UW-Madison Cloud Strategy

v6.3

Abridged presentation for ITANA meeting 05-APR-19

Your Presenter

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- Joined UW-Madison in May 2018
- Have worked in information technology for 28 years
  - Four years as an IT and Business instructor for a community college
  - Twenty years as an database administrator, manager, trainer, consultant, speaker, and author specializing in Oracle
  - Four years as an enterprise architect
  - Focused on leveraging cloud to meet organizational goals since 2013
- Created the enterprise cloud strategy for a $9B, Fortune 500, financial services company

Agenda

- Introduction
- Approach
- Cloud Strategy Overview
- Define Desired Future State
- Prepare for Cloud Journey
- Summary and Next Steps

Introduction

ITANA Presentation Focuses On:

- "Minimum Viable Cloud" concept
- Pattern-based security model
- New roles associated with enterprise cloud strategy
- Use of Tiger Teams to deliver minimum viable cloud deployments

Topics Omitted From This Presentation:

- Reasons for exploring cloud computing
- Detailed overview of cloud terms and concepts
- UW-Madison cloud projects
- UW-Madison funding models

Approach
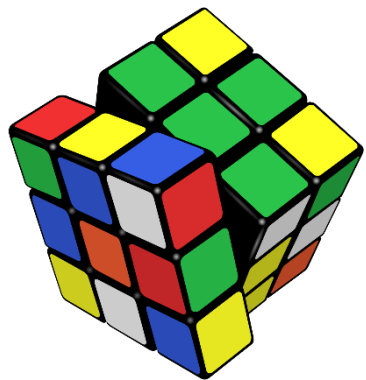
Approach

○ = iterative process

Establish Initial Direction	Understand Current State	Define Desired Future State	Prepare for Cloud Journey	Begin Cloud Journey
Define "cloud"	Existing Cloud services	Identify services to deliver	Design foundational infrastructure	Implement foundational infrastructure
Define cloud guiding principles	Standardization and automation level	Standardization and automation level ○	Document operational objectives and procedures ○	Build MVP operational objectives and procedures ○
Staff new cloud positions	Data governance ○	Data governance ○	Define or revise IT roles ○	Tiger Team(s) to deliver "quick wins"
Look for quick wins ○	Security controls ○	Security controls ○	Define or revise IT policies ○	Define and report metrics ○

Cloud Strategy Overview

UW-Madison Cloud Strategy

- There are lots of ways cloud can be deployed into an organization
- This strategy presents the approach which is being recommended for UW-Madison

Goal of Cloud Strategy

- Support research, teaching and learning, administrative, and outreach activities
- Deliver a secure, predictable cloud services which are focused, and easy to consume
- Allow campus constituents to focus on analysis, innovation, experimentation, and true differentiating activities.

Define "Cloud"

The cloud is not a place. The cloud is a way of delivering IT services in a secure, predictable manner which are focused, and easy to consume.

Start Small: Minimum Viable Cloud

We Are Here

We Want To Be Here

Make It Work
- Frequently DIY
- Delivery in weeks
- No implied warranty

Make It Better
- Basic automation
- Delivery in days
- No implied warranty

Make It Right
- Moderate automation
- Scalable
- Highly available
- Recoverability

Operationalize
- Full automation
- Workflow orchestration
- Auto-scaling
- Self-healing

Minimum Viable Cloud: Focus Areas

Guiding Principles for Cloud

- "The cloud" is not a place, it is a way of delivering IT resources.
- Cloud options will be considered for all IT solutions.
- Automation is paramount across the entire technology stack.
- Virtualization and standardization are keys to automation.
- A new application architecture is required to fully leverage the benefits of most cloud services.
- People and process are a critical part of cloud adoption.
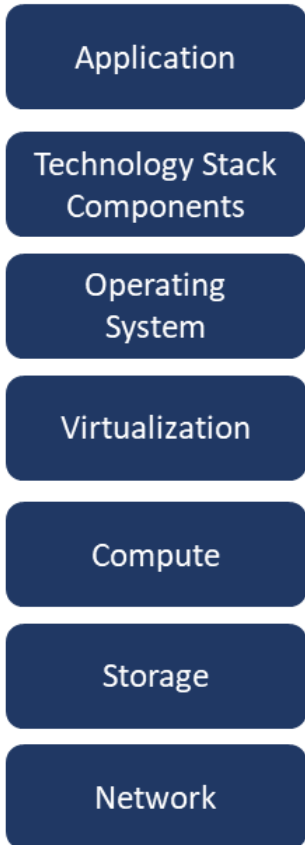- Cybersecurity compliant deployment patterns are critical.

Define Desired Future State
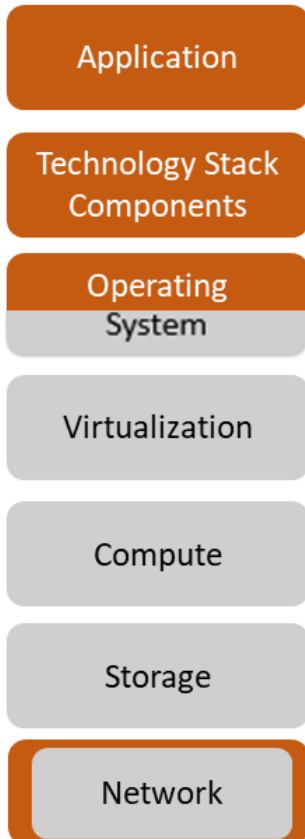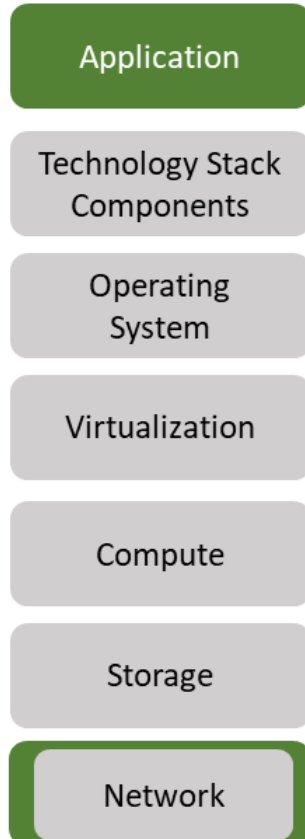
Define Services to Deliver
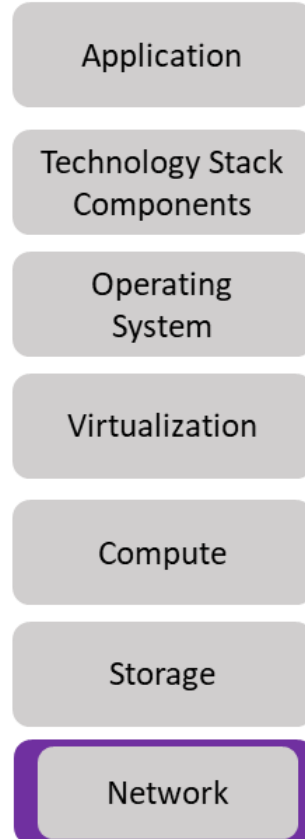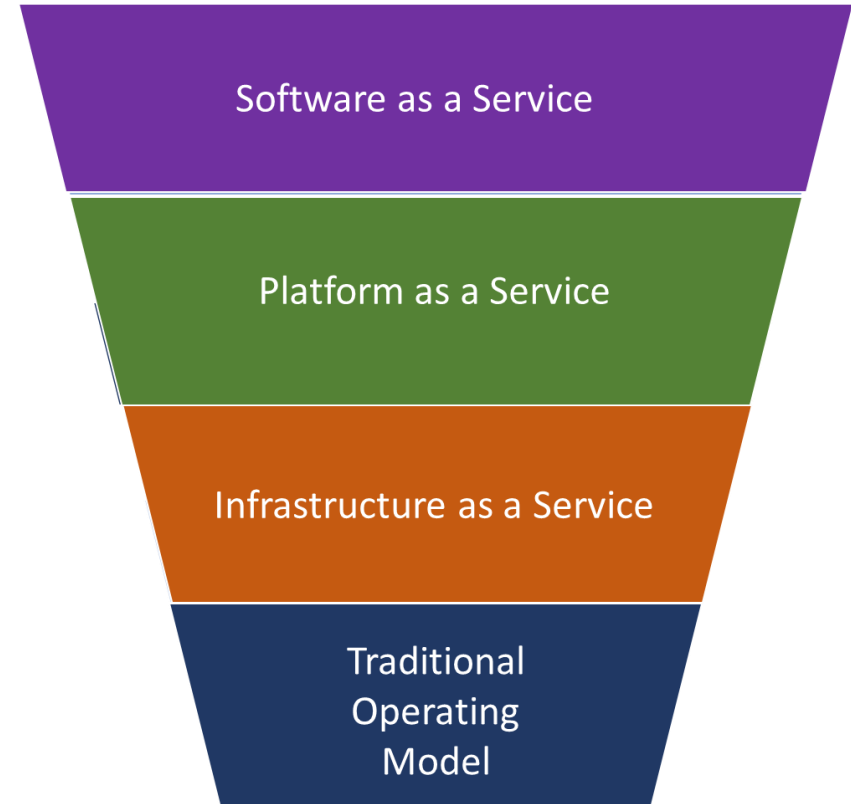
Define Pattern-based Data Security

Data User's Shared Responsibility

Public Data

Examples:
- Published Research
- Campus Maps
- Job Postings
- Course Information

Security Restrictions:
- Low

Sample Cloud Controls:
- Public internet
- Any server type
- Any storage type
- Minimal firewall rules

Possible Cloud Uses:
- Experimentation
- Innovation
- Presentations

Internal Data

Examples:
- Student Records w/o PII
- Admission Applications
- Employment applications
- Date of Birth

Security Restrictions:
- Medium

Sample Cloud Controls:
- Dedicated connection
- Any server type
- Any storage type
- Basic firewall rules

Possible Cloud Uses:
- Data analytics
- Data storage
- Public-facing apps

Sensitive Data

Examples:
- Unpublished research
- Export controlled information under US Laws

Security Restrictions:
- High

Sample Cloud Controls:
- VPN with encryption
- Approved server images
- Encrypted storage
- Customary firewall rules

Possible Cloud Uses:
- Data analytics
- Data storage
- Public and Internal apps

Restricted Data

Examples:
- PHI & HIPAA data
- DNA Profile
- PCI data

Security Restrictions:
- Very High

Sample Cloud Controls:
- VPN with encryption
- Approved server images
- Encrypted storage
- Special firewall rules

Possible Cloud Uses:
- Data analytics
- Data storage
- Internal apps

Data User's Shared Responsibility

Very Low ———— **Level of Institutional Risk** ———— Very High

Prepare for Cloud Journey

IT Roles Change as Cloud Encroaches

Role. *Noun*. A collection of functional duties and responsibilities required to support a particular aspect of technology related to the widespread adoption of cloud services.

Work isn't going away, but it is *changing*.
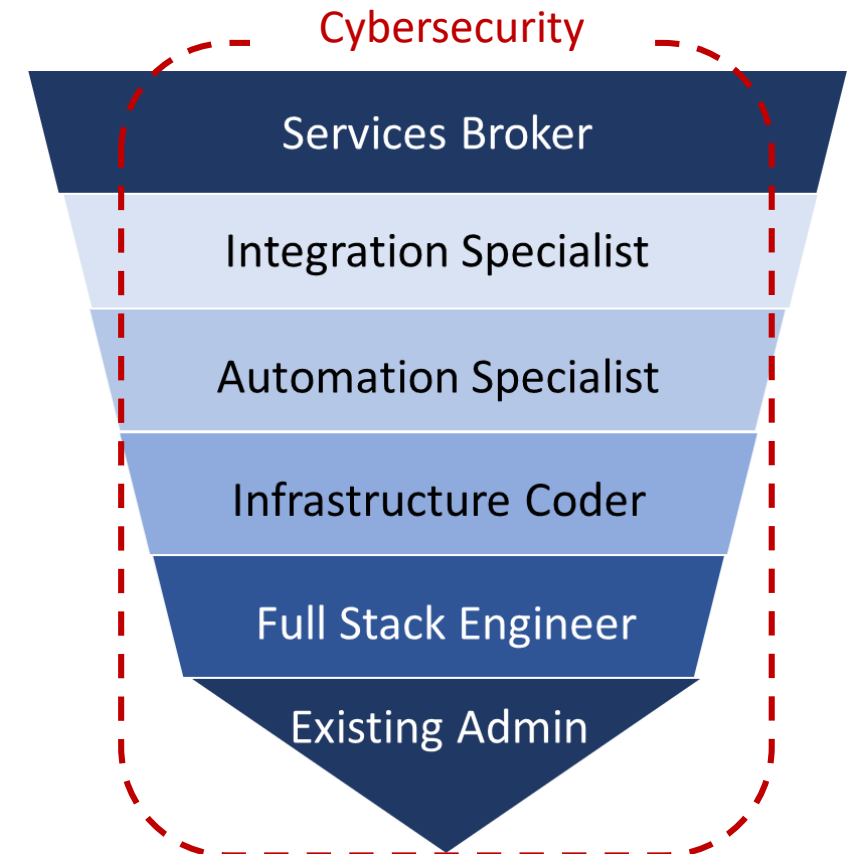
New Cloud Roles: Infrastructure

Existing Administration Roles

Network
Storage
Server
Database
Middleware
Messaging
Data Movement

Cloud Administration Roles

Cybersecurity
Services Broker
Infrastructure Coder
Full Stack Engineer
Integration Specialist
Automation Specialist
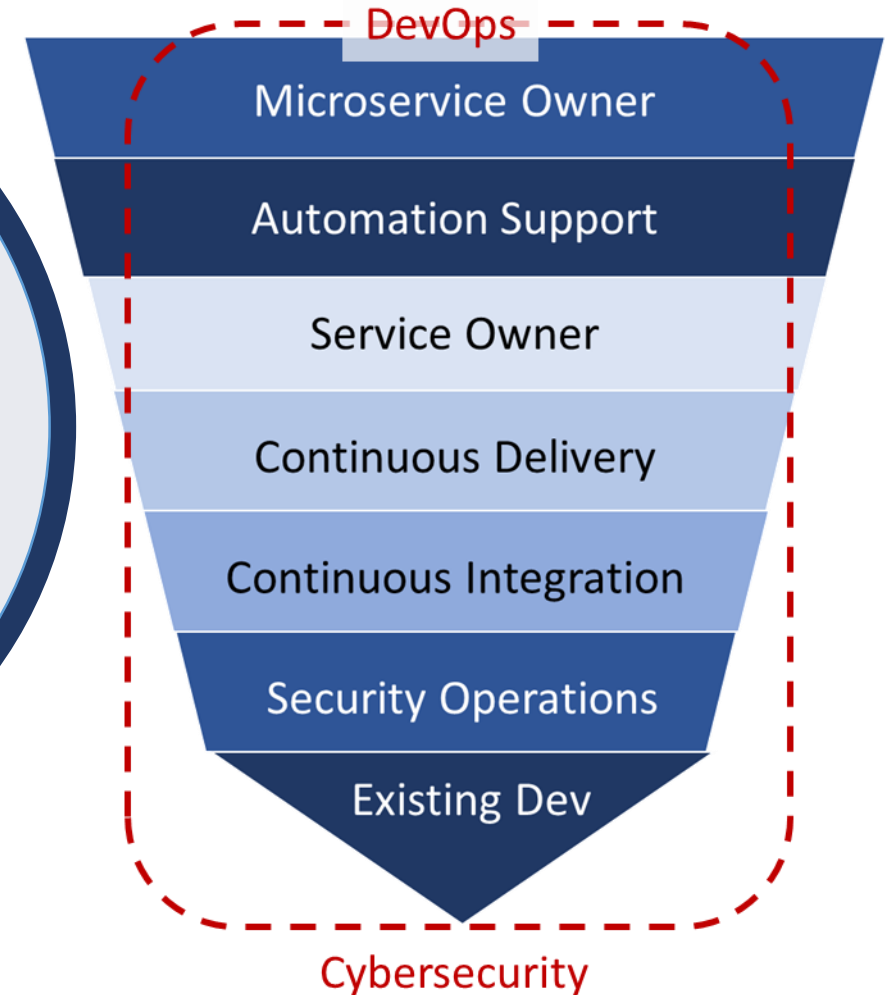Cybersecurity

Projected Breakdown 5-7 Years

Cybersecurity
Services Broker
Integration Specialist
Automation Specialist
Infrastructure Coder
Full Stack Engineer
Existing Admin

New Cloud Roles: Operations

Existing Operational Roles

Environmental Controls

Infrastructure Installers

Physical Security

Upgrades and Patching

Monitoring and Alerting

Level I, II, and III Support

Cloud Operational Roles

Hybrid Cloud Management

Capacity Analyst

Cost Engineer

Lifecycle Management

Access Control

Automation Management

Monitoring and Alerting

Level I and II Support

Projected Breakdown 5-7 Years

Automation Management

Hybrid Cloud Management

Monitoring and Alerting

Level I and II Support

Capacity Analyst

Cost Engineer

Cloud Access Control

Lifecycle Management

Existing Ops

New Cloud Roles: Security

Existing Security Roles

Enterprise Security
Gov., Risk, Compliance
Monitoring
Incident Response
Security Testing
Cyber Defense

Cloud Security Roles

Continuous Integration
Monitor and Alert
Cloud Controls Mgmt

Projected Breakdown 2-5 Years

Existing Security Roles

Continuous Integration

Monitor and Alert

Cloud Controls Mgmt

New Cloud Roles: Architecture

Existing Architecture Roles

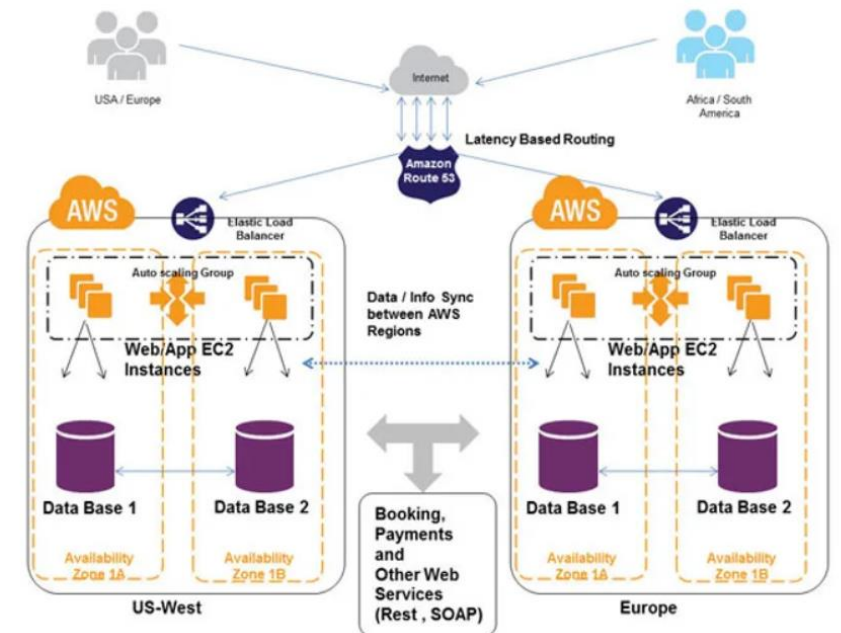**Cloud Architecture Roles**

Enterprise Architect

Solution Architect

System Architect

Cloud broadens and deepens existing roles

Understand common cloud architecture components

Decipher typical cloud architectures

Who Does the Work: Cloud Tiger Teams

Cloud Tiger Team. *Noun*. A nimble team of five to seven technical specialists who relentlessly identify opportunities to deliver secure and reliable cloud services in a highly automated manner.

Sol. Eng. & Network Srvs.

Cloud Engineer

Cybersecurity

Cloud Security

Cloud Coordinator

Sponsor

Cloud Team

Automation

Tools & Orchestration

Integrations

Appl. Integration Services

Applications

Application Owner & SME
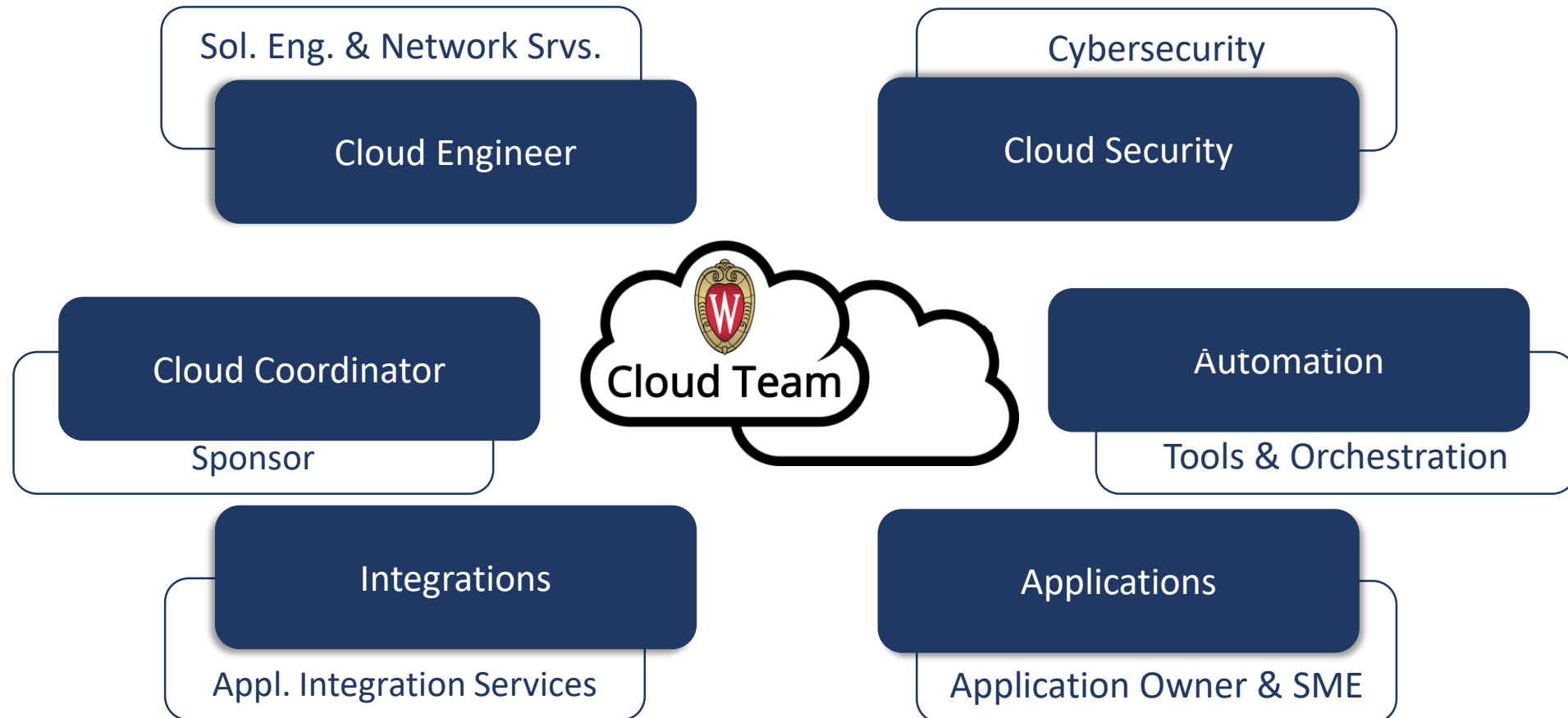
Tiger Team Member Profile

- "T-Shaped" shaped individuals
- Broad cross-discipline skills
- Deep expertise in a specific discipline

Training Roadmap

Cloud 101:
Cloud Foundations
$Free
1 hour

AWS 101:
Concepts & Services
$Free
1.5 hour

AWS 201:
Putting Things Together
$Free
1.5 hour

Azure 101:
Concepts & Services
$Free
1.5 hour

Azure 201:
Putting Things Together
$Free
1.5 hour

Cloud 301:
Moving to the Cloud
$Free
1 hour

Architecting on AWS
$TBD Cost
3 days

Developing on AWS
$TBD Cost
3 days

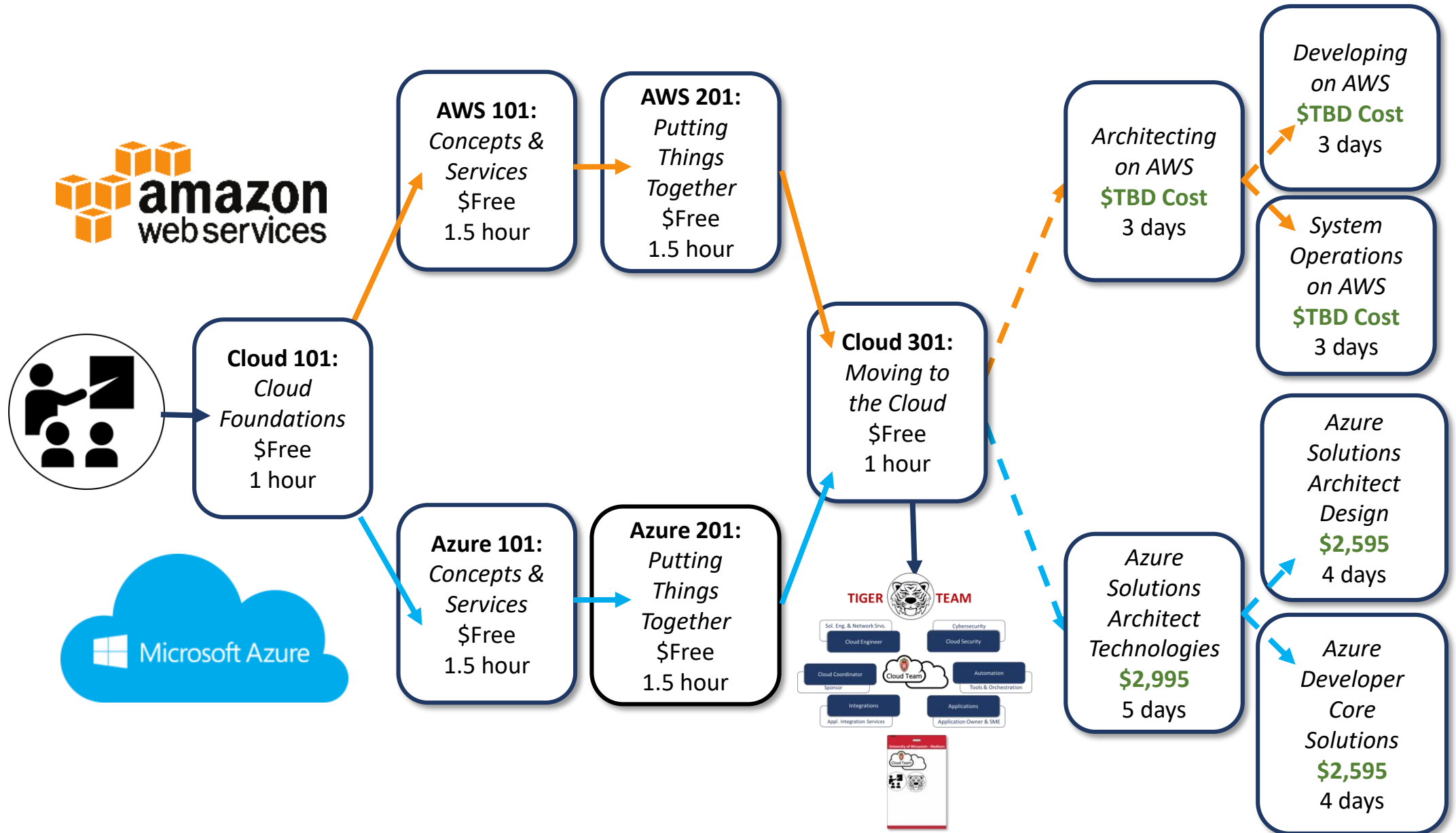*System Operations on AWS*
$TBD Cost
3 days

Azure Solutions Architect Technologies
$2,995
5 days

Azure Solutions Architect Design
$2,595
4 days

Azure Developer Core Solutions
$2,595
4 days

TIGER TEAM

Sol. Eng. & Network Srvs. — Cloud Engineer
Cybersecurity — Cloud Security
Cloud Coordinator Sponsor
Cloud Team
Automation Tools & Orchestration
Integrations
Applications
Appl. Integration Services
Application Owner & SME

Summary and Next Steps

Summary

- Strategic cloud approach focused on 5 areas:
    1. Establishing initial direction
    2. Understanding current state
    3. Defining desired future state
    4. Preparing for the cloud journey
    5. Starting the cloud journey
- Clearly define "cloud".
- Establish guiding principles for cloud
- Start small, by defining "minimum viable cloud" projects
- Define a specific security strategy, by data classification
- Get ahead of impact to job roles and responsibilities
- Provide a clear training path for impacted technologists

Next Steps

- Socialize the strategy early and often, with audience-specific tweaks
- Find the explorers, tinkers, experimenters
- Look for simple use cases that provide quick wins:
    - Single page applications
    - Offsite backups
    - Serverless data exploration
    - Things you can't do in your own data center
- Define your approach to security, referencing data classifications
- Start training anyone who is interested
- Form some Tiger Teams and try some things
- Share updates on your progress, both successes, and failures

Questions
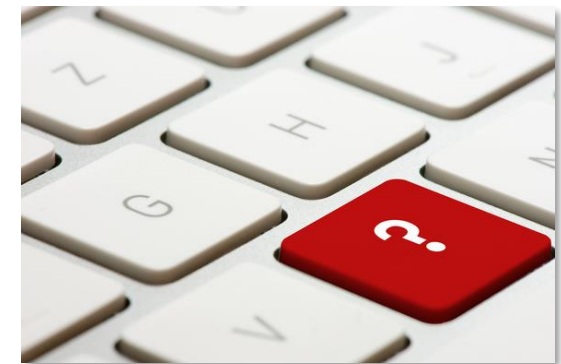
Thank You

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