





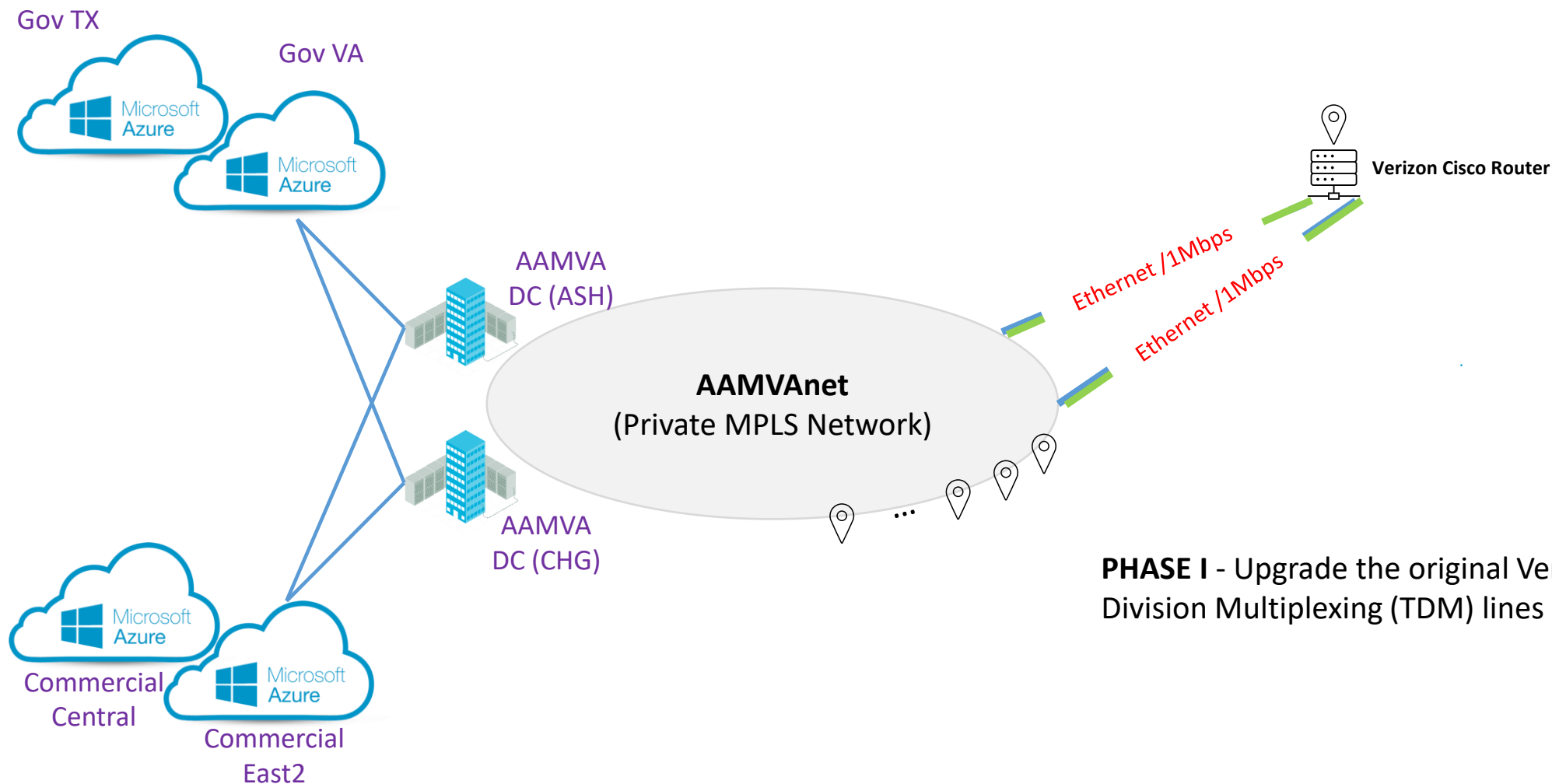


1. AAMVAnet Modernization (Robert Gondi)
2. Cloud Adoption (Robert Gondi)
3. RESTful Web Services (Surajit Chatterjee)
4. AAMVA's Applications Availability Metrics (Abhi Kapil)

# AAMVAnet Modernization - Background

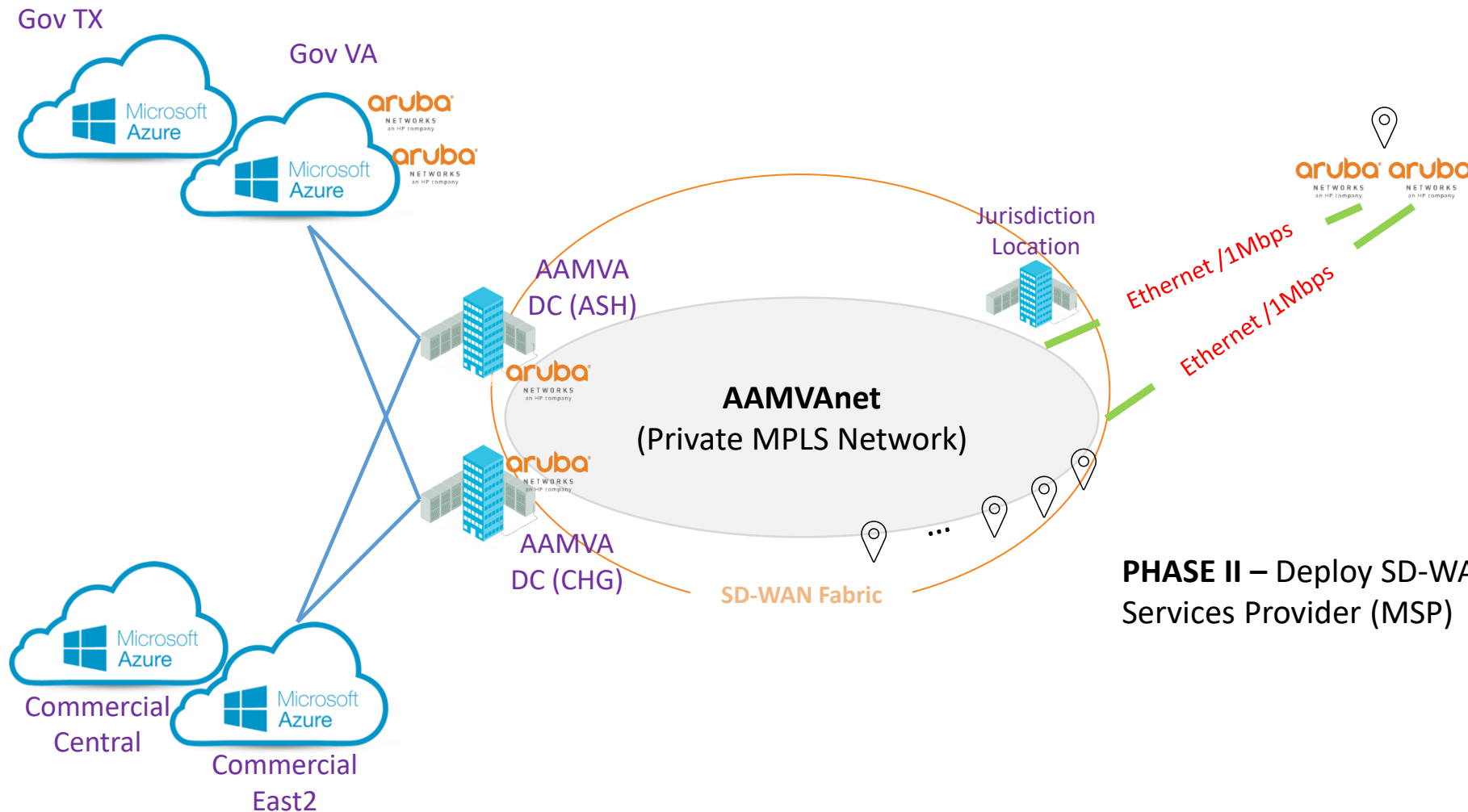
<div> <div>Approach</div> <div>  </div> </div> <div> <div>AAMVAnet Modernization Objectives</div> <div>  </div> </div>	<div>  </div> <div>Network Performance</div>	<div>  </div> <div>Reliability</div>	<div>  </div> <div>Security</div>	<div>  </div> <div>Cost</div>
<div>Upgrade existing Verizon Time-Division Multiplexing (TDM) lines with Ethernet lines</div>	<div>✓</div>			<div>✓</div>
<div>Highly flexible network management solution (SD-WAN)</div>	<div>✓</div>	<div>✓</div>	<div>✓</div>	
<div>Dedicated and effective Managed Services Partner</div>		<div>✓</div>		<div>✓</div>
<div>New Internet Service Providers</div>	<div>✓</div>	<div>✓</div>		<div>✓</div>

# AAMVAnet Modernization Phase I



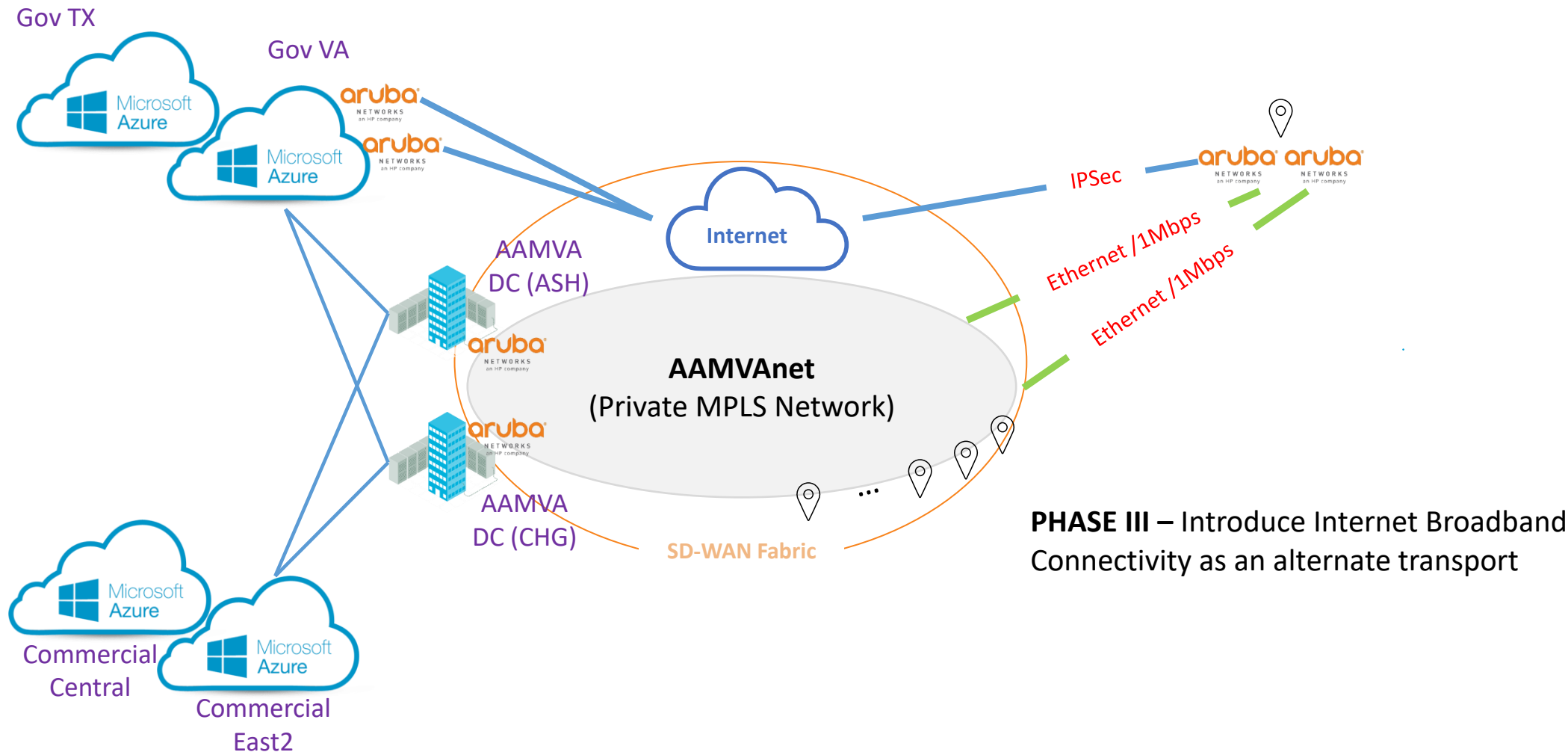
**PHASE I** - Upgrade the original Verizon Time-Division Multiplexing (TDM) lines with Ethernet

# AAMVAnet Modernization Phase II

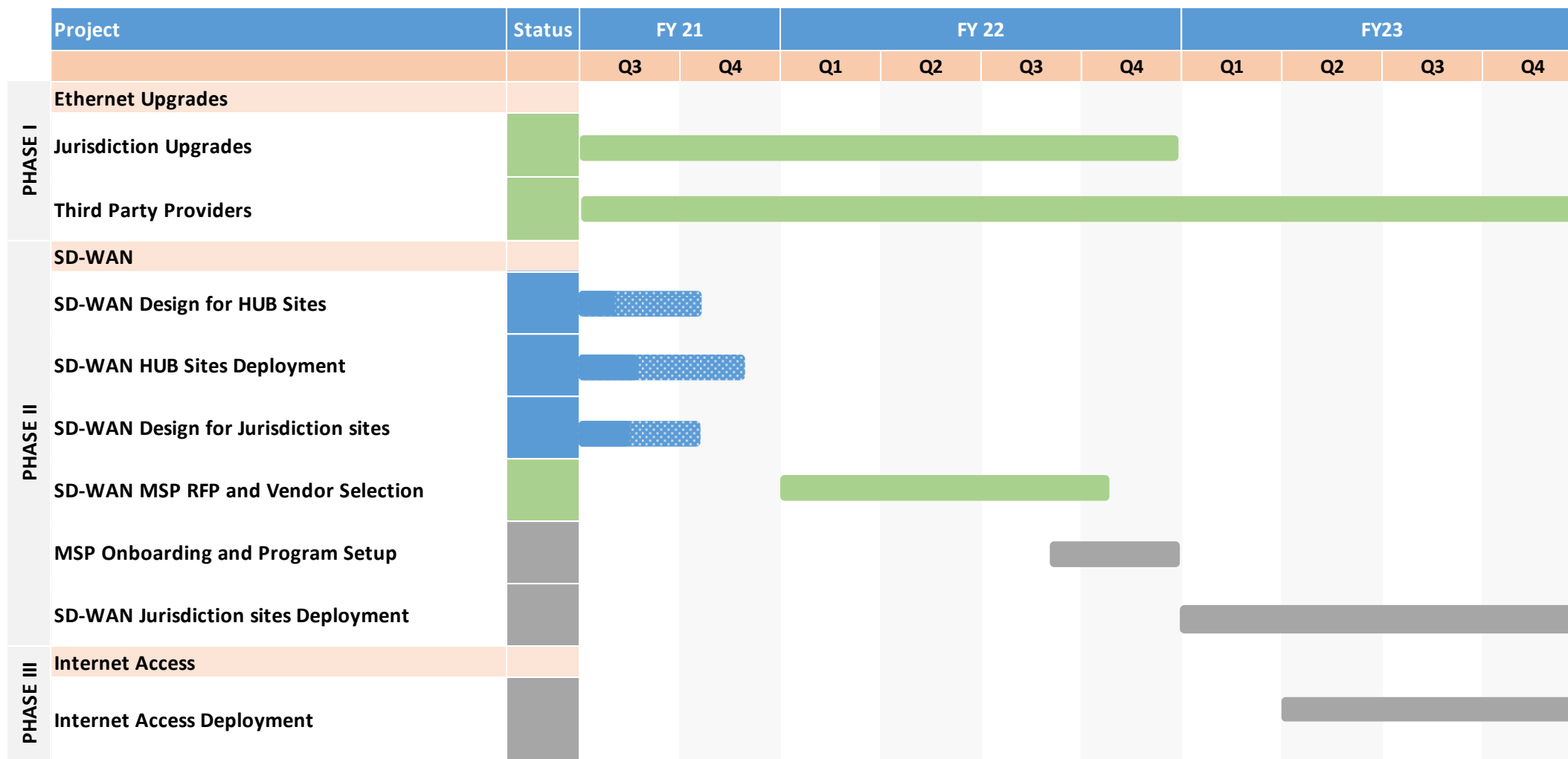


**PHASE II** – Deploy SD-WAN & identify a Managed Services Provider (MSP)

# AAMVAnet Modernization Phase III

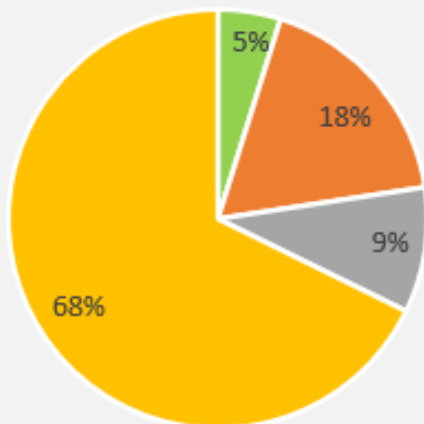


# AAMVAnet Deployment Phase Timeline



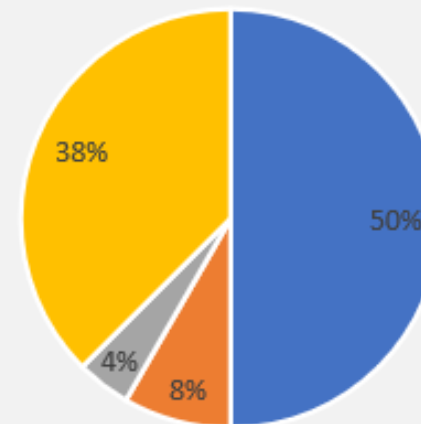
- **Deployment** activities to continue into FY22
  - **68%** of Jurisdiction sites in scope completed. No Jurisdictions remain “Outstanding”.
  - **38%** of Third-Party Providers completed

**Jurisdictions**



■ Cloud-Hosting ■ Data Gathering ■ Orders Placed ■ Sites migrated to Ethernet

**Third Party Providers**



■ Outstanding ■ Data Gathering ■ Orders Placed ■ Sites migrated to Ethernet

- **Partner ecosystem :**

- Technology partner:

- Network Managed Services:

- Broadband Internet Services:



- **Spokes Site Deployments:**

- Hub Site Deployments – Completed in FY2021.
- Began Spoke Site Deployment – Completed design and testing.
- Roll-out was initially targeted to start Jan 2022.
- Selected MSP acquired by new services provider in Q1 FY22.
- MSP notified AAMVA that they could no longer meet the original RFP requirement for 24x7 SD-WAN support.
- Prompted a reset back to the procurement phase.
- In partnership with Aruba, working to identify an alternate service provider and commence roll-outs in Q1 FY23.



- **Ethernet**

- Conclude Jurisdiction roll-out.
- Continue 3<sup>rd</sup> Party site upgrades.

- **SD-WAN**

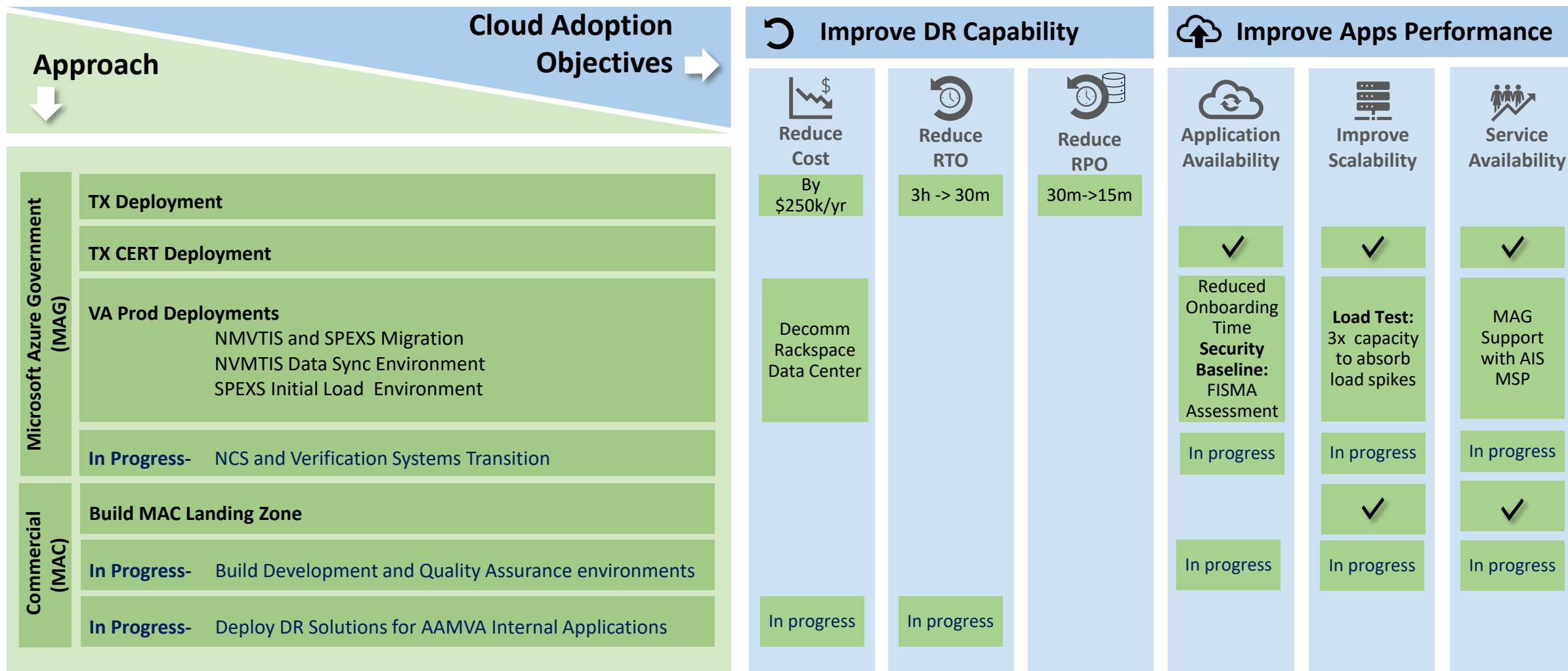
- Select alternate Managed Services Provider.
- Finalize Jurisdiction deployment methodology (includes technical configuration, pricing, and ordering process).
- Operationalize SD-WAN platform management.
- Begin deployments.

- **Internet**

- Finalize Jurisdiction deployment methodology.
- Begin deployment in Jurisdiction sites.

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# Azure Cloud Adoption - Background

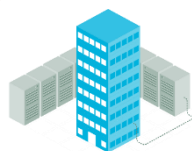


Gov TX

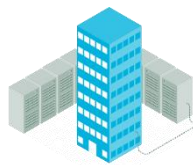
Gov VA



Rackspace

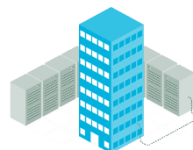


**IAD**  
SPEXS Production  
NMVTIS (DR)

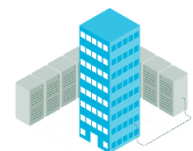


**DFW**  
NMVTIS Production  
SPEXS (DR)  
SPEXS & NMVTIS CERT

Mindshift



**ASH**  
NCS  
Business Sys  
Verification Sys



**CHG**  
NCS (DR)  
Verification Systems (DR)

HQ (VA)

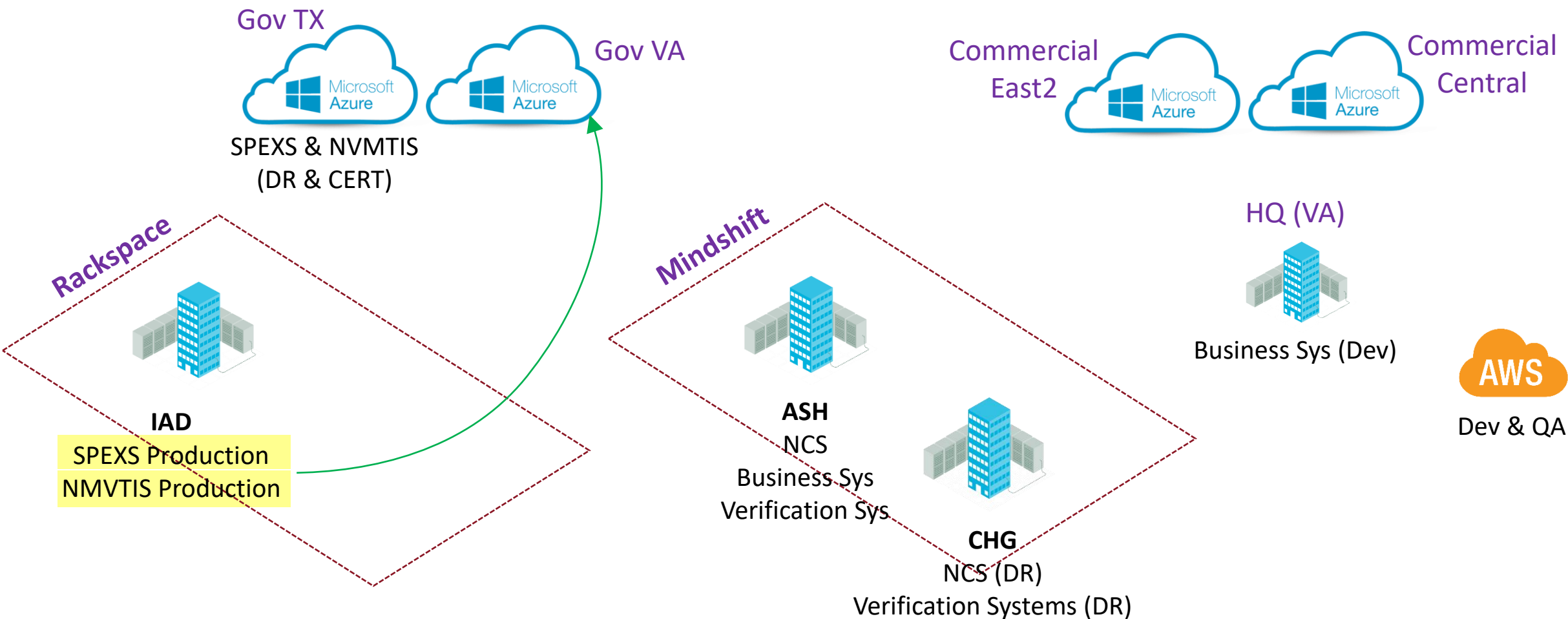


Business Sys Dev

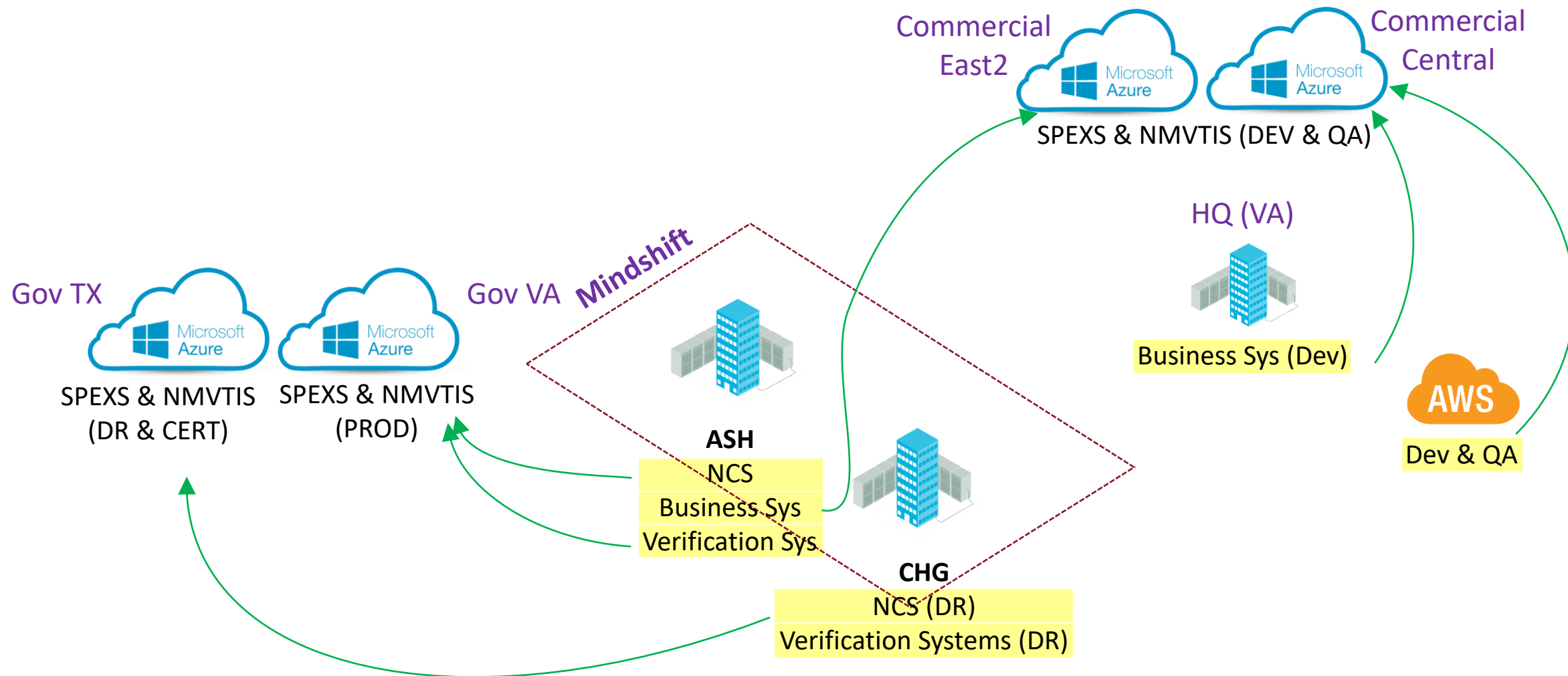


Dev & QA

# AAMVA Cloud Adoption – Phase II



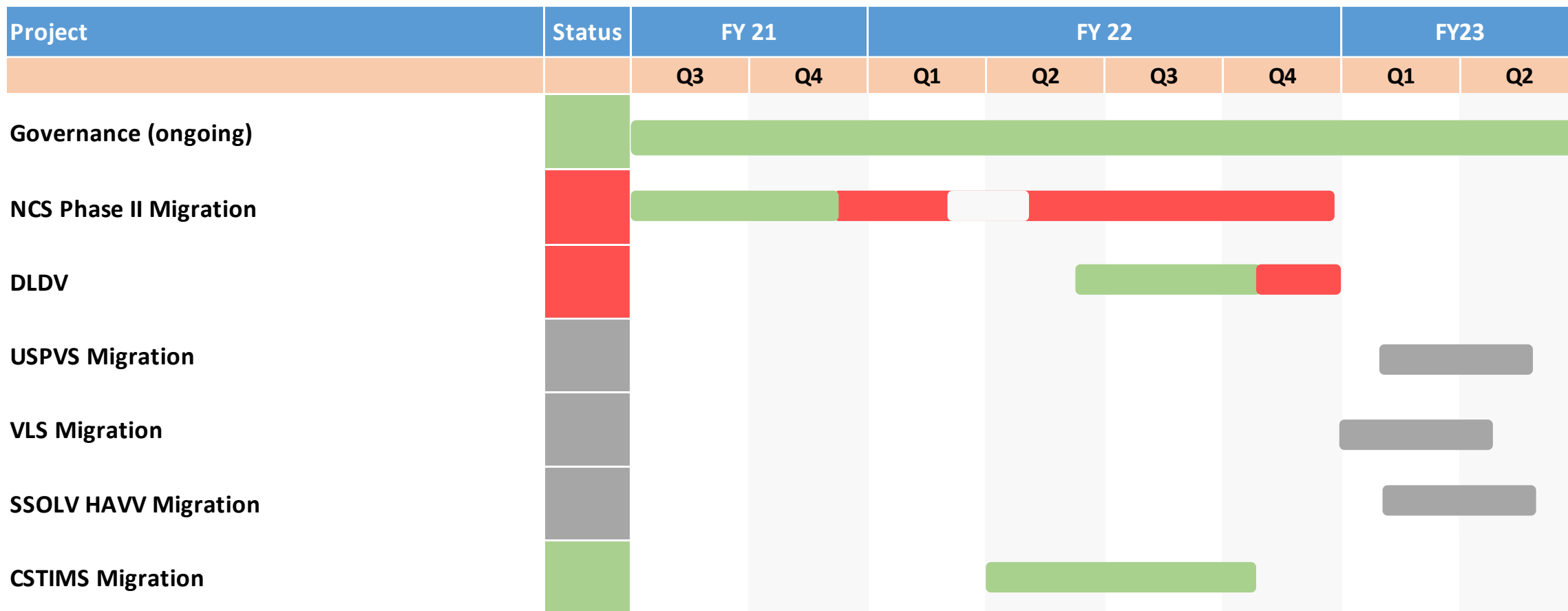
# AAMVA Cloud Adoption – Phase II



## Azure Government – MAG

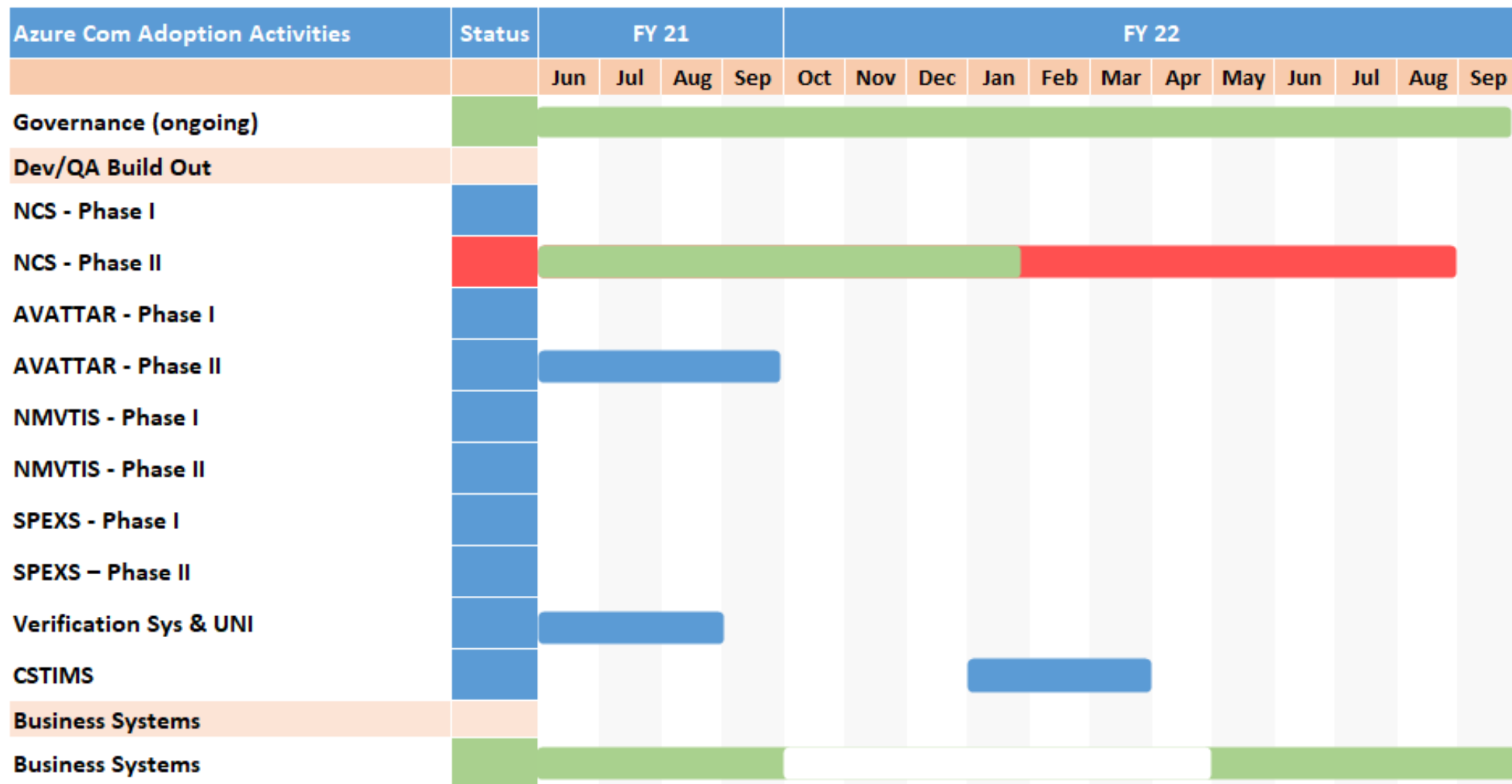
- Network Control Software (NCS) –
  - Completed the build of the server environments for NCS Virginia and Texas.
  - Encountered considerable challenges when attempting to integrate AAMVAnet securely with Azure Gov.
    - Onboarded a specialized Network Services Partner (i.e., Presidio) to assist with integrating AAMVAnet with Azure Gov.
    - Following Microsoft and Cisco guidance, performed multiple design Proofs-of Concept (POC) without success.
    - In late Q2 FY23, a final alternative was recommended and passed our POC - the solution complexity meant further delays to the implementation period and a continued impact on the resources.
  - Currently we are in Load Testing.
  - External DR with the selected Jurisdiction partners scheduled for July.
  - Production release scheduled for September 10<sup>th</sup>.

# Azure Gov Adoption Timeline for FY22/23





# Azure Comm Adoption Timeline for FY2022



Status Legend In Progress Not Started Late Complete Completed Late

- **MAG**

- Complete the NCS migration
- Complete the DLDV migration
- Migrate CSTIMS
- In FY23, finalize USPVS, VLS, and SSOLV migrations

- **MAC**

- Complete NCS Non-Prod Environment Migration
- Business Systems – Start building DR capability for Internal Applications

The Cloud: a New operating paradigm across **People**, **Processes** and **Technology**.

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## **People**

### **Training, Training, Training**

- Train early and broadly.
- Culture of continuous learning and retooling.
- Seek certifications.

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### **Skillset Gap**

- What worked on-prem does not always translate.
- Networking, scripting, and security are critical to a successful transformation and ongoing operation.

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### **Partner with the right vendor(s)**

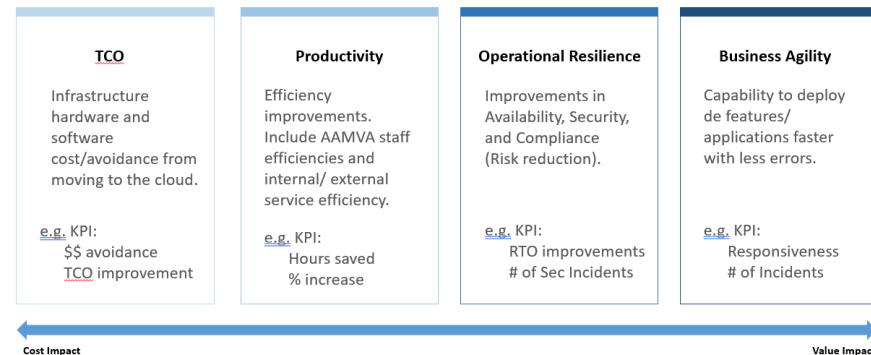
- Experienced integration partners make all the difference but expect them to continue growing with you (partner!)
  - Seek vendors with both consulting and operation groups/services, and a proven portfolio.
  - Have a strong relationship with the Cloud Providers and leverage continuously their architectural, engineering and services teams, but resist the temptation to constantly chase the latest “recommended” architectural guidance.
-

# The Cloud: a New operating paradigm across People, Processes and Technology.

## Process

## Governance

- Adoption and operational decisions need to be performed against a Value Model.
- Leverage early-on Cloud vendor programs that enable expedited adoption.
- Standardize CI/CD pipelines early on before you have multiple flavors.
- DevSecOps
- Effective Agile Project Management methodology.



## Test, Test, Test

- Proofs-Of-Concept (POCs) are essential in developing an approach path. POC even what vendors are “certain it will work”.
- Identify test cases early on to save time (e.g., we started with 50 and ended with approximately 300) and consider the tools needed.
- Details matter – do not assume you are complete until all the test cases are completed.

## Cost

- Financial management is essential and time-consuming. Invest in it early.
- Tagging resources and managing costs against calculated projections is a must-have.

The Cloud: a New operating paradigm across **People**, **Processes** and **Technology**.

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### Technology

#### Leading Edge vs. Bleeding Edge

- Be careful of what Vendors are recommending.
- Some features recommended by Cloud Vendors and integrators are not always fully operationalized.
- If working with multiple clouds environments validate if technologies are available not only across Cloud Types (e.g., MAG vs MAC), but also between zones (e.g., MAG VA vs. MAG TX).

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#### Third Party/Marketplace solutions

- Just because a solution is available in the Cloud Marketplace it does not mean it is the latest version supported by the third-party vendor.
  - Third-Party providers support teams don't always understand cloud deployments.
-

The Cloud: a New operating paradigm across **People**, **Processes** and **Technology**.

## Cross Cutting Theme

### Security

Increased complexity in:

- Access control
- Hardening
- Network segmentation and traffic flow management
- Key management

Need for re-tooling:

- Vulnerability management
- SIEMS

## In Summary

**The migration to the cloud is a journey that needs careful planning**

**If the cloud was the answer, what was the question?**

**Not all systems/resources can/should be migrated to the cloud**

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## **AAMVA supports different forms of communication technologies**

1. Sockets – messaging over sockets
2. Web services – some legacy and some modern
  - i. SOAP/AMIE - messaging over web services
  - ii. SOAP/NIEM – on its way to being legacy
  - iii. REST/JSON – in development



## **AAVMA supports multiple messaging formats**

1. AMIE – used by legacy messaging and NCS web services
2. NIEM/XML – used by SOAP services
3. JSON – de facto format used by RESTful web services

1. Web-service - A method by which one software program communicates with, delegates work to another program
2. Why REST?
  - i. Predominantly supported by several programming languages
  - ii. Support for SOAP has waned or was never quite there in Java, Ruby, Go and other languages
3. Why now?
  - i. Members, customers and partners have been asking for it
  - ii. Lots of states are looking at options to migrate out of using mainframe UNI

## Example of some NIEM/XML (blue=tags, red=data):

```

<n1:NetworkControl>
  <n1:AddressData>
    <n1:MessageOriginatorID>NY</n1:MessageOriginatorID>
    <n1:TransactionOriginatorID>NY</n1:TransactionOriginatorID>
    <n1:DestinationID>WV</n1:DestinationID>
  </n1:AddressData>
  <n1:TransactionLocatorID>1234567...</n1:TransactionLocatorID>
</n1:NetworkControl>
<nc:VehicleIdentification>
  <nc:IdentificationID> A123456789B1234567</nc:IdentificationID>
</nc:VehicleIdentification>
<nc:TitleIdentification>
  <nc:IdentificationID> X1234567</nc:IdentificationID>
</nc:TitleIdentification>
<nc:TitleIssuingAuthorityName>NY</nc:TitleIssuingAuthorityName>

```

Example of some JSON (blue=tags, red=data):

```
{  
  "networkControl": {  
    "transactionOriginator": "NY",  
    "messageOriginator": "NY",  
    "messageDestination": "WV",  
    "transactionLocator": "1234567..."  
  },  
  "vin": "A123456789B1234567",  
  "titleNumber": "X1234567",  
  "sot": "NY"  
}
```

1. **SOAP** – interface definitions via WSDL
2. **REST** – interface definitions via Open API (aka Swagger)

Example of a SWAGGER description:

POST /VehicleSystems/v1/UsedVehicleInquiry

## Parameters

Try it out

Name	Description
------	-------------

encToken string (header)	<input type="text" value="encToken"/>
--------------------------------	---------------------------------------

Request body

application/json

Example Value | Schema

```
{  "networkControl": {    "transactionOriginator": "string",    "messageOriginator": "string",    "messageDestination": "string",    "transactionLocator": "string"  },  "vin": "string",  "titleNumber": "string",  "sot": "string"}
```

## Responses

Code	Description	Links
------	-------------	-------

200	Success	No links
-----	---------	----------

Media type

text/plain

Controls Accept header.

Example Value | Schema

```
{  "correlationToken": "string"}
```

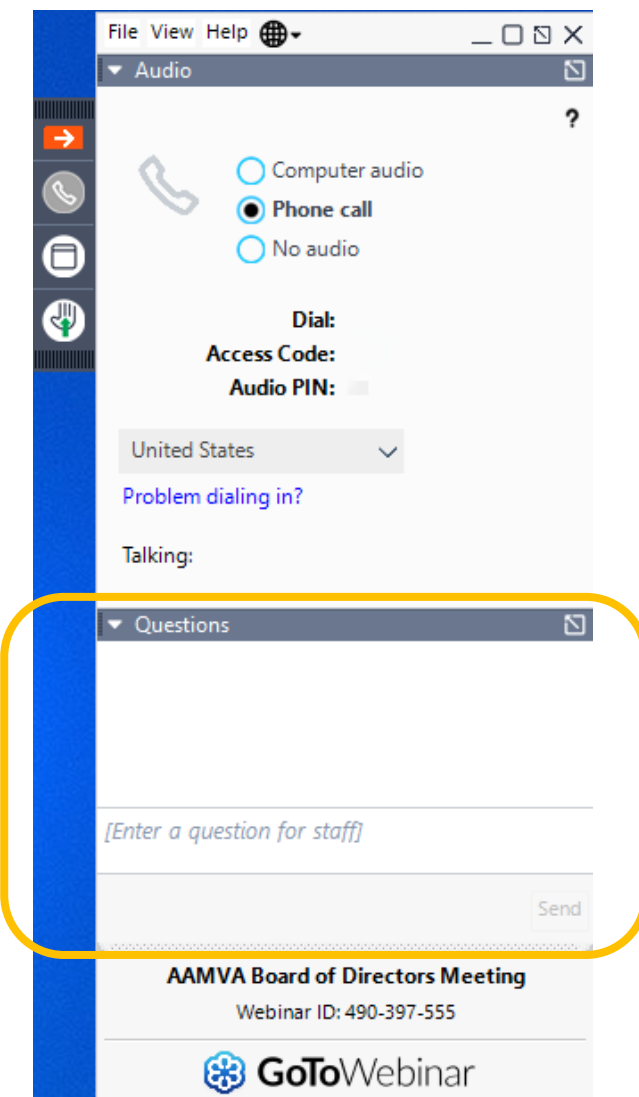
400	Bad Request	No links
-----	-------------	----------

- Consuming REST services vs. using UNI
  - Hierarchical and normalized data model
  - User friendly names compared to AMIE element names
  - One comprehensive response compared to multiple messages
  - No message size limit
  - Enhanced end to end security
- However, no support for
  - Pseudo-batch and Pacing
  - Retry
  - Site table
- Like most technology choices
  - There are pros and cons



Application	AMIE	NIEM	REST
02 CDLIS	available	none	none
05 SR22/26	available	none	none
10 ELT	available	none	none
12 PDPS	available	none	Specs in Summer; In CERT by Fall 2023
12 DIA	available	none	Part of PDPS
13 BPEVR	available	none	none
17 SSOLV/HAVV	available	available	In CERT
20 SSR	available	none	none
22 NMVTIS	available	available	In CERT by 9/30
32 USPVS	available	available	In CERT
37 SPEXS	available	available	In CERT
39 VLS	available	available	In CERT by 11/1

- Phone or computer audio; muted by default.
- During Q&A type your question in the Questions box.
- Use the Questions box for any technical issues as well.



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- AAMVA publishes monthly 'Application Availability' report, which contains the percentage 'uptime' for each application (AAMVA and non AAMVA applications), for:
  - Last calendar month
  - Current fiscal year
  - Past four fiscal years

# List of Applications Monitored

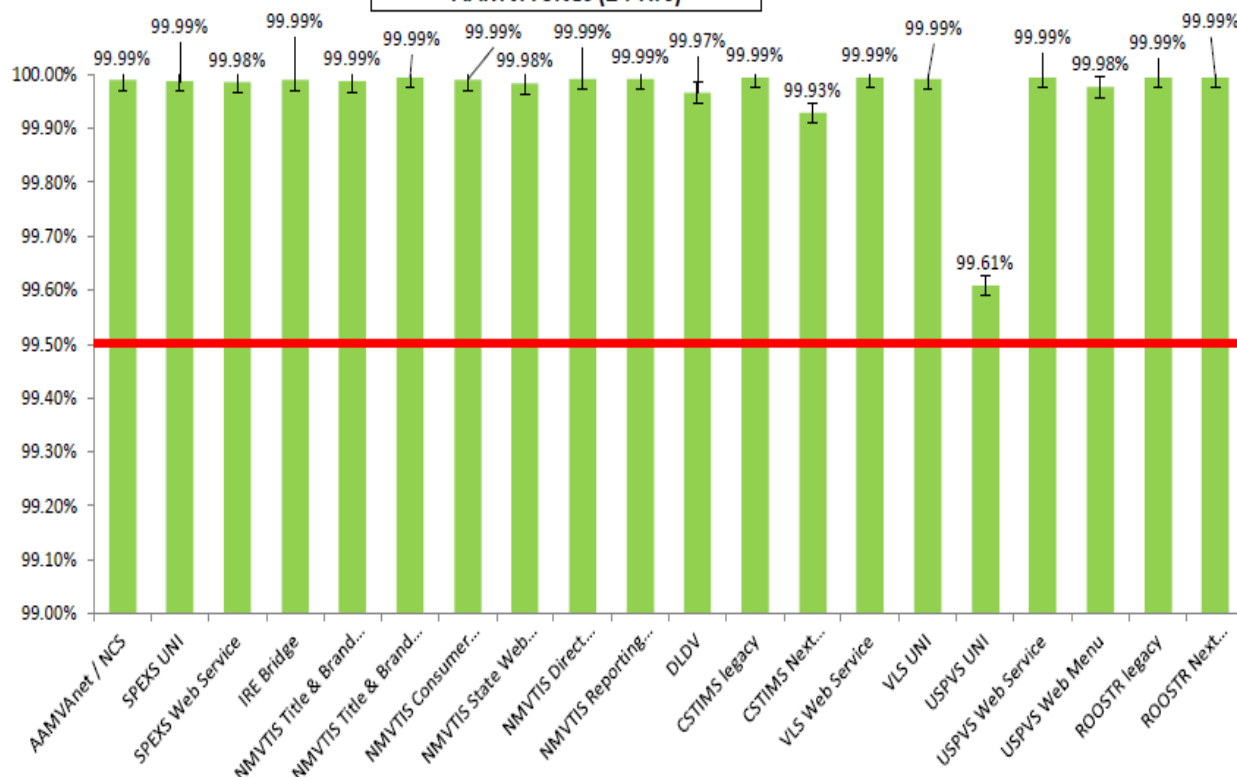
AAMVAnet Applications	Non-AAMVAnet Applications
AAMVAnet / NCS	VLS
SPEXS UNI	USPVS
SPEX Web Service	PDPS
IRE Bridge	NMVTIS Theft File
NMVTIS Title & Brand – UNI	SSOLV
NMVTIS Title & Brand - Web Service	Selective Service Registration
NMVTIS Consumer Access	
NMVTIS State Web Interface	
NMVTIS Direct Reporting Service	
NMVTIS Reporting Portal	
DLDV	
CSTIMS legacy	
CSTIMS Next Generation (NG)	
VLS Web Service	
VLS UNI	
USPVS UNI	
USPVS Web Service	
USPVS Web Menu	
ROOSTR legacy	
ROOSTR Next Generation (NG)	

- AAMVA publishes 2 types of Application availability reports:
  - For 24-hours
  - For 'Core Business' hours
    - Monday - Friday: 7:30 AM ET to 11:00 PM ET; Saturday: 7:00 AM ET to 6:00 PM ET
    - Only outages within these hrs are accounted for in the availability calculations
- Based on the time the application outage started/ended, and the 'Expected Uptime' for the month, the 'Availability' is calculated
- AAMVA has a Service Level Objective (SLO) of 99.5% Uptime for all AAMVA Applications

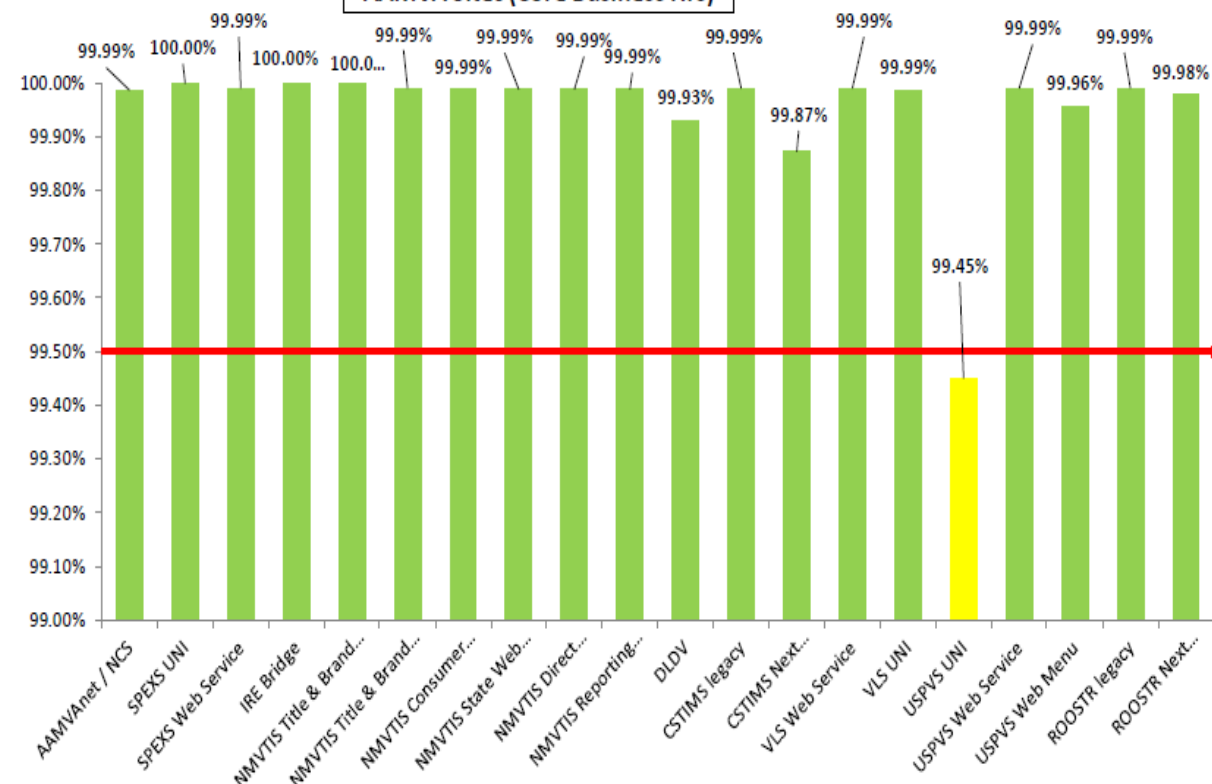
- AAMVA is extremely sensitive to the impact outages have on our members, and shares the details transparently.
- Any outage for an AAMVA application is diligently analyzed and documented as part of “SEV1 RCA” Process.
- SEV1 RCA includes, among other details, for the outage:
  - Impact
  - Details on detection and resolution
  - Root Cause
  - Learnings
  - Action Items to minimize/eliminate the possibility of a recurrence
    - These are tracked to implementation

- Application availability is tracked per application

**FY2022 Application Availability  
AAMVA Sites (24 Hrs)**

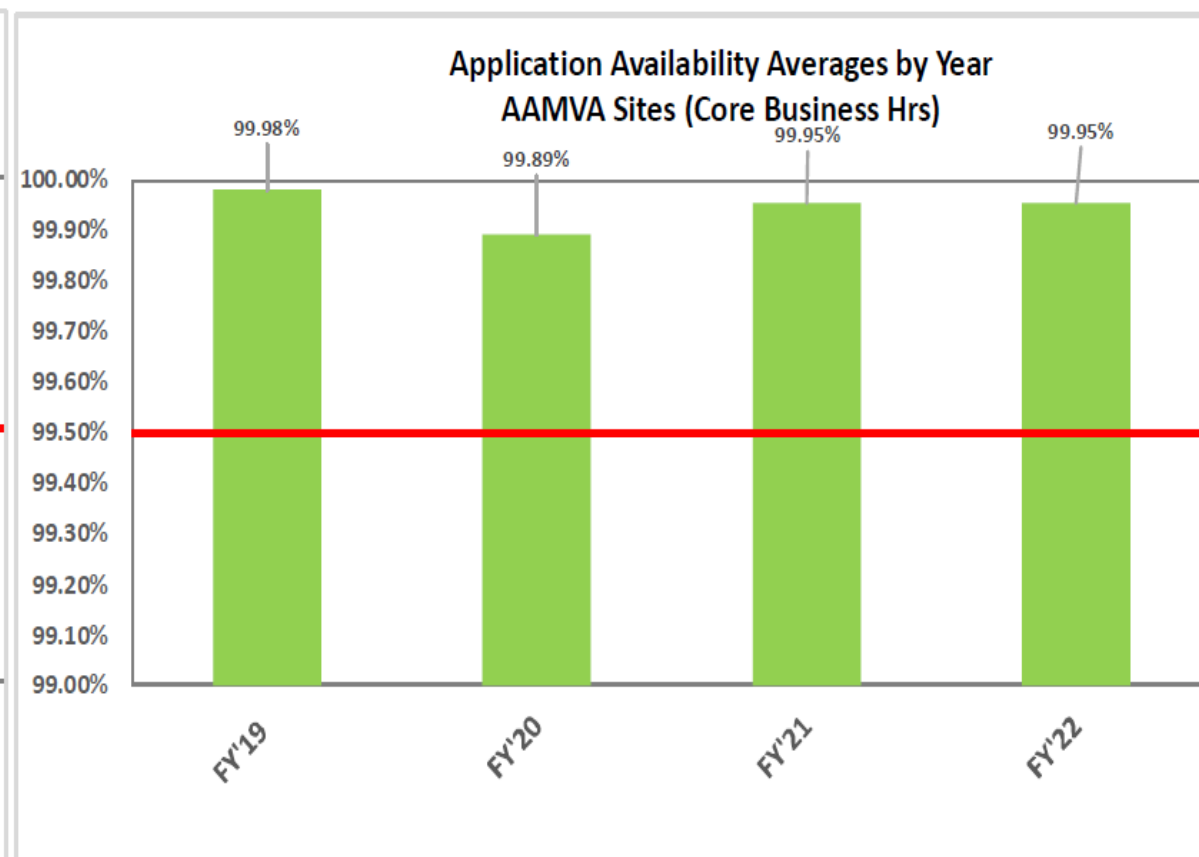
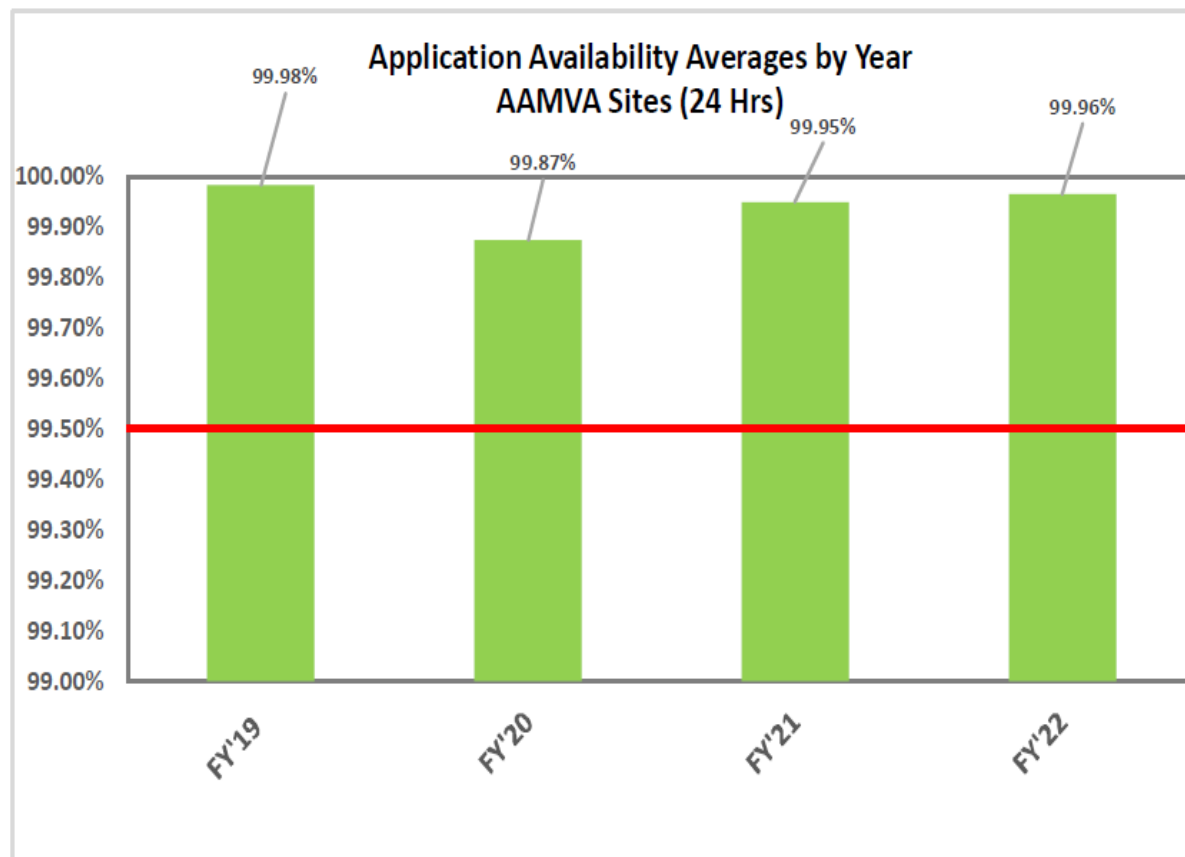


**FY2022 Application Availability  
AAMVA Sites (Core Business Hrs)**





- We have consistently surpassed the SLO for the past several years



- Complete the survey
- Suggest webinar topics – Send email to Abhi Kapil – [akapil@aamva.org](mailto:akapil@aamva.org)
- Invite your colleagues

## THANK YOU!