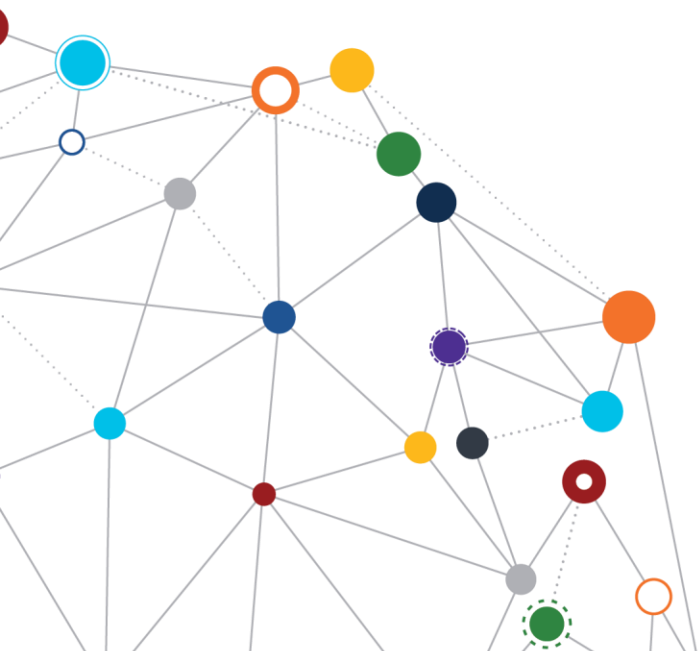


OFFICE OF
INFORMATION
AND TECHNOLOGY

Infrastructure-as-a-Service (IaaS) Enterprise Design Pattern

IaaS Service Provider Selection

August 2018 | Demand Management Division



VA



U.S. Department of Veterans Affairs
Office of Information and Technology



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Table 1: Change Matrix

Version	Date	Description of Updates
1.0	08/03/2018	IaaS EDP Segment 1 document approved

1 Context

The move to an Infrastructure-as-a-Service (IaaS) model enables the Department of Veterans Affairs (VA) to achieve economies of scale, greater elasticity, greater resource efficiency, and better ability to maintain systems. IaaS breaks down data center silos, for example, by moving systems to the cloud. When management groups do not share information, goals, tools, priorities, and processes with each other, duplication and redundancy are at risk.

2 Problem

The VA Office of Information and Technology (OIT) intends to continue to capitalize on marketplace developments to bring an improved level of agility and cost savings to VA. This strategy supports Veteran initiatives, while complying with Federal Government mandates, such as the Federal Information Security Management Act (FISMA), the Federal Risk and Authorization Management Program (FedRAMP) for Cloud Service Providers (CSPs), the Federal Information Technology Acquisition Reform Act (FITARA), and Section 508 of the Rehabilitation Act. As VA shifts to a Cloud First approach, IaaS is included as part of its information technology (IT) service offerings through the VA Enterprise Cloud (VAEC).¹ The Enterprise Cloud Solution Office (ECSO) Team works with project managers and business owners to determine an application's suitability for the VAEC.

3 Approach

The VAEC offers on-demand self-service, broad network access, resource pooling, elasticity, and a measured service. Currently, the VAEC provides private VA cloud environments in the Amazon Web Services (AWS) Government Cloud and the Microsoft Azure Government Cloud (MAG). VA is also planning an on-premise VA Private Cloud.²

3.1 Implementation Tasks

VA project teams selecting an IaaS environment should adhere to the following preliminary task guidance.

- Address security management
 - Via the VAEC security guidelines (NIST, FedRAMP, and VA-required security controls need to obtain a VA Authority to Operate (ATO))³

¹ Reference the Cloud First Policy, articulated within VA Directive 6517, *Cloud Computing Services*, at http://www.va.gov/vapubs/viewPublication.asp?Pub_ID=852&FTYPE=2.

² For more information on VAEC, reference the VAEC SharePoint Site at <https://vaww.portal.va.gov/sites/ECS/SitePages/Home.aspx>.

³ Reference the VAEC link at <https://vaww.portal.va.gov/sites/ECS/SitePages/VA-Enterprise-Cloud-VAEC.aspx>.

- Refer to the *Cloud Security* Enterprise Design Pattern (EDP) (Trusted Internet Connection (TIC) Compliance, Cloud Encryption, Auditing of Cloud Services, Cloud Availability)⁴
- Assess in-house knowledge to utilize subject matter experts (SMEs) from the Enterprise Cloud Solutions Office (ECSO), if necessary.
- Select an appropriate service model: Follow the logical method provided in the *Transition to Cloud* EDP.⁵
- Select the CSP to meet the VA mission: Guidance on selecting VAEC CSPs through ECSO is provided in Section 3.2.⁶
- Consider the constraints of legacy systems while executing migration.
 - Customize the development and integration to interface new applications with old foundational systems.

3.2 Guidance on Cloud Service Provider

VA project teams need to reach an agreement regarding which IaaS CSP to utilize. The following decision tree draft serves as guidance to navigate the decision to converge on an IaaS CSP, which is currently an AWS or Azure implementation.

⁴ Reference the *Cloud Security* EDP at https://www.oit.va.gov/library/programs/ts/edp/privacy/CloudSecurity_V1.pdf.

⁵ Reference the *Transition to Cloud* EDP at https://www.oit.va.gov/library/programs/ts/edp/cloud/TransitiontoCloud_V1.pdf.

⁶ Reference the *IaaS* EDP, Section 3.2, internally.

VA Enterprise Cloud Target Cloud Environment Decision Rationale

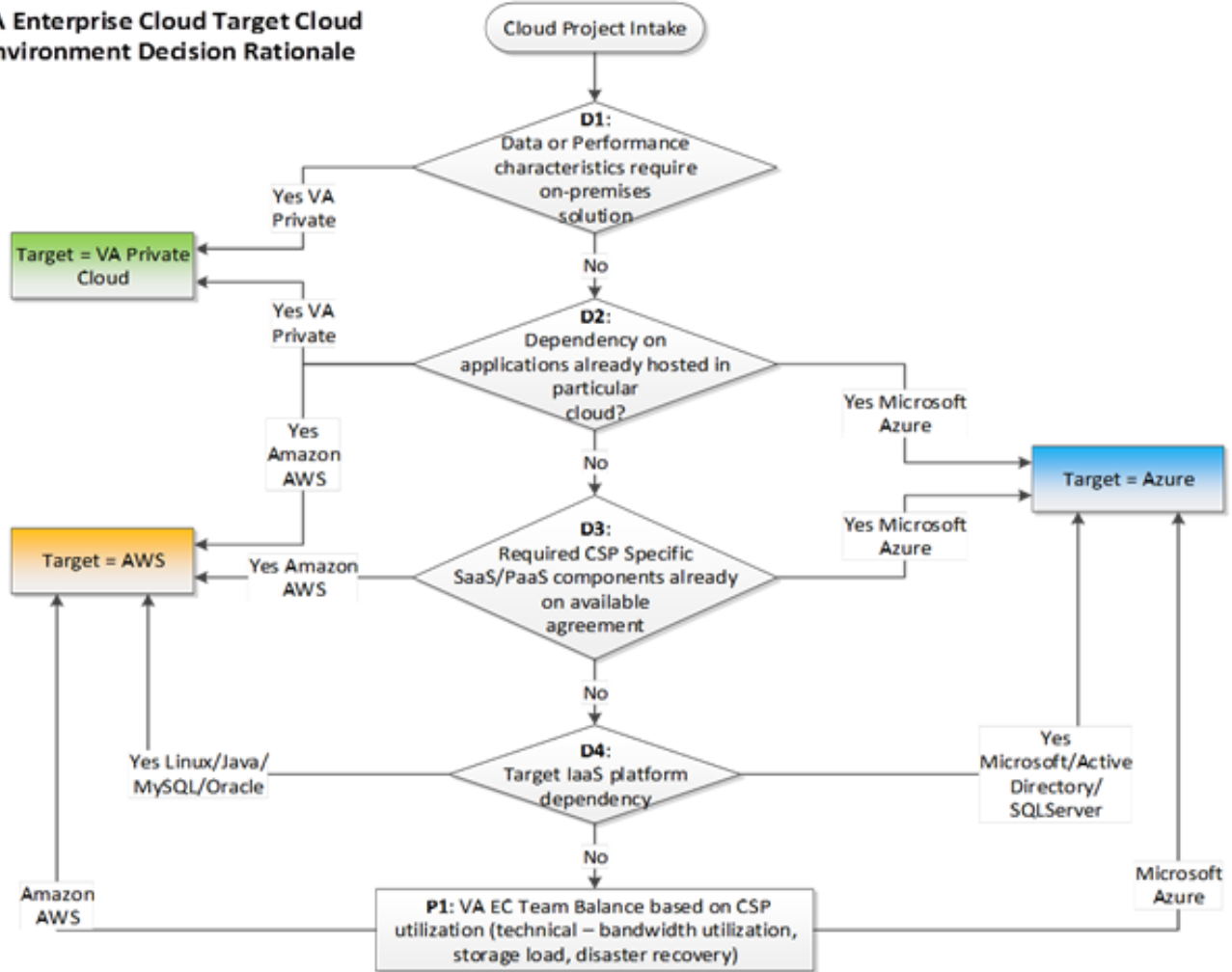


Figure 1 IaaS Draft Decision Tree CSP from ECSO

In step D2, project teams know if an application is already in the cloud by verifying with the ECSO. Similarly, in step D3, project teams know if a component is on an available agreement by verifying with the ECSO.

4 Application

Project teams using the Veteran-focused Integration Process (VIP) must comply with the approved standards and applications in the One-VA Technical Reference Model (TRM)⁷. Project teams must also map to the IaaS utilization standard for Design, Engineering, and Architecture

⁷Reference the One-VA TRM to identify approved standards and applications from the internal VA network at <http://trm.oit.va.gov/>. External vendors may utilize a less comprehensive site at <https://www.oit.va.gov/services/trm/>.

(DEA) user stories, as shown in the following table. The table provides additional guidance on implementing key recommendation areas.

Table 2 : Guiding Principles IaaS EDP

DEA User Story	Title	User Story Text	Relevant User Story Acceptance Criterion
DEA 04.23.01	Cloud Computing	As an Enterprise Architect, I need Cloud Computing so that VA infrastructure and services are flexible, secure, reusable, maintainable, and scalable.	<p>(1)-Analysis completed to determine “Cloud Readiness” as a solution and to identify the pertinent cloud delivery model, i.e., IaaS, PaaS, or SaaS.</p> <p>(2)-The solution design is independent of a specific hosting infrastructure or data center, and leverages established enterprise cloud services or approved public cloud vendors.</p> <p>(3)-Where an applicable service level agreement (SLA) exists, availability levels will be in accordance with the SLA terms and documented in the solution.</p>

Future updates of this document will reflect updates to the DEA Compliance Criteria to reflect the VA Guiding Principles for IaaS release.

5 Impacts

If a transition to the IaaS Cloud is not implemented, the following are potential pitfalls:

- Higher capital expenditure costs (CapEx)
- Lower computing power
- Less scalability

Appendix: References

References:

- Application Performance Management EDP:
https://www.oit.va.gov/library/programs/ts/edp/ea/ApplicationPerformanceManagement_v3.pdf
- Business Impact Analysis EDP:
https://www.oit.va.gov/library/programs/ts/edp/itsm/BusinessImpactAnalysis_V1.pdf
- Cloud Computing Architecture EDP:
https://www.oit.va.gov/library/programs/ts/edp/cloud/CloudComputingArchitecture_V1.pdf
- Cloud First Policy:
http://www.va.gov/vapubs/viewPublication.asp?Pub_ID=852&FType=2
- Cloud Security EDP:
https://www.oit.va.gov/library/programs/ts/edp/privacy/CloudSecurity_V1.pdf
- DEA User Stories:
<https://vaww.portal2.va.gov/sites/asd/TechStrat/IPTS/SitePages/Home.aspx>
- Disaster Recovery as a Service EDP:
https://www.oit.va.gov/library/programs/ts/edp/itsm/DisasterRecoveryAsAService_V1.pdf
- ECSM EDP:
https://www.oit.va.gov/library/programs/ts/edp/cloud/EnterpriseCloudServiceManagement_v2.pdf
- ECSO Service Request: <https://vaww.portal.va.gov/sites/ECS/SitePages/ECS-Request-Form.aspx>
- FedRAMP: <https://www.fedramp.gov/>
- Handbook 6500:
https://www.va.gov/vapubs/viewPublication.asp?Pub_ID=793&FType=2
- Transition to Cloud EDP:
https://www.oit.va.gov/library/programs/ts/edp/cloud/TransitiontoCloud_V1.pdf
- TRM: <http://trm.oit.va.gov/>
- VA Available Cloud Training: <https://vaww.portal.va.gov/sites/ECS/SitePages/Cloud-Training.aspx>
- VA Cloud Security Handbook, VA Directive 6517:
https://www.va.gov/vapubs/viewPublication.asp?Pub_ID=853&FType=2
- VA Cost Benefit Analysis Template:
https://www.va.gov/PROCESS/artifacts/cost_benefit_analysis_template.docx

- VA Digital Modernization Strategy, April 11, 2018 VA Directive 6551:
https://www.va.gov/vapubs/viewPublication.asp?Pub_ID=829&FType=2
- VA Enterprise Architecture: <https://www.ea.oit.va.gov/>
- VA MEFs: https://www.va.gov/vapubs/viewPublication.asp?Pub_ID=582&FType=2
- VAEC: <https://vaww.portal.va.gov/sites/ECS/SitePages/VA-Enterprise-Cloud-VAEC.aspx>
- VASI Dashboard:
<http://vaausappdar401.aac.dva.va.gov/views/VAEATargetPortfolios/VATargetPortfolioDashboard?iid=1&isGuestRedirectFromVizportal=y&embed=y>
- VEAR: <https://vaausdarapp82.aac.dva.va.gov/ee/request/home>

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