

DRAFT
E-Enterprise and Exchange Network
API Product Management Framework
April 2020

1 Overview

The *E-Enterprise and Exchange Network API Management Framework* provides E-Enterprise partners with an overarching Application Programming Interfaces (APIs) vision and a shared management framework to fully take advantage of APIs and support powerful collaboration on their joint development. E-Enterprise partners will develop APIs in different ways and for different uses. The framework does not seek to standardize API development but instead identifies common areas for sharing best practices that support the development of APIs that can be used across partners. The current version of this document reflects some unknowns that will be filled in over time as E-Enterprise partners provide feedback, share best practices and participate in collaboration opportunities. In addition, the document contains recommendations to continue the buildout of the framework and its implementation.

The primary audiences for the framework are technical development managers and agency staff who support the software, systems, and data flows that enable interoperability and interactions across environmental programs and agencies.

1.1 The API Framework and the Exchange Network

The Exchange Network was built using Web Services, which at the time was the best format to exchange large batches of data in a secured flow. As business processes and technology have evolved, the Exchange Network has been working to expand the tools available to the community including APIs and associated standards so they can be applied by E-Enterprise partners. This API Framework is a first step in that direction. Work on this API framework will be complemented with a parallel joint effort to reassess the evolving business needs and develop a plan for existing Exchange Network tools and the business functions they fulfill. This will allow partners to match the best technologies and designs to the Exchange Network's evolving business needs.

Exchange Network and API Framework Recommendations for Moving Forward:

1. Validate the Exchange Network business functions and the design patterns they support to develop plans for modernizing Exchange Network data flows, standards, and tools.
2. Reflect knowledge gained from the API Framework into the Exchange Network Grant Program.

1.2 API Challenges, Opportunities and Goals within the E-Enterprise Community

Environmental agencies in the E-Enterprise community are increasingly turning to APIs to enable many of their most critical business interactions. APIs are powerful connectors that can deliver access to data and functionality. They can help agencies efficiently develop and operate applications, move data, and provide capabilities within and between organizations. With the trend toward the use of APIs expected to accelerate, environmental agencies need an overarching API vision and a shared management framework to fully take advantage of this technology and encourage collaboration.

This document was developed in response to the following identified challenges:

- E-Enterprise partners are developing new APIs to exchange data (e.g., updating facility identification) without any mechanisms for cross-program and cross-agency coordination and learning. It is the speed and flexibility of API development which makes them so powerful; however, without coordination, this speed and flexibility could lead to the need to build the information and silos E-Enterprise aims to reduce.

Opportunity: Leverage the experience of industry best practice and the E-Enterprise community's experience to develop an API framework for collaboration and innovation.

- There are many operating models¹ over which APIs are developed and used by E-Enterprise partners. There is no one-size-fits-all solution to API development.

Opportunity: E-Enterprise API guidance will apply differently and with different levels of rigor, depending on business requirements. For example, security and message standards for secured regulatory exchanges between partners will have different requirements from public APIs used solely to access data.

- Building services with APIs requires more than just the adoption of new standards on topics such as syntax or documentation.

Opportunity: Develop high-level agreements to address the challenges of existing Exchange Network flows and many broader API application opportunities.

- API management tools and platforms are rapidly co-evolving with the associated standards. The capabilities of these tools may shape which standards E-Enterprise will adopt and how they are implemented.

Opportunity: Standards must be tool neutral as different partners will choose different tools for API management. Pilot work led by the New Mexico (NM) Environment Department is an example of the use of an API management tools.

¹ Operating models includes who has the authority for a given environmental program and who is hosting the core software used to support it.

Based on the challenges, the **goals** of the E-Enterprise API Framework are to:

- Support the E-Enterprise Digital Strategy (Digital Strategy) goal of developing a successful ecosystem of APIs between E-Enterprise Partners and their users, including APIs interacting with shared core regulatory systems.
- Affirm APIs as a complementary and core technology of the Exchange Network and its ongoing evolution.
- Create and support an E-Enterprise community of practice for all types environmental APIs in which there is shared interest to provide cross-program API knowledge sharing and act as an integration point for API work that spans functional areas and organizations. This community of practice will be supported by a collaboration site in which members can exchange ideas, seek support from each other, find answers on processes and tooling and find guidance and standards.
- Leverage opportunities to improve interoperability among applications, systems, domains, and organizations as new systems are being developed and legacy systems are being re-engineered.
- Identify opportunities for how API standards, technologies, and platforms can be leveraged by the E-Enterprise community.

1.3 Overview of the API Management Framework

The *E-Enterprise and Exchange Network API Management Framework* serves as the foundation for designing, building, managing, and sharing APIs – in short, the entire lifecycle of the API process. Developers often refer to API frameworks as code blocks for programming language, which allow the integration of services from a third party to send emails and fetch data using the third party's API. However, this document expands this definition to include suggested methods, principles, and components.

The API Management Framework is a set of principles and methods intended to guide E-Enterprise Partners in planning, building and publishing APIs using best practices. The framework promotes alignment, collaboration, and delivery employing the underlying principles used by product delivery teams. It borrows from the pillars of customer-centric product development and leverages three primary bodies of knowledge: lean agile software development, product development, and continuous delivery. In addition, the design of the framework incorporates lessons from the history of the Exchange Network, existing environmental API efforts, and other API strategy literature.

The document is organized by the framework as depicted in *Figure 1: API Management Framework*. The framework is anchored by the following principles: Service Design and Lifecycle Management, API Management Tools, and Standards and Shared Tools. The two outer pillars support the principles and the sharing of information through the collection and sharing of E-Enterprise Partner use cases and the Collaboration site, which will host information for an API E-Enterprise Partner Community of Practice². The overall framework consists of the exchange of knowledge, best practices, technology trends, standards, shared tools and use cases.

² The Community of Practice (CoP) and Collaboration site are in concept form only. The establishment of the CoP and collaboration site have yet to be determined.

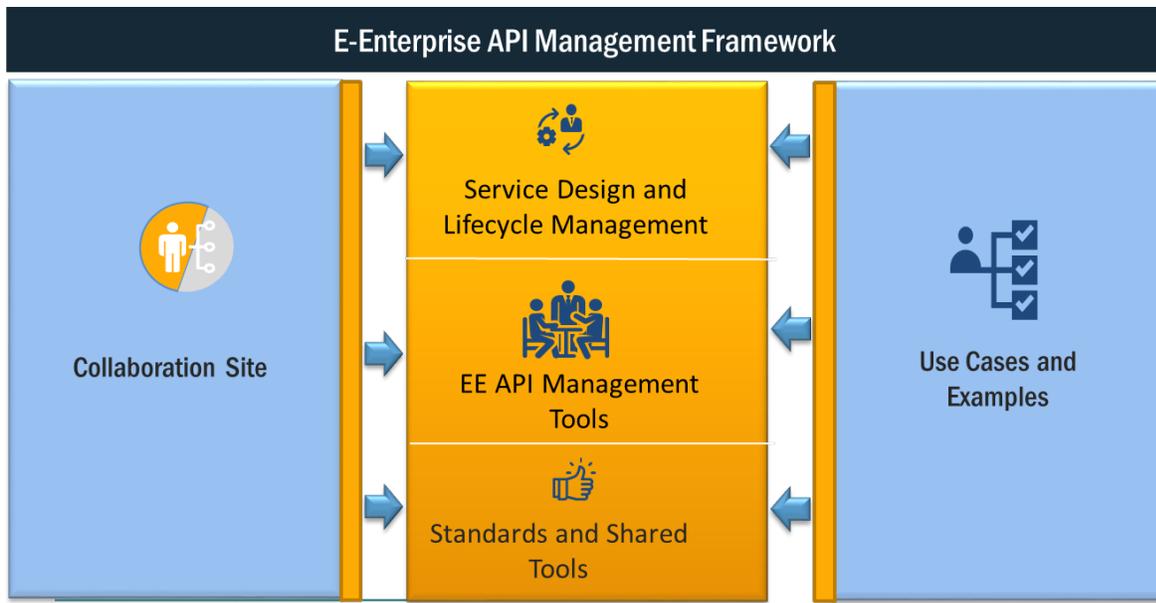


Figure 1: Enterprise API Framework

As the framework is further developed, standards and guidelines will be developed in the following key areas:

- **Service Model:** Implement a customer-centric approach to identifying business needs and the data exchange flows.
- **General API Design:** Ensure the design and construction of individual APIs align with the APIs that make up the service.
- **Change Management:** Ensure that the entire lifecycle of APIs is managed with a deliberate approach, including version management, communicating changes to users through product roadmaps and deprecating APIs when it is time to retire them with appropriate processes.
- **Developer Onboarding:** Provide guidance to help developers quickly learn, test, and use APIs.
- **Documentation:** Provide standards and documentation around how APIs can be shared and consumed.
- **Authentication and Authorization:** Use industry standards and best practices for authentication and authorization.
- **Monitoring and Observation:** Provide transparency into how APIs operate after being published.
- **Discovery:** Ensure that published APIs are discoverable.