace down a security incident.

Why Bother?



Why do we Monitor?

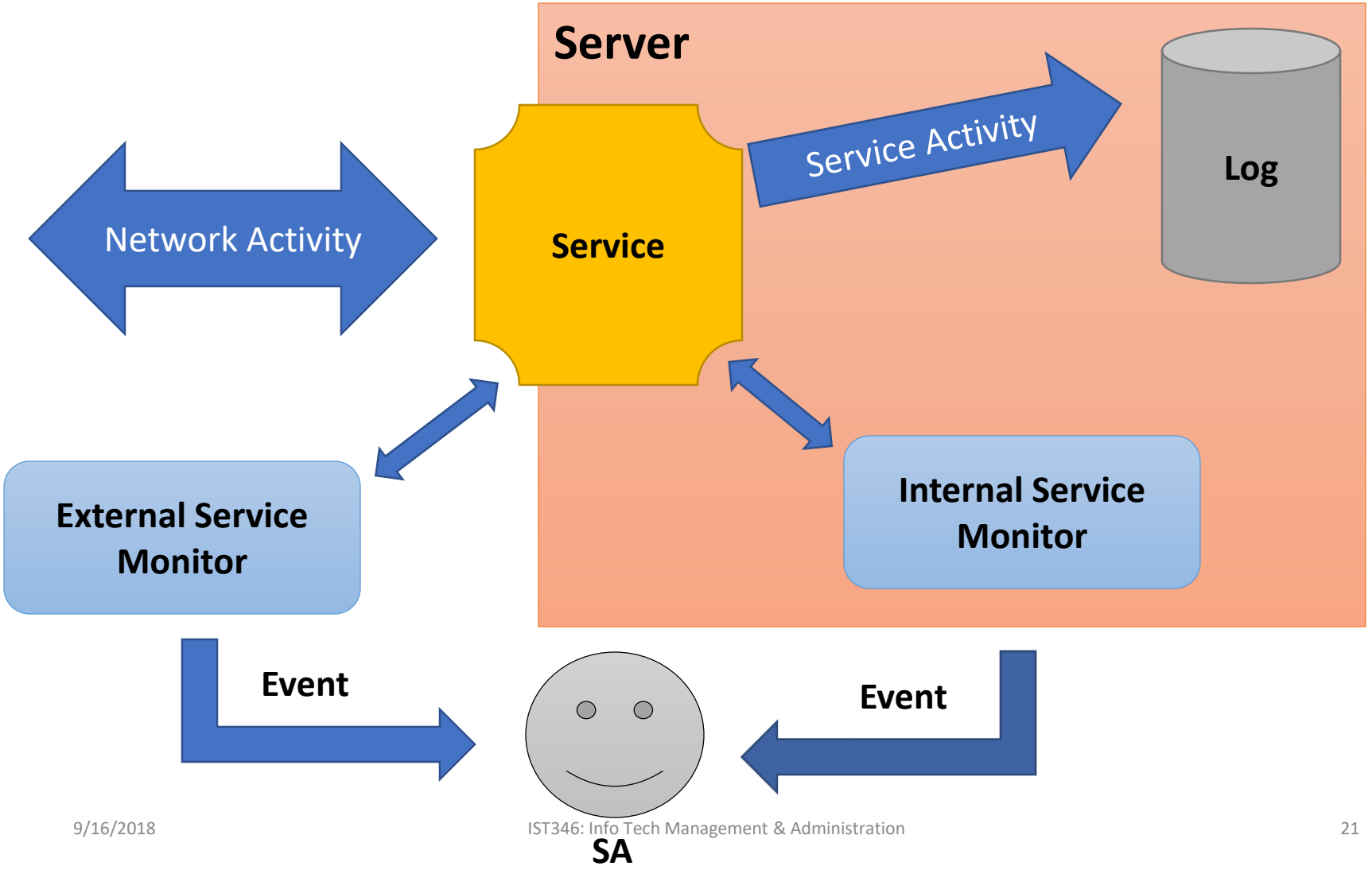
- To detect / identify problems quickly.
- Ideally you want to know about it before your users do.
- To determine if resources are being constrained or over utilized.

Why do we Log?

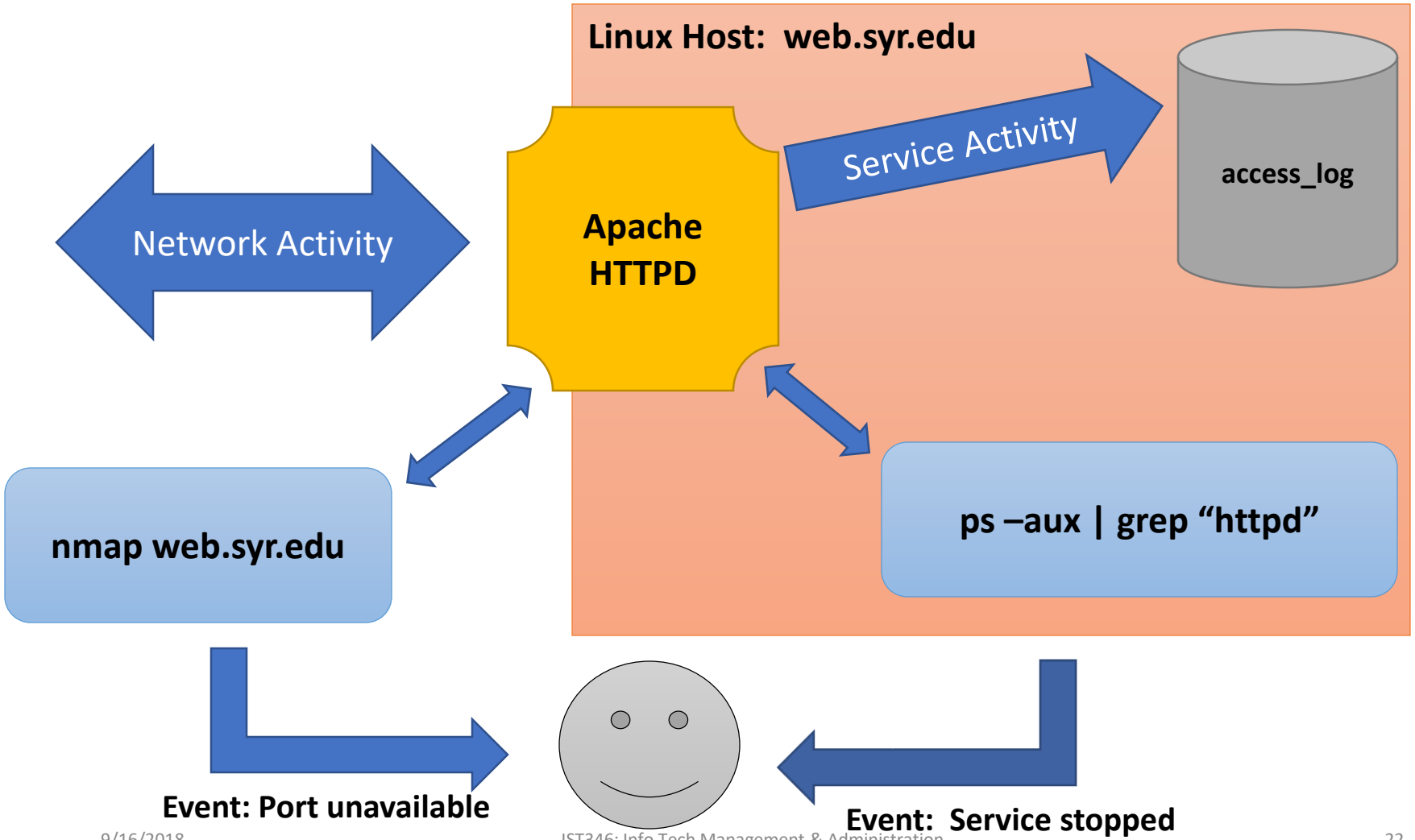
- Help get to the root cause of an issue or incident.
- Help us predict problem and avoid them.
- Provide historical data or trends for service usage.
- Report on service activity.

If you're not ***measuring*** it you aren't ***managing*** it

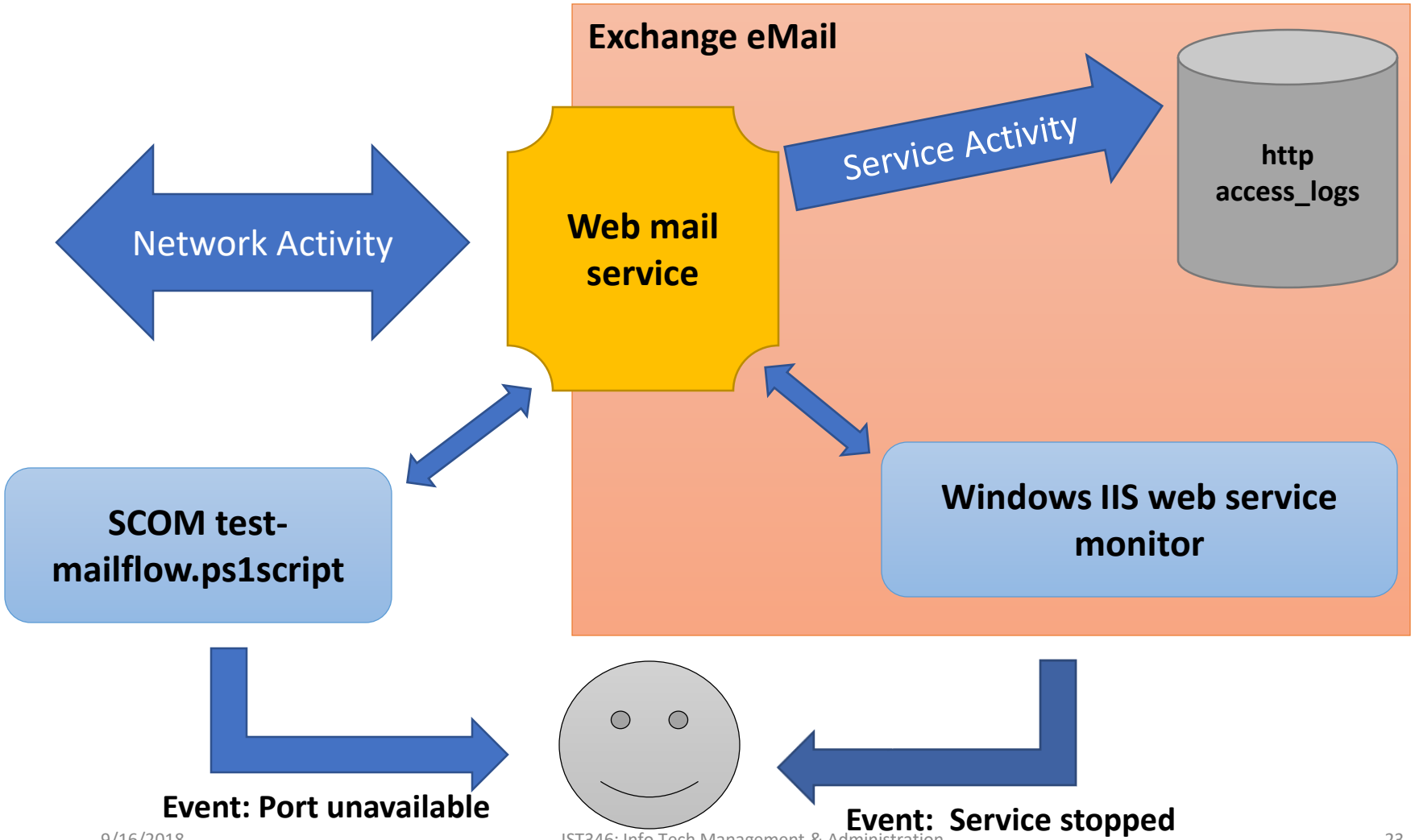
How Monitoring and Logging Work



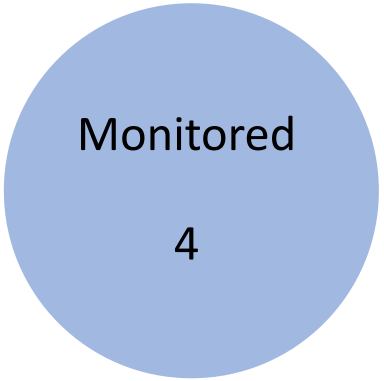
Example: Simple Web Service Monitoring



Example: Email Service Monitoring



What to Monitor, what to Log?

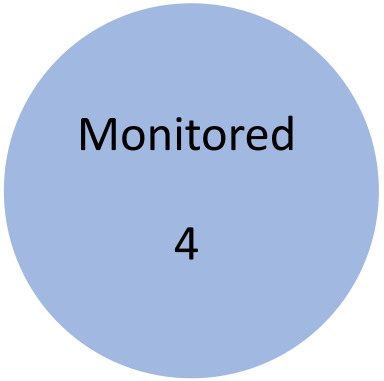


- Monitor for a **condition**.
- Send **alert** when the condition is met.
- Log the **condition** whether it sends an alert or not.

Examples: **(Why would you monitor/log these?)**

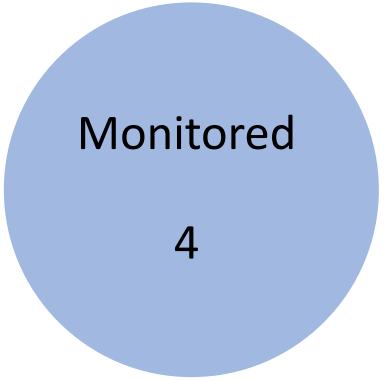
- CPU utilization stays at 100% for X minutes.
- Free disk space drops below 10%.
- Port does not respond for 1500 ms
- HTTP request take more than 5 sec to get response.

Better Monitoring



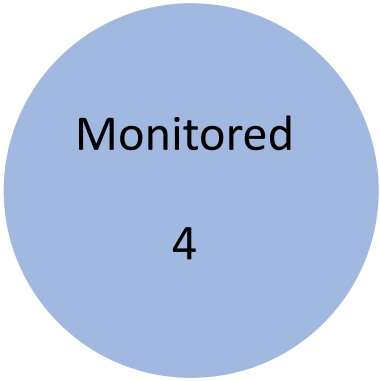
- Normal
  - **Normal:** When a service fails you send an alert.
- Proactive Monitoring
  - **Proactive:** When a service show signs it is about to fail you send an alert. (100% cpu, Long responses, etc.)
- Automated Responses
  - **Normal:** When a service fails you send an alert.
  - **Automated:** When the service fails, you attempt to restart it. If the restart fails, you send an alert.
- PM and AR are difficult and time-consuming to implement, but are time savers for difficult problems with no permanent fix.
- A layered approach is always better.

Alerts!



- Types:
  - Email
  - TXT message
  - SMS Page
  - Automated dialer calls phone.
- Pick the appropriate Alert for the appropriate Event and time.
  - Don’t send email when you’re not going to check it!
- In a layered approach, you might send an email, and if the problem persists send a TXT, etc…

Logging

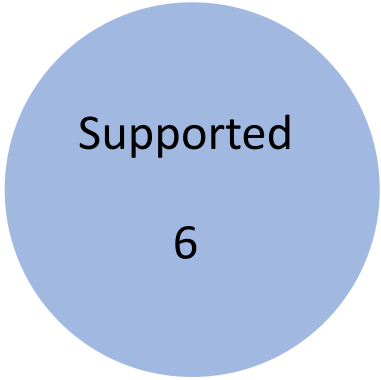


- Log files get very large
  - since they record all activity.
- Log file rotation – service points to a different log file after a specified interval.
  - Lets you backup log files
  - Keeps the size of the files manageable.
  - Log files are text and they compress nicely.
- How long do you keep logs?
  - Depends on service, depends on your policy
  - It's not a decision the SA should make.
- Ship logs to a Big Data system like Hadoop or ElastiSearch
- Like an insurance policy. Not very useful until the off chance that you need it... then you're glad you have it!

Service Maintenance

- Yes, there **will** come a time when you will need to deny service. (Make it unavailable.)
  - Upgrades to hardware / OS / Service itself
- Plan and advertise your service outages so your users can plan accordingly.
- Make sure your outage complies with your TOS.

Supporting your service



After your service is up and running,
but **before** rolling it out you should:

- Document how the service should be used and maintained by your IT staff
- Train your IT staff how to support the new service
- Train the users, if required
- Build out self-help support for the service to reduce calls to the helpdesk.
- Don't forget to advertise the new service to your users.
- **Roll it out using "One – Some - Many" so you can get a handle of any unforeseen issues.**