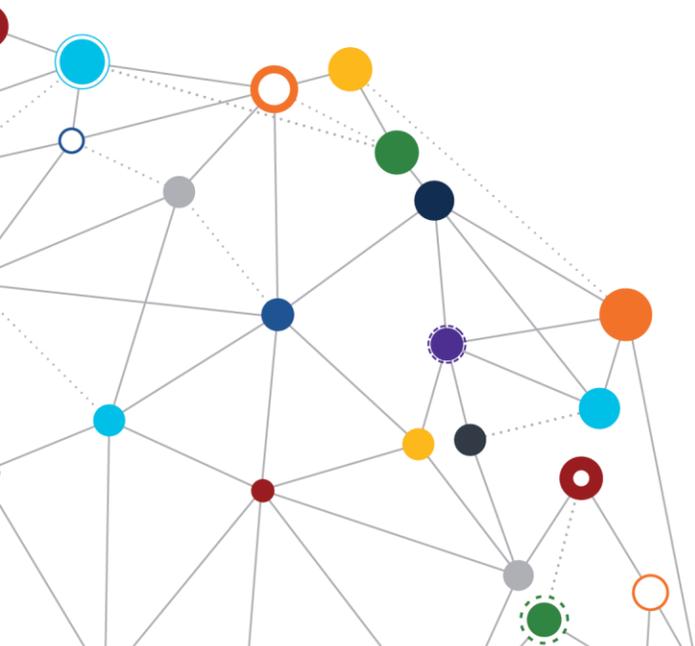


OFFICE OF  
INFORMATION  
AND TECHNOLOGY

# Application Programming Interface (API) Enterprise Design Pattern

*API Management*

March 2019 | Enterprise Program Management Office



**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
<b>1.0</b>	08/03/2018	API EDP Segment 3 document approved
<b>2.0</b>	02/13/2019	Updated discovery, gateway, and analytics guidance

## 1 Context

The Department of Veterans Affairs (VA) implements numerous information technology (IT) projects with Application Programming Interfaces (APIs) that expose underlying services. This document provides recommendations to project teams *for discovery, configuration management, data management, API gateways, and analytics*, promoting greater use and reuse of APIs and services.

## 2 Problem

The technical management of APIs within VA spans multiple management platforms. The *absence of a common approach and platform, and resources for managing APIs*, can lead to inefficiencies and difficulties in centralization. *Frequent updates of APIs can break backward compatibility and lead to rework* for applications that consume APIs.

## 3 Approach

This Enterprise Design Pattern (EDP) provides actionable steps and planning recommendations to address the inefficiencies and problems within the management areas described in Table 2.

Table 2: Management Approach

Management Concept	Description
<b>Discovery</b>	Methods by which teams should <i>discover APIs</i> , allowing <i>reuse</i> of software across the enterprise
<b>Configuration Management</b>	Approaches for managing the <i>versioning and configurations</i> of APIs across the VA enterprise
<b>Data Management</b>	<i>Data management</i> techniques for consideration <i>when deploying APIs</i>
<b>API Gateway</b>	Guidance for <i>using VA gateway services</i> to provide <i>a common point of integration</i> for VA API consumers and publishers
<b>Analytics</b>	Recommendations for <i>recording and analyzing API performance</i>

### 3.1 Promote API Discoverability

To ensure that APIs are discoverable by automated platforms, project teams should:

- Register APIs on the API Developer Portal<sup>1</sup> so that external partners and users can access the service. When developing APIs, follow the principles of the *API Release EDP*<sup>2</sup> to inventory and publish APIs so that others may discover them. Adhere to the documentation standards found in the *API Documentation Standard EDP*<sup>3</sup> and the *Documenting API Security EDP*.<sup>4</sup>
- Discover APIs through VA repositories, including:
  - The VA API Developer Portal<sup>5</sup>
  - The Enterprise Services Collaboration Portal (ESCP)<sup>6</sup>
  - The VA Enterprise Architecture Repository (VEAR)<sup>7</sup>
  - WebSphere Service Registry and Repository (WSRR)<sup>8</sup>
  - Integration Hub<sup>9</sup>
- Where possible, ensure that all APIs share a common schema or structure (e.g., common date time format, common image format, common record format) to reduce the number of service response structures that must be managed.<sup>10</sup>
- Design APIs and data representations with focus on a subject area (e.g., clinical, research, supply chain, logistics). Cross reference these subject areas with the data and information portal in VEAR.<sup>11</sup>

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<sup>1</sup> The VA API Developer Portal is available at <https://developer.va.gov/>.

<sup>2</sup> Refer to the VA *API Release EDP* at <https://www.oit.va.gov/library/recurring/edp/>.

<sup>3</sup> Refer to the VA *API Documentation Standard EDP*, June 2018, at [https://www.oit.va.gov/library/files/edp/apis/APIEDP\\_DocumentationStandard\\_v1.pdf](https://www.oit.va.gov/library/files/edp/apis/APIEDP_DocumentationStandard_v1.pdf).

<sup>4</sup> Refer to the VA *Documenting API Security EDP*, September 2018, at [https://www.oit.va.gov/library/files/edp/apis/APIEDP\\_DocumentingAPISecurity\\_v1.pdf](https://www.oit.va.gov/library/files/edp/apis/APIEDP_DocumentingAPISecurity_v1.pdf).

<sup>5</sup> Refer to the VA API Developer Portal at <https://developer.va.gov>.

<sup>6</sup> APIs used by internal VA projects and teams should be documented in the ESCP at <https://escp.va.gov>. The catalog is accessible from multiple venues (e.g., use the search functionality and select the icon next to the service catalog title to download the entire current catalog as a comma-separated values (CSV) file, or collect the catalog from the Reports page).

<sup>7</sup> Refer to the VEAR at <https://vaausdarapp82.aac.dva.va.gov/ee/request/home>. Also refer to the OMB API Report in VEAR at <https://vaausdarapp41.aac.dva.va.gov/ee/request/filter?id=29247&pageSize=20>.

<sup>8</sup> Refer to WSRR at <https://vaausemiihtwgdev12.aac.va.gov/ServiceRegistryDashboard>.

<sup>9</sup> Refer to the Integration Hub at

<https://qacrmnac.np.crm.vrm.vba.va.gov/WebParts/Documentation/Documentation/ServiceIndex>

<sup>10</sup> More information on data formats will be made available in the VEAR at

<https://vaausdarapp41.aac.dva.va.gov/ee/>. If additional information is needed, project teams may contact the Data Governance Council (DGC) Secretariat at [VADataGovernanceCouncil@va.gov](mailto:VADataGovernanceCouncil@va.gov). Open Data should be machine-readable and follow *Office of Management and Budget Memorandum 13-13* at <https://digital.gov/open-data-policy-m-13-13/>.

<sup>11</sup> Refer to the VEAR at <https://vaausdarapp82.aac.dva.va.gov/ee/request/home>.

## 3.2 Manage the Configuration of APIs Throughout Their Lifecycle

To ensure successful API configuration management and governance, project teams should:

- Where possible, retain the same API version so that existing VA projects can continue to interface with the corresponding, underlying service. Avoid changes to the API that will break compatibility with existing VA consuming applications.
  - Design for backward compatibility to the maximum extent possible. If compatibility is broken, keep the frequency of such major API changes to a minimum.
  - Employ techniques, such as continuous release and automated deployment for the underlying service software, while maintaining the same API version. The versioning of the API should not be tied to the service software versioning.
- When API deprecation is necessary, mark older versions of APIs for retirement to address API version management.
  - Alert the application owners 180 days ahead of deprecation and work with them to enable applications to use the new API version.
  - When an API version is identified as deprecated, developers should be alerted through deprecation warnings. For example, provide a warning that the API is deprecated as an output parameter that will show in system logs.
  - With appropriate notification, retire and remove deprecated APIs from the platform to avoid maintenance overhead.
- Define an API testing strategy to ensure that APIs have the necessary levels of security, reliability, and governance.<sup>12</sup>
- Ensure that the metrics and responsibilities of the service level agreement (SLA) are implemented by the API and service provider. Provide a SLA with 99.9% availability and reachability in the production environment. Providers should configure pre-production environments (e.g., those for testing, user acceptance testing, development) to have 99% availability and reachability.
- Validate that APIs follow the guidance in the *API Documentation Standard*<sup>13</sup> and *Documenting API Security* EDPs.<sup>14</sup> Retain copies of this documentation with the system operating the API.<sup>15</sup>

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<sup>12</sup> Refer to the VA *API Release Standard* EDP segment, June 2018, at [https://www.oit.va.gov/library/files/edp/apis/APIEDP\\_ReleaseStandard\\_v1.pdf](https://www.oit.va.gov/library/files/edp/apis/APIEDP_ReleaseStandard_v1.pdf). For more information, consult the VA *API Security Pattern* EDP segment, when available, at <https://www.oit.va.gov/library/recurring/edp/>.

<sup>13</sup> Refer to the VA *API Documentation Standard* EDP segment, June 2018, at [https://www.oit.va.gov/library/files/edp/apis/APIEDP\\_DocumentationStandard\\_v1.pdf](https://www.oit.va.gov/library/files/edp/apis/APIEDP_DocumentationStandard_v1.pdf).

<sup>14</sup> Refer to the VA *Documenting API Security* EDP segment, September 2018, at [https://www.oit.va.gov/library/files/edp/apis/APIEDP\\_DocumentingAPISecurity\\_v1.pdf](https://www.oit.va.gov/library/files/edp/apis/APIEDP_DocumentingAPISecurity_v1.pdf).

<sup>15</sup> For additional information, refer to the VA *API Documentation Standard* EDP segment, June 2018, at [https://www.oit.va.gov/library/files/edp/apis/APIEDP\\_DocumentationStandard\\_v1.pdf](https://www.oit.va.gov/library/files/edp/apis/APIEDP_DocumentationStandard_v1.pdf).

- Software code and APIs that VA previously funded are available for use, but need to be validated by system owners and project teams. This will ensure that legacy APIs that are still in use are properly documented and managed.
- Use existing VA API capabilities before creating new APIs and services.<sup>16</sup>
- Ensure that APIs and the underlying services align to VA strategic and business requirements.<sup>17</sup>
  - For example, APIs and their exposed services should align to the business functions listing and VA systems listing in VEAR.<sup>18</sup> APIs should also be consistent with the VA Digital Modernization Strategy of April 2018.<sup>19</sup>
  - Consult the VA API Developer Portal for additional information on strategy and business requirements.<sup>20</sup>

### 3.3 Manage Data Processed Through the API

APIs are often used to create, read, update, and delete data and are sometimes solely used in a data access and management capacity. Where APIs are used to interact with data sets, project teams should undertake data management steps.

When providing an API and the underlying service:

- Document the intended API purpose, required data, and data quality expectations.<sup>21</sup>
- In designing a new API, review a catalog of Authoritative Data Sources (ADSs) in VEAR to determine ADSs for each data element.<sup>22</sup>
- Gather relevant API or data source artifacts (e.g., API documentation, data dictionaries, data models, reference data, business rules, data use, and disclosure requirements) to understand the candidate data, its associated requirements, and limitations. Consult the VA Enterprise Architecture (EA) Data and Information Domain found in the VEAR to use consistent information classes.<sup>23</sup>

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<sup>16</sup> Refer to the *VA API Release Standard* EDP segment, June 2018, at [https://www.oit.va.gov/library/files/edp/apis/APIEDP\\_ReleaseStandard\\_v1.pdf](https://www.oit.va.gov/library/files/edp/apis/APIEDP_ReleaseStandard_v1.pdf).

<sup>17</sup> Refer to the VA EA at <https://www.ea.oit.va.gov/>.

<sup>18</sup> Refer to the VEAR at <https://vaausdarapp41.aac.dva.va.gov/ee/>.

<sup>19</sup> Refer to the VA Digital Modernization Strategy, April 2018, at [http://vawww.ea.oit.va.gov/wp-content/uploads/2018/08/DigitalModernizationStrategy\\_080118.pdf](http://vawww.ea.oit.va.gov/wp-content/uploads/2018/08/DigitalModernizationStrategy_080118.pdf).

<sup>20</sup> Refer to the VA API Developer Portal at <https://developer.va.gov>.

<sup>21</sup> Data fields, quality, functionality, and definitions should be provided with the API documentation. For more information, reference the *VA API Documentation Standard* EDP segment at [https://www.oit.va.gov/library/files/edp/apis/APIEDP\\_DocumentationStandard\\_v1.pdf](https://www.oit.va.gov/library/files/edp/apis/APIEDP_DocumentationStandard_v1.pdf).

<sup>22</sup> The VEAR may include relevant data source information at <https://vaausdarapp41.aac.dva.va.gov/ee/>. Refer to a list of VA ADSs on VA Pulse at <https://www.vapulse.net/groups/data-management-council/projects/authoritative-data-sources>. Work with the Data Governance Council (DGC) if an approved data source cannot be identified or does not exist; contact the DGC Secretariat at [VADataGovernanceCouncil@va.gov](mailto:VADataGovernanceCouncil@va.gov).

<sup>23</sup> Refer to the VEAR at <https://vaausdarapp41.aac.dva.va.gov/ee/>.

- Analyze the privacy implications of the data within APIs through a documented privacy threshold analysis (PTA) and privacy impact assessments (PIAs).<sup>24</sup>
- Examine high-level descriptive statistics in coordination with the business owner to determine if there are data quality concerns to remediate.
- Define data quality requirements and dimensions based on the desired use of the API. This information should be provided with the API documentation to inform consumers of the API's quality and limitations.<sup>25</sup>
- Review data quality analysis results. Create reports which support review of anomalous data.<sup>26</sup> Participate in iterative discussions with the data source partner on actions necessary to address data defects.
- Establish a Memorandum of Understanding (MOU) with the data source partner that specifies the type of data access, frequency of access, volume of data covered, and data quality expectations that are permitted via the API.
- Document, publish, and maintain information about the API data specification.<sup>27</sup>
- Use machine-readable and open formats for information collected or created. Data sets should be available, usable, readable, and accountable.
- Enter metadata-tagged datasets into the VA Enterprise Data Inventory (EDI) at [www.data.va.gov](http://www.data.va.gov).

#### When consuming an API:

- Document the intended business use of known API consumers, including required data and data quality expectation.<sup>28</sup>
- Discover, understand, and implement an API data agreement (i.e., API data specification).
- Establish a data sharing agreement and any other necessary mechanisms for initial agreement between the API consumer and the data source partner.
- Coordinate with the Business Data Steward to ensure that data standards are identified and reused appropriately.
- Coordinate with the Technical Data Steward to ensure data quality is understood and maintained.

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<sup>24</sup> Based on OMB Memorandum 03-22, "All agencies must conduct a PIA prior to developing or procuring IT systems or projects that collect, maintain or disseminate information in identifiable form from or about members of the public."

<sup>25</sup> These should be based on the DGC data quality dimensions: accuracy, completeness, consistency, timeliness, traceability, uniqueness, and validity. Also, refer to the VA *API Documentation Standard* EDP segment, June 2016, at [https://www.oit.va.gov/library/files/edp/apis/APIEDP\\_DocumentationStandard\\_v1.pdf](https://www.oit.va.gov/library/files/edp/apis/APIEDP_DocumentationStandard_v1.pdf).

<sup>26</sup> Anomalous data consists of outliers, novelties, noise, deviations, and exceptions.

<sup>27</sup> For more information on documentation and publishing, refer to the VA *API Documentation Standard* EDP segment, June 2016, at [https://www.oit.va.gov/library/files/edp/apis/APIEDP\\_DocumentationStandard\\_v1.pdf](https://www.oit.va.gov/library/files/edp/apis/APIEDP_DocumentationStandard_v1.pdf).

<sup>28</sup> Consult common use cases documented by 18-F at <https://github.com/18F/api-standards>.

### 3.4 Integrate with VA's API Gateway

The capabilities of an API Gateway are a critical part of an API-driven business strategy. Developer information is available on [developer.va.gov](http://developer.va.gov); the gateway itself will be hosted at [api.va.gov](http://api.va.gov) (when available). Project teams should work to ensure that APIs and underlying services are configured as follows:

- Use the API gateway to monitor traffic, prioritize traffic, and throttle traffic where needed. The gateway can help ensure that spikes of traffic do not overload backend services.<sup>29</sup>
- Where available, use VA API gateway functions for consuming/invoking APIs to streamline development efforts, orchestrate calls, validate data, and ensure consistent security practices are followed.
- When implementing microservices for an API, consult Section 3 of the *Microservices EDP*<sup>30</sup> for additional recommendations.
- If used with the API and service, the API gateway can be configured to permit and deny RESTful<sup>31</sup> methods for security purposes.<sup>32</sup>
- Use HyperText Transfer Protocol (HTTP) headers to support the API gateway caching functions (e.g., HTTP entity tag or etag). These headers can be used to communicate last modification date, expiry time of cached data, and suitability of information for caching.

### 3.5 Instrument API Analytics

Analytics help API developers and the underlying service providers to understand usage and performance. Developers of APIs and related service developers **must**:

- Use analytics to monitor API and service performance, including response time, uptime, number of API calls, errors, latency, and backend service performance. Development Operations (DevOps) staff should use this information as a feedback loop to adapt and

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<sup>29</sup> Additional content on API gateways can be found in the VA *Secure Messaging EDP*, September 2016, at [https://www.oit.va.gov/library/programs/ts/edp/privacy/SecureMessaging\\_V2.pdf](https://www.oit.va.gov/library/programs/ts/edp/privacy/SecureMessaging_V2.pdf).

<sup>30</sup> Refer to the VA *Microservices EDP*, July 2016, at [https://www.oit.va.gov/library/programs/ts/edp/cloud/Microservices\\_V1.pdf](https://www.oit.va.gov/library/programs/ts/edp/cloud/Microservices_V1.pdf).

<sup>31</sup> RESTful APIs are based on the Representational State Transfer (REST) architectural style.

<sup>32</sup> Refer to *API Security Pattern* at [https://vaww.vashare.oit.va.gov/sites/ois/KnowledgeService/SecurityDocuments/Cybersecurity%20Architecture%20Docs/VA\\_API\\_Security\\_Pattern\\_v1.2.pdf](https://vaww.vashare.oit.va.gov/sites/ois/KnowledgeService/SecurityDocuments/Cybersecurity%20Architecture%20Docs/VA_API_Security_Pattern_v1.2.pdf).

adjust the API and underlying service, using scalability.<sup>33</sup> Publish API performance information and data as a scorecard for API consumers to reference.<sup>34</sup>

- Monitor and log API traffic and performance to aid security posture.<sup>35</sup> This can be achieved by integration with VA's API gateway solution (once available), which can also log unauthorized access attempts. Monitoring and logging enterprise services are available from the Enterprise Cloud Solutions Office (ECSO) and VA Enterprise Cloud (VAEC).<sup>36</sup>
- Guarantee API runtime quality through analyzing certain features, such as API monitoring, deployment, and dynamic provisioning.
- Develop key business metrics (e.g., number of developers using the API, usage and adoption trends, user sources) on a case-by-case basis to manage each API and service.<sup>37</sup> Implement these metrics through use of cloud services, an API gateway, or individual API and service data collection. Use analytics to understand API usage and plan for improvements.

## 4 Application

Project teams using the Veteran-focused Integration Process (VIP),<sup>38</sup> or developing or retaining APIs, **must** comply with the approved standards in the VA Technical Reference Model (TRM),<sup>39</sup> and map to the Design, Engineering, and Architecture (DEA) user stories<sup>40</sup> that follow. Future changes in the standard will be reflected in the TRM; and in pertinent DEA user stories that are related to both API consumption and provisioning.

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<sup>33</sup> For more information on application and service performance monitoring, refer to the VA *End-to-End Application Performance Management (APM) EDP*, August 2017, at [https://www.oit.va.gov/library/programs/ts/edp/ea/ApplicationPerformanceManagement\\_v3.pdf](https://www.oit.va.gov/library/programs/ts/edp/ea/ApplicationPerformanceManagement_v3.pdf).

<sup>34</sup> Additional information on the scorecard will be made available in future updates. Scorecard content is expected to be available at <https://github.com/department-of-veterans-affairs/va-api-scorecard> and <https://developer.va.gov/scorecard> when available.

<sup>35</sup> For more information on enterprise audit, refer to the VA *Enterprise Auditing EDP*, February 2015 at [https://www.oit.va.gov/library/programs/ts/edp/privacy/EnterpriseAuditing\\_v1.pdf](https://www.oit.va.gov/library/programs/ts/edp/privacy/EnterpriseAuditing_v1.pdf).

<sup>36</sup> For more information on General Support Services (GSS) that can support traffic monitoring, refer to <https://vaww.portal.va.gov/sites/ECS/SitePages/VA-Enterprise-Cloud-VAEC.aspx>.

<sup>37</sup> Many web and API platforms have built in analytics. Additionally, the Digital Analytics Program (DAP) provides Google Analytics for federal government web sites. More information is available at <https://digital.gov/dap/>.

<sup>38</sup> Refer to the VIP 3.2 Guide, December 2018, at <https://vaww.vaco.portal.va.gov/sites/OIT/epmo/vip/Policy%20%20Guidance/VIP%20Guide%203.2.pdf>.

<sup>39</sup> Refer to the VA TRM to identify approved applications and standards on 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/>.

<sup>40</sup> Refer to the DEA User Stories, version 2.3, October 11, 2018, at [https://vaww.portal2.va.gov/sites/asd/TechStrat/IPTS/External%20Documents/DEA%20User%20Stories%20v2.3%20\(ACTIVE\).doc](https://vaww.portal2.va.gov/sites/asd/TechStrat/IPTS/External%20Documents/DEA%20User%20Stories%20v2.3%20(ACTIVE).doc).

Table 3: DEA User Stories

DEA User Story	Title	User Story Text	Relevant User Story Acceptance Criterion
<b>DEA.04.17.01</b>	Service Access	As an Enterprise Architect, I need exposed and published interfaces so that systems are loosely coupled, with uniform behavior, and have defined and limited interaction.	(1/1) 100% of enterprise-level services have exposed and published interfaces.
<b>DEA.04.17.02</b>	Service Enabled Information Sharing	As an Enterprise Architect, I need Service Enabled Information Sharing so that services can be reused across the enterprise, reducing costs and resource requirements, while improving quality.	(1/1) Analysis to identify the available Shared Enterprise Services required for the solution in the VA Service Registry has been conducted and results documented.
<b>DEA.04.18.02</b>	Web Analytics	As an Enterprise Architect, I need Web Analytics so that web performance and customer satisfaction tools are implemented on all Department of Veterans Affairs (VA) government websites, providing objective performance analytics to improve the development and delivery of effective digital government services.	(1/3) Per Milestone 8.2 of the Digital Government Strategy, product must adhere to the implementation guidance of the General Services Administration (GSA) <sup>41</sup> federally funded Tier 2 implementation of Google Analytics.  (2/3) Product must not expose, or make vulnerable, any personally identifiable information (PII) or protected data and be operated in accordance with all Federal and Department Privacy and Security Policies.

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<sup>41</sup> Refer to GSA at <https://www.gsa.gov/>.

DEA User Story	Title	User Story Text	Relevant User Story Acceptance Criterion
<b>DEA.04.24.01</b>	Service Design and Documentation	As an Enterprise Architect, I need consistent and reusable service design and documentation so that interactions between systems are known, and costs can be lowered through reuse and consumer discovery.	<p>(1/2) 100% of Enterprise Shared Services are reviewed for compliance with published guidelines, including publication in the VA Service Registry, if applicable.</p> <p>(2/2) 100% of APIs that meet the OpenAPI specification standard must be documented, according to the API EDP documentation and template, and published in the VA Enterprise Architecture Repository (VEAR).</p>
<b>DEA.04.24.03</b>	Conceptual Design Documentation	As an Enterprise Architect, I need standardized architecture and engineering conceptual design so that stakeholders can determine whether the product concept meets real customer needs and is technically feasible. Standard conceptual diagrams provide consistent, reusable, and modifiable documentation, which supports compliance reviews, maintainability, and the security of the VA Enterprise.	<p>(3/5) The product architecture and design documentation includes a Conceptual Software Design Component Diagram that depicts the high-level software components of the product.</p>
<b>DEA.04.24.02</b>	Detailed Design Documentation	As an Enterprise Architect, I need standardized architecture and engineering detailed design so that stakeholders have consistent, reusable, and	<p>(4/5) The product architecture and design documentation includes an Application Design Component Diagram that depicts the software components of the product, their attributes and</p>

DEA User Story	Title	User Story Text	Relevant User Story Acceptance Criterion
		modifiable documentation, which supports compliance reviews, maintainability, and the security of the VA Enterprise.	operations, and their public and private interfaces.
<b>DEA.04.25.02</b>	Integration Control Registrations (ICRs)	As an Enterprise Architect, I need Integration Control Registrations (ICRs) so that I have a mechanism for identifying and documenting integration points with VistA, including application logic available for reuse by consuming applications, while reducing the risk to custodial and consuming applications.	(1/2) ICRs are in an active status prior to application installation into a production system.  (2/2) Updates to ICRs are successfully completed without a negative impact to consuming applications.
<b>DEA.04.26.01</b>	Enterprise Design Patterns (EDPs)	As an Enterprise Architect, I need Enterprise Design Patterns (EDPs) so that system design at VA is systematic, reusable, and compliant with VA Directive 6551.	Conduct an analysis of EDPs to determine which are applicable, and can be implemented by the product solution.

Future updates of this document will reflect updates to the DEA compliance criteria to reflect the guiding principles for API release. Compliance with these standards apply to the following major project scenarios:

- All new development efforts leveraging the VAEC
- All new and existing APIs that expose ADS data
- All new and existing APIs that provide endpoints for approved Enterprise Shared Services (ESS)

## 5 Impacts

If standard API management approaches are not followed, the following negative impacts may be realized across the VA enterprise and projects:

- VA will not capitalize on reuse possibilities if APIs are not discoverable by developers and easy to use.
- Lower efficiency and security risks exist if there is no API gateway to serve as a single point of entry.
- There is limited or isolated visibility into API usage and enterprise performance, without common approaches to analytics.

## Appendix: References

- Office of Management and Budget Memorandum 13-13, <https://digital.gov/open-data-policy-m-13-13/>
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