

Natural API Management: Concepts and Facilities

Version 1.1

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This document applies to Natural API Management Version 1.1 and to all subsequent releases.

Specifications contained herein are subject to change and these changes will be reported in subsequent release notes or new editions.

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About this Guide

This guide describes the technical features and architecture of Natural API Management.

The product Natural API Management provides extensive functionality on API management, which allows you to expose valuable business rules from Natural applications to attend business demands.

Online Information

Software AG Documentation Website

You can find documentation on the Software AG Documentation website at http://documentation.softwareag.com. The site requires Empower credentials. If you do not have Empower credentials, you must use the TECHcommunity website.

Software AG Empower Product Support Website

You can find product information on the Software AG Empower Product Support website at https://empower.softwareag.com.

To submit feature/enhancement requests, get information about product availability, and download products, go to Products.

To get information about fixes and to read early warnings, technical papers, and knowledge base articles, go to the Knowledge Center.

Software AG TECHcommunity

You can find documentation and other technical information on the Software AG TECHcommunity website at http://techcommunity.softwareag.com. You can:

- Access product documentation, if you have TECHcommunity credentials. If you do not, you will need to register and specify "Documentation" as an area of interest.
- Access articles, code samples, demos, and tutorials.
- Use the online discussion forums, moderated by Software AG professionals, to ask questions, discuss best practices, and learn how other customers are using Software AG technology.
- Link to external websites that discuss open standards and web technology.

1 Introduction

Due to the influence of new technologies (for example, Mobile, Cloud, Social, IoT), the API (Application Programming Interface) adoption became an important asset to the business, enabling innovative applications through internet protocols and so, quickly reaching internal and external consumers. This distribution channel allows companies to reach new markets and partners by offering new products and services.

Natural API Management is the solution to expose and maximize the great value of Natural applications by extending its usage as an API.

Since we provide more business features by API exposure, management becomes necessary and important, as the scalability of consumption is increasing significantly. The Natural API Management platform, where NaturalONE and EntireX are essential components in the creation and reuse of Natural applications, lets you manage the entire process of planning, designing, developing and securely exposing your Natural APIs to external developers, partners, and other consumers. Thus, you can:

- Quickly expose Natural applications as APIs.
- Integrate and compose APIs with webMethods ESB.
- Manage the API lifecycle end-to-end with CentraSite.
- Protect and virtualize your APIs with webMethods Mediator and Enterprise Gateway.
- Engage with developers and B2B partners using webMethods API-Portal.
- Monitor APIs holistically with webMethods Insight.

This solution provides extensive capabilities and flexibility on end-to-end API management for Natural applications, and it also allows Adabas and Natural customers to exchange data and functionality involving heterogeneous technologies to meet business demands.

2 Key Characteristics

APIs are the new channel for the distribution of products and services, enabling you to reach new markets, create revenue streams and quickly reach partners and consumers. Natural API Management will enable you to expose Natural applications as an API, allowing you to unlock the unique value of existing applications, and also provides the ability to accelerate mobile strategy and innovative apps to reach the customers.

In this context, Natural API Management offers valuable features for your environment:

■ Natural API Development - API generation from Natural applications

Ability to expose Natural applications as API objects. The Natural server can be hosted on a mainframe or in Linux, UNIX and Windows environments. For remote access, Natural Development Server needs to be enabled.

API Management

Lifecycle management of APIs

Manage the entire process of designing, developing, deploying, versioning and retiring APIs. Ensure standards and practices by defining permissible transitions between states. Use built-in versioning capabilities to track API versions.

APIs repository

Provide a repository that allows keeping API documentation, technical information and interfaces.

API publishing

Publish REST and SOAP APIs. Automatically synchronize API documentation between your enterprise catalog and developer portal. Collect analytics at the portal to better understand portal usage. Analysis of popularity - which APIs are popular and which are not. Allow developers to read about, request access to and test your APIs. Deploy webMethods API-Portal in the public cloud, private cloud or in the DMZ.

API catalog

Catalog all APIs for discovery, re-use and lifecycle management. Browse and search API capabilities.

API security and mediation

Use policy driven security to uniformly secure and monitor access to back-end services from apps using your APIs. Support for transport and message-layer security, including authentication, authorization, digital encryption and digital signatures. Provide runtime enforcement of defined policies.

API monitoring

Quickly identify service issues and provide deep visibility into transactions.

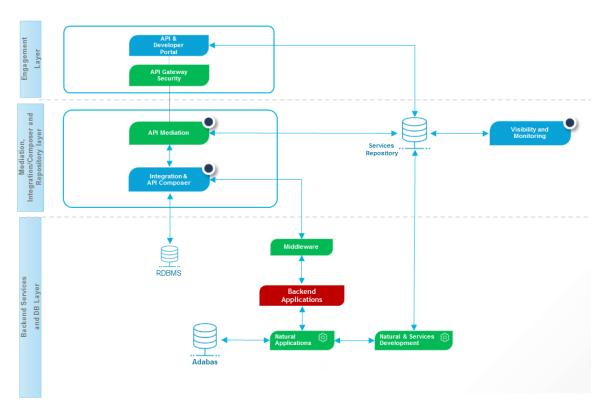
- Multi-caches and in-memory data
 - Gives more power to the entire solution (for example, APIs and services), allowing scalability to attend a higher number of consumers.
- Implement a single solution for both internal and external as APIs.

3 Architecture and Capabilities

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The following sections provide an overview of the solution, describing the capabilities as well as the physical architecture. For detailed information about the components that make up the solution, see the product documentation at https://empower.softwareag.com/.

Solution Layers



The above figure describes the roles of the individual elements in the layers that involve the solution. The following is a summary of each layer:

Backend Services and Database Layer

The solution has comprehensive and integrated tools that allow you to expose Natural business rules in a very easy and quick way using a graphical interface. This reduces error-prone manual tasks and also allows for code testing and debugging. The Natural applications can be hosted on mainframe or Linux, UNIX and Windows (LUW) platforms.

Mediation, Integration/Composer and Repository Layer

This layer provides the ability to develop service flows using the available assets (for example, APIs, web services) and to integrate heterogeneous technologies. It provides all the capabilities needed to quickly create, deploy and publish services. It also enables you to enforce defined security polices, apply protocol transformation and mediation capabilities.

This layer also includes the following:

Monitoring Component

The users will have monitoring capabilities. Thus, they are able to quickly identify service issues. This provides visibility into the transactions provided by the APIs.

Web Service Repository Component

The solution provides a repository and allows management of assets (for example, APIs, web services). This helps enterprises to securely expose Natural API services, and developers can thus easily create new web, mobile and cloud apps. As a result, you can reach new customers, support new devices and technologies, and obtain new sources of revenue. In addition, it also allows lifecycle management of APIs.

Engagement Layer

The users will have the presentation functionality offered by the API Portals. Using the engagement layer, it is possible to get information about the APIs (for example, directory information, documentation, and access methods). You can also discover or search for APIs, and try and set deals for API use.

Solution Capabilities

Natural API Management delivers capabilities to develop, integrate, manage, protect, engage and monitor APIs in the organization.

The following is a summary of the capabilities provided by the solution:

Adapters

The adapters layer provides the ability to connect to Natural hosts in order to expose/reuse Natural business rules as APIs. The Natural business rules are exposed by Natural RPC servers allowing IDL (Interface Description Language) object generation.

Integration

The integration layer enables API adapters to integrate the services allowing the use of heterogeneous technologies. Web services can be deployed directly from IDLs extracted from Natural applications or based on an EntireX adapter connection generated into the Integration Server (generated on the adapters layer).

Web Service Repository

The repository provides management facilities for the assets that are developed and deployed from Natural applications and others. Based on web services deployed from the integration layer, the asset should be registered in and published to the repository (CentraSite) to be available for further consumption, and also to control the entire API lifecycle.

- Creation of an enterprise catalog of internal and external APIs.
- Documentation of SOAP and REST APIs.
- Management of the API provider workflow: access token request approvals for API keys and OAuth2.
- Manage the entire API lifecycle from design until retirement.
- API virtualization and configuration/enforcement of runtime policies.
- API usage analysis at runtime through dashboards reports and traffic.

API Management

The API Management layer enables companies to unlock the business value of their unique Natural applications, while also supporting new devices and technologies, hybrid integration, Internet of Things, and service governance initiatives. Thus, existing Natural functionality can be reused as APIs on the new services, giving agility for developers to meet business demands quickly.

This layer also enables monitoring, policies enforcement, authorization/ authentication, mediation, transformation, and consumption of services delivered.

The highlights for API managers are:

- Secure and mediate traffic between API consumers/users and back-end applications.
- Collection of performance metrics for dynamic dashboards and accounting for billing.
- Realize statistics about API usage with added analytics and reporting.
- Automated documentation publishing to the API-Portal.
- API creation, packaging, and publishing.

API Mediation and Gateway

webMethods Mediator provides a service intermediary that enforces the runtime policies you create in the web services repository (CentraSite). Mediator also virtualizes shared services, making it easy to change services when required.

Combined with CentraSite, Mediator provides end-to-end governance of all your services and APIs from development to runtime. Combined with webMethods Enterprise Gateway, Mediator provides comprehensive API Gateway functionality. The key capabilities offered are:

- Use it as a central runtime policy enforcement point for APIs.
- Enforce security, traffic management, monitoring and SLA management policies.
- Virtualize services to decouple API consumers/users from APIs providers.
- Provide intelligent routing and load balancing of APIs requests.
- Collect analytical data on API consumption/usage and policy evaluation.

- Send selected events to the webMethods Event Bus Infrastructure for processing and immediate action.
- SOAP-to-REST transformation.
- Performance.
- Protocol switching.
- Message transformation.
- Consumer provisioning.
- Message validation.
- Traffic management.
- SLA monitoring.
- Security.
- API key enforcement.
- Smart policy provisioning.
- Standards support.

API-Portal

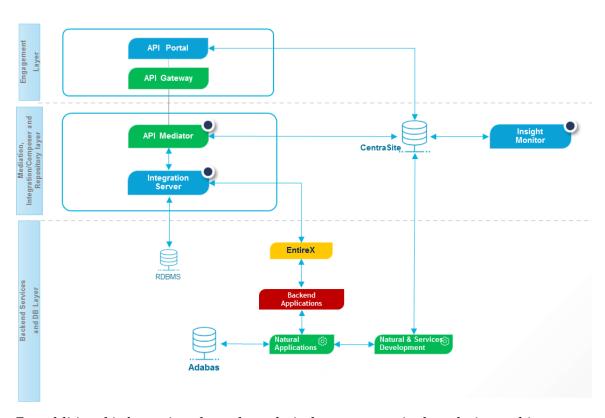
API-Portal provides a consumer-centric user interface for the discovery of APIs. The portal exposes API documentation to third-party developers, manages the developer on-boarding process, and allows these developers to use the exposed APIs for creative new uses. When developers leverage your APIs with new mashups and apps or to support new devices, your reach is extended, and new channels are opened up to your corporate assets. The key capabilities offered are:

- Full API documentation.
- Customizable branding of the Portal interface.
- Automatic synchronization of documentation from the web services repository.
- API support for REST and SOAP based APIs.
- Integrated API testing.
- Built-in APIs usage analytics.
- Full text search capabilities to find the desired APIs.
- Responsive design for both desktop and mobile web-based administration interface.
- API grouping.
- Multiple deployment options: behind the firewall, in the DMZ, in your private
- Built-in workflows for an approval process to manage API access requests.

■ Sign up to track specific APIs to automatically receive notices of changes.

To support environments that require higher levels of availability and performance, Natural API Management provides support for cluster scenarios in some of its components (for example, Mediation, Gateway, engagement layer).

4 Technical Components



For additional information about the technical components in the solution architecture, refer to the respective product documentation as per the table below:

Technical Capability	Implemented by Component
Application and API Portals	webMethods API-Portal My webMethods Server
API Monitoring	webMethods Insight
API Mediation	webMethods Mediator Enterprise Gateway
API Lifecycle Management	CentraSite ActiveSOA
Natural Development	NaturalONE Natural Development Server (for remote access)

Technical Capability	Implemented by Component
Development Platform	Software AG Designer
Integration Server	webMethods Integration Server
In-Memory Solution	BigMemory Max EX Edition for webMethods

5 Exposing Natural as an API

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Natural business rules can be exposed in different ways and thus enable reusability to attend business demands according to requirements quickly. The approach described below is based on the webMethods EntireX and webMethods API-Portal solutions from Software AG.

Infrastructure

The following infrastructure components are used to deploy an API from Natural applications:

- Mainframe platform:
 - Natural
 - EntireX
 - Natural RPC Server
- Windows platform:
 - Software AG Designer NaturalONE, EntireX Development and Service Development
 - Integration Server (with EntireX Adapter)
 - CentraSite (API repository)
 - API components (for example, API-Portal, Mediator, Insight)
 - BigMemory solution

Step-by-Step

This section describes the procedure that is used to expose Natural business rules as an API and to enable the registration and governance of the deployed assets.

This procedure is based on Natural programs on a mainframe, but it also works for Natural on Linux, UNIX and Windows (LUW).

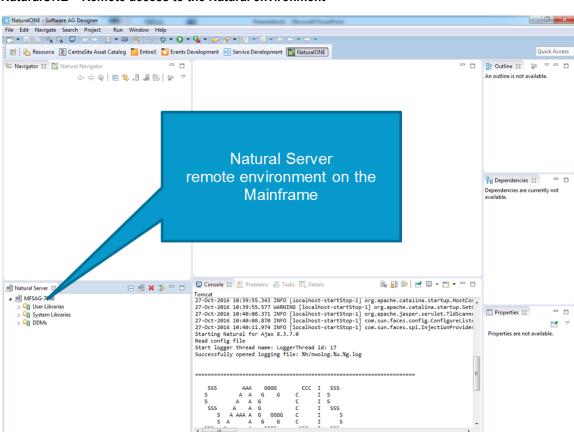
Sample of a Natural application used

```
\underline{\underline{S}}ession \quad \underline{\underline{E}}dit \quad \underline{\underline{V}}iew \quad \underline{\underline{U}}tilities \quad \underline{\underline{W}}indow \quad \underline{\underline{H}}elp
💌 🌉 🙆 🖟 🖫 🛍 🖖 🧧 🏢 🧸 🔇 🗞 🔥 🙎 atin Clr entr Dcnl eeof eri ins nlin prn syro home pai pa2 pa3
                                                                                                                                                                                   LEEMPWS Lib BRMDO
                                                                                                                               > + Subprogram
      11 ....+...1...+...2...+...3.

0010 DEFINE DATA PARAMETER

0020 1 #MATRICULA (A08)

0030 1 #NOME (A20)
 A 1 1
    0040 *
0050 LOCAL
0060 1 EMP VIEW OF EMPLOYEES
0070 2 PERSONNEL-ID
0080 2 NAME
0090 END-DEFINE
0100 FIND (1) EMP WITH PERSONNEL-ID EQ #MATRICULA
0110 IF NO RECORDS FOUND
0120 COMPRESS 'MATRICULA - NOT FOUND' INTO #NOME
0130 ESCAPE ROUTINE
0140 END-NOREC
0150 MOVE NAME TO #NOME
0160 END-FIND
       0040
      0160 END-FIND
0170 END
0180
0190
       0200
       0210
0220
       0240
0250
       0260
       0270
       0280
                                                                                                                                                                                                                S 17
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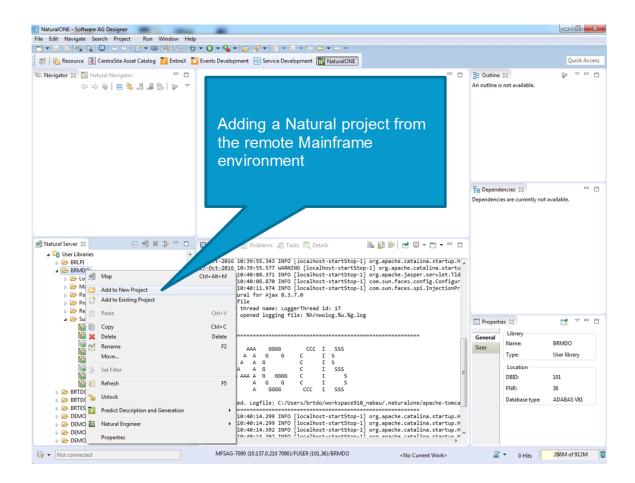


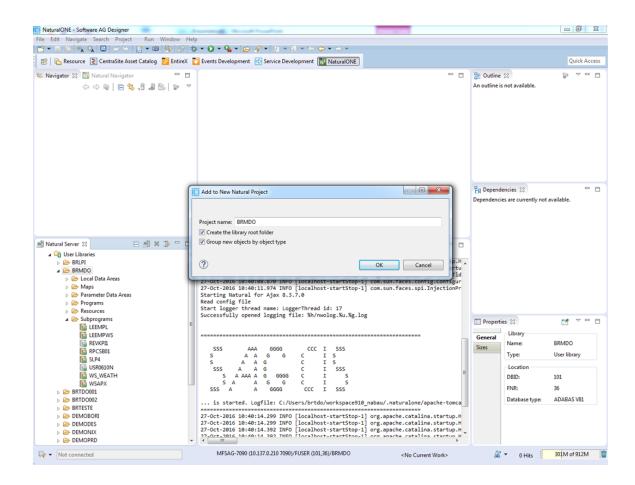
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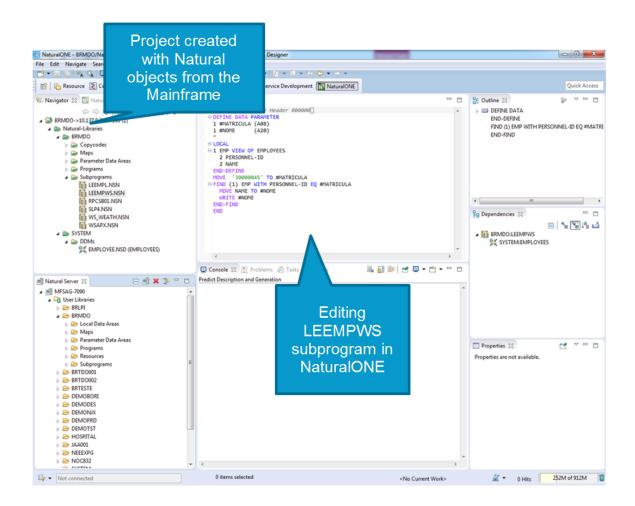
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NaturalONE - Remote access to the Natural environment

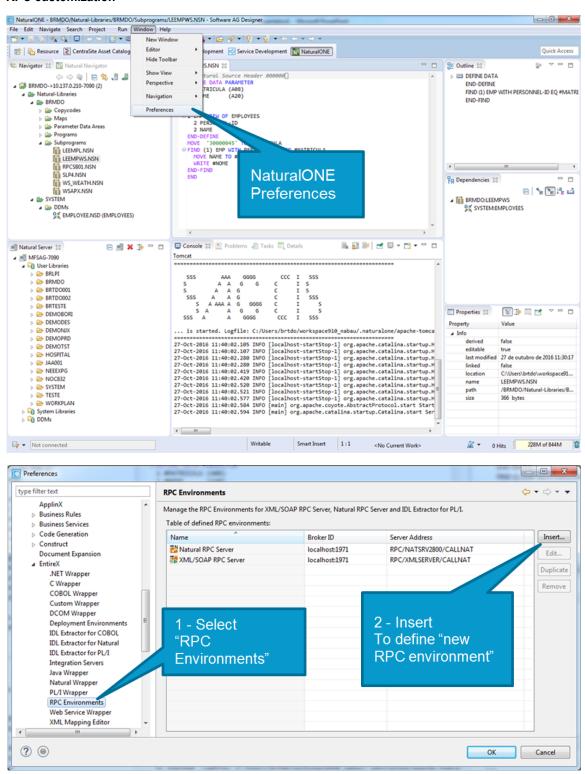
Not connected

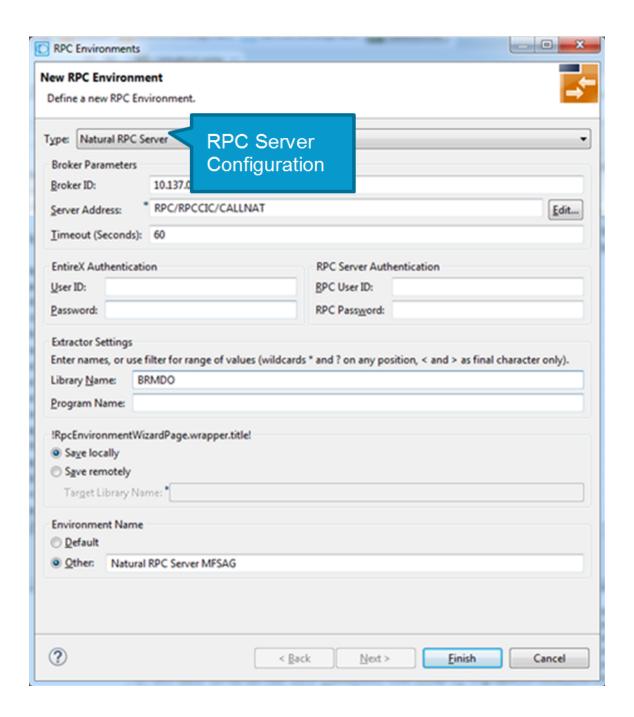




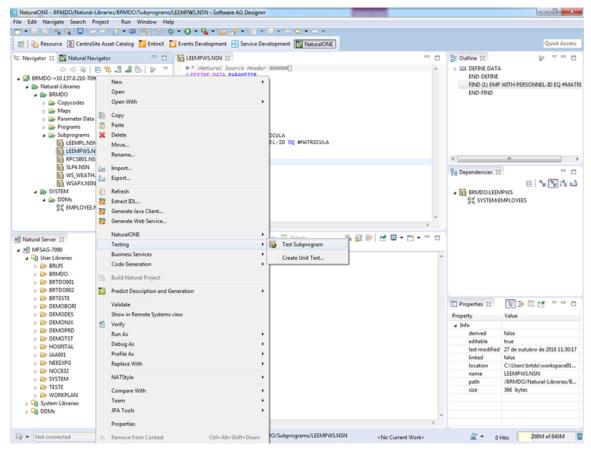


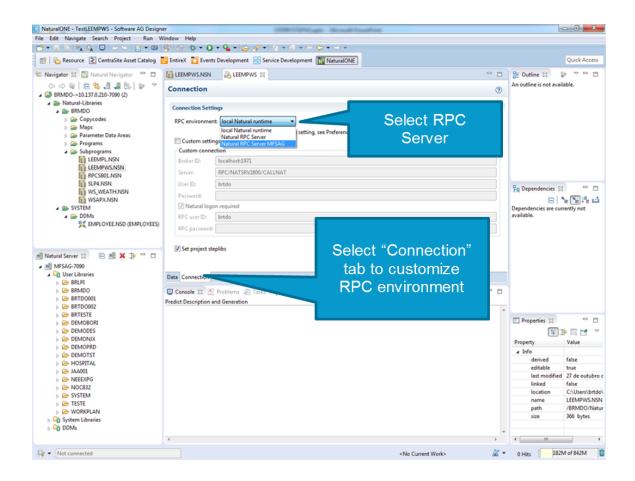
RPC customization

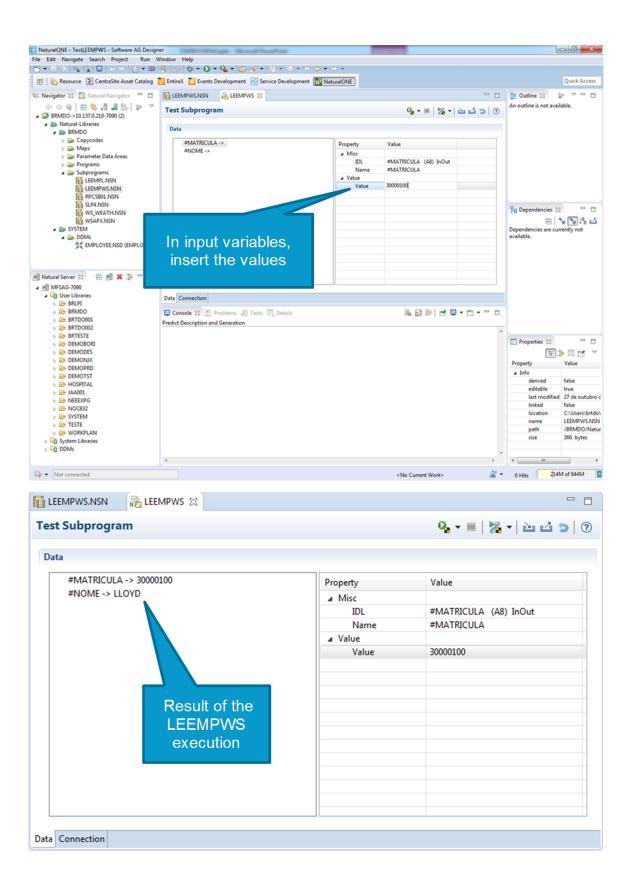




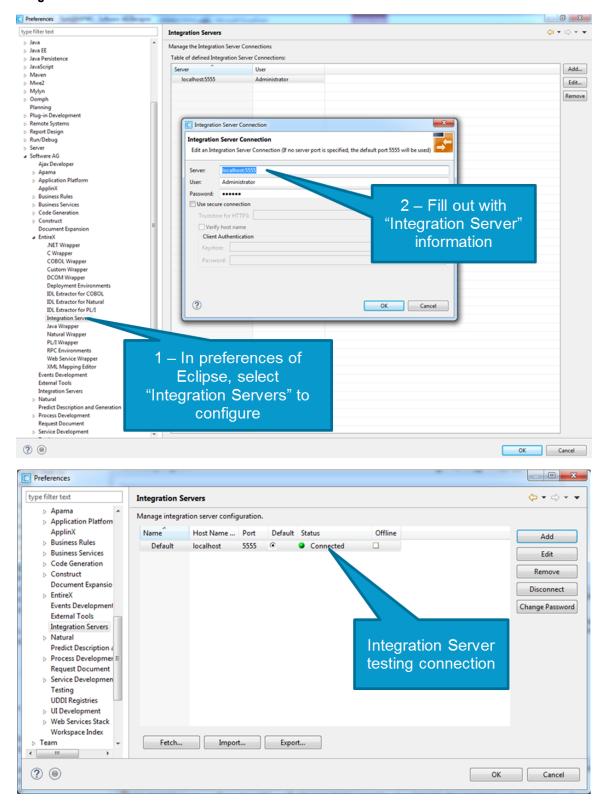
Testing the subprogram using the Natural RPC server environment



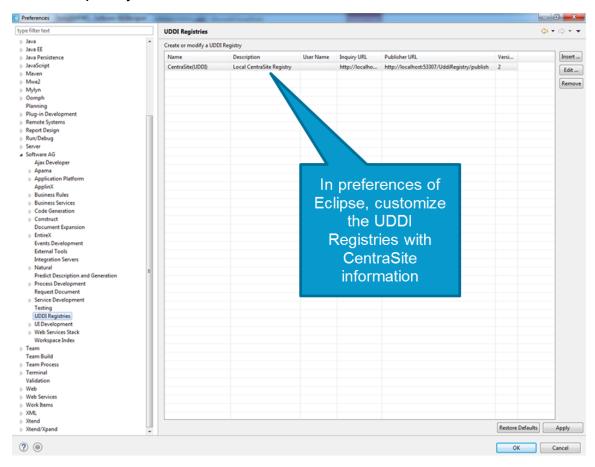




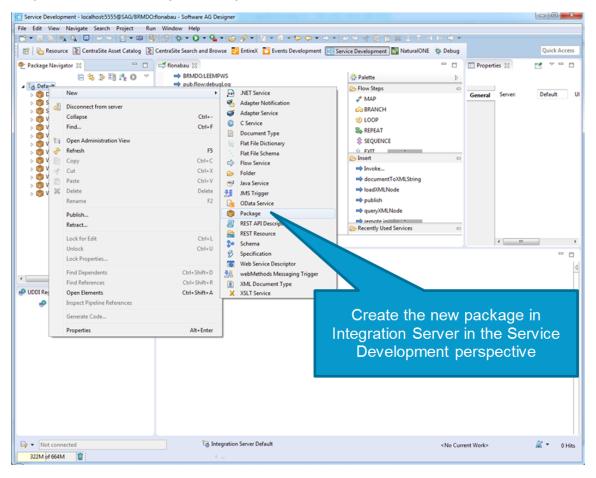
Integration Server customization

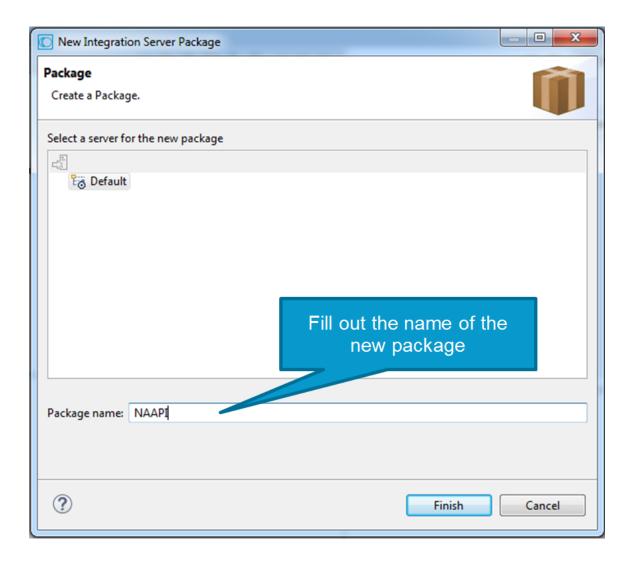


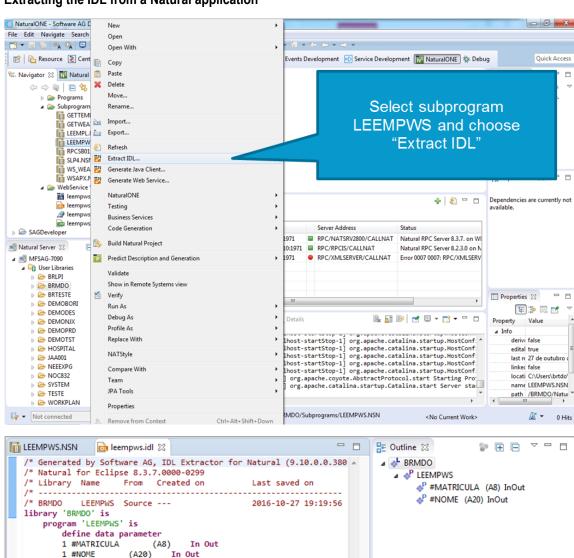
CentraSite repository customization



Integration Server – Defining the package







Extracting the IDL from a Natural application

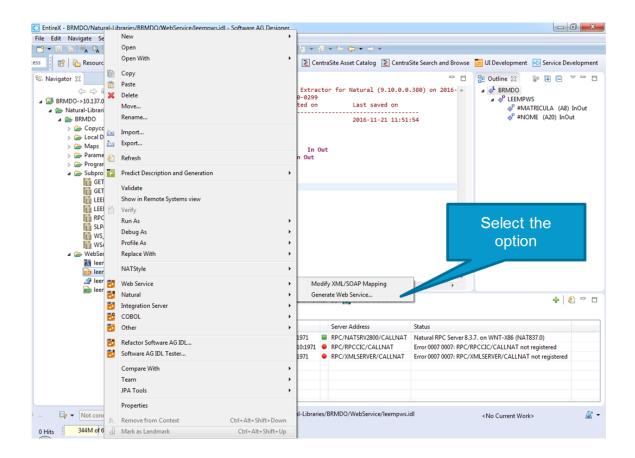
Exposing the web service from EntireX Developer to CentraSite

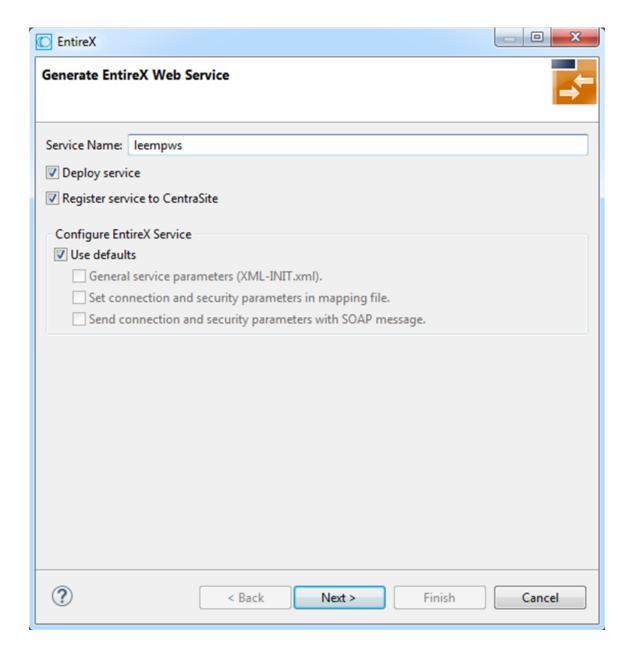
The web service can be exposed by Integration Server, where you can add new functionality of other application systems. In this example, the exposed web service is based on the IDL extracted from Natural.

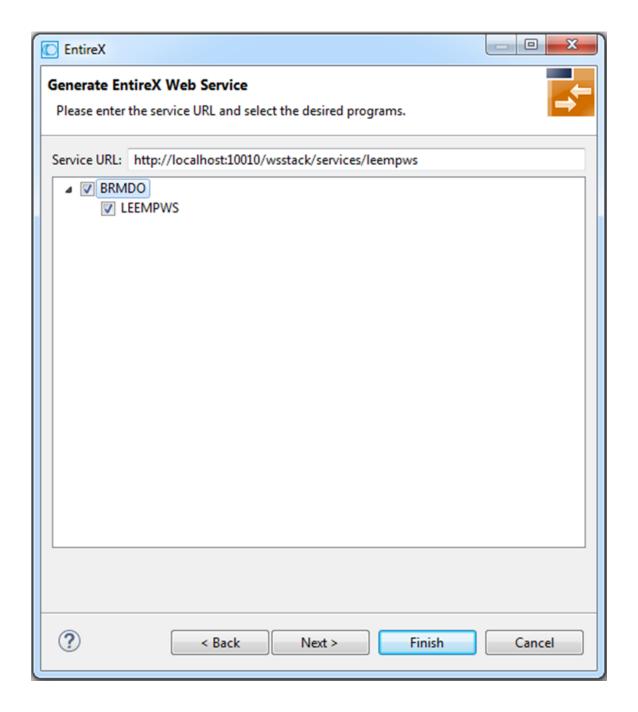
IDL extracted

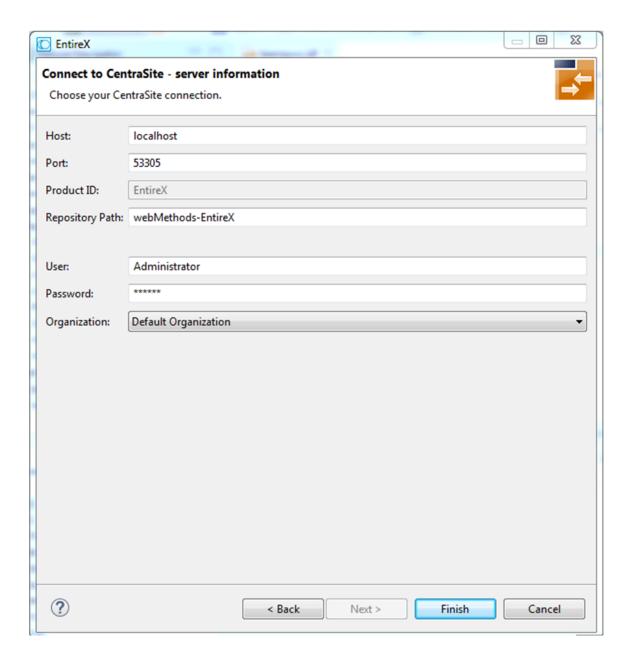
end-define

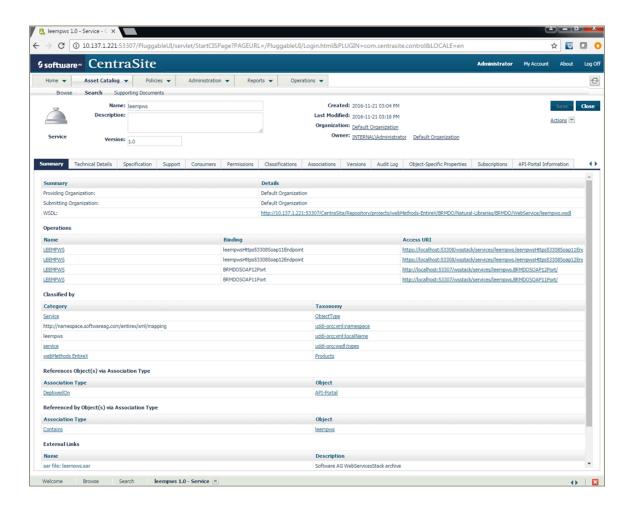
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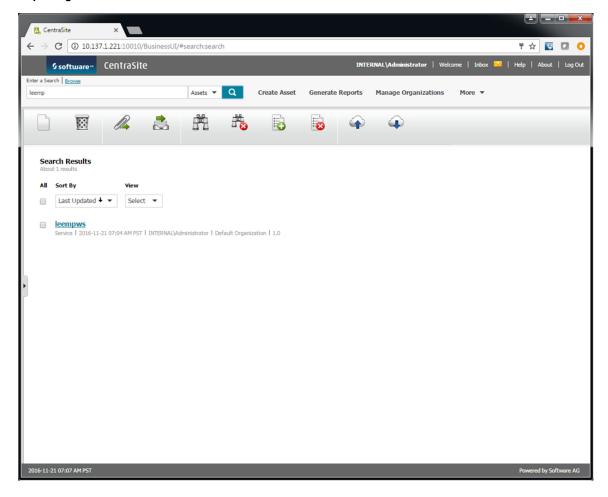


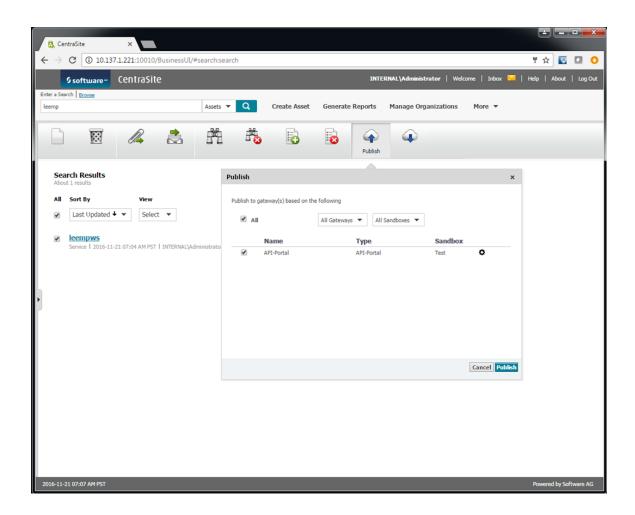


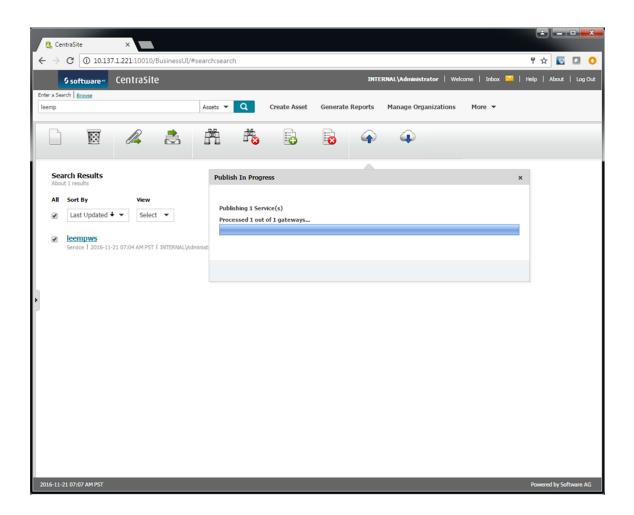




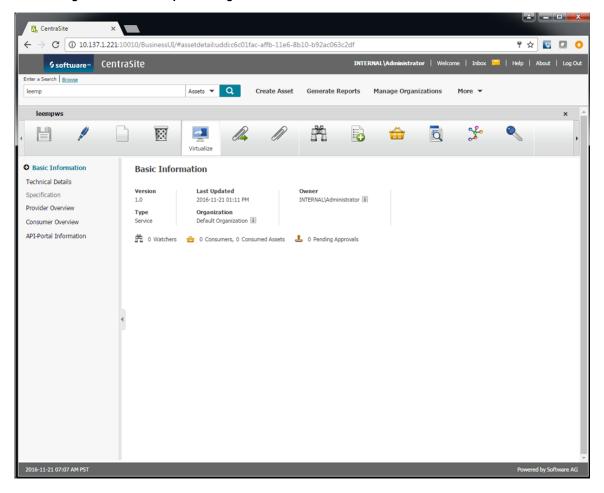
Exposing the service from CentraSite to API-Portal

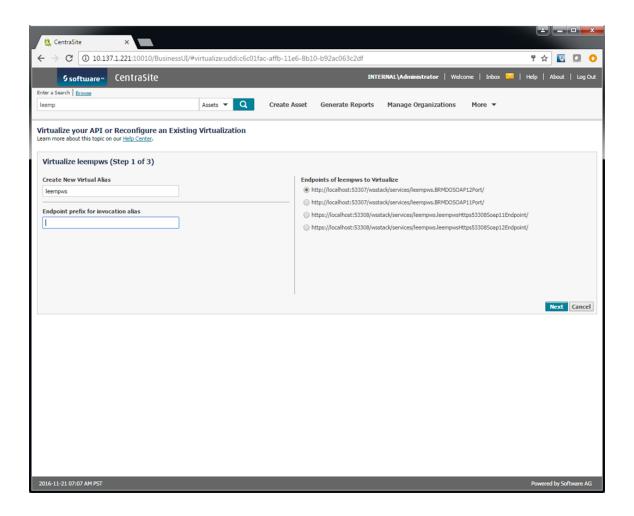


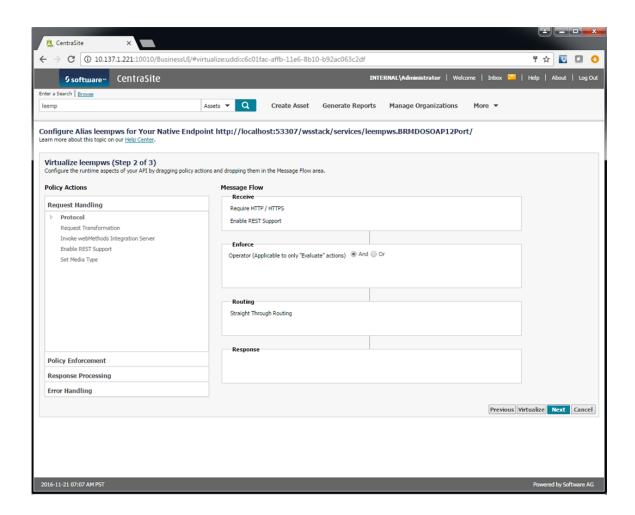


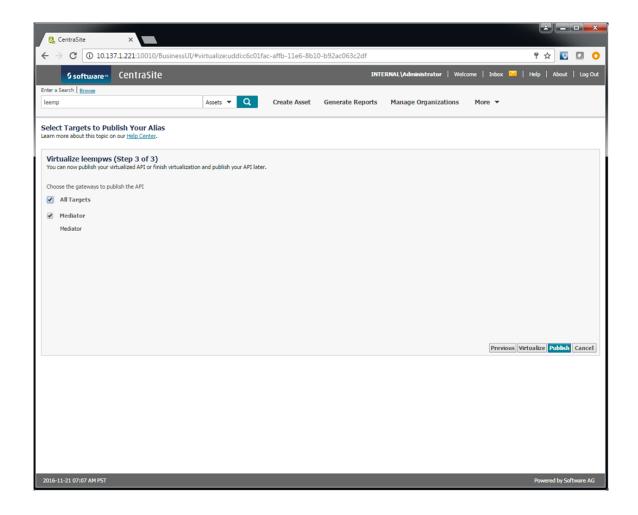


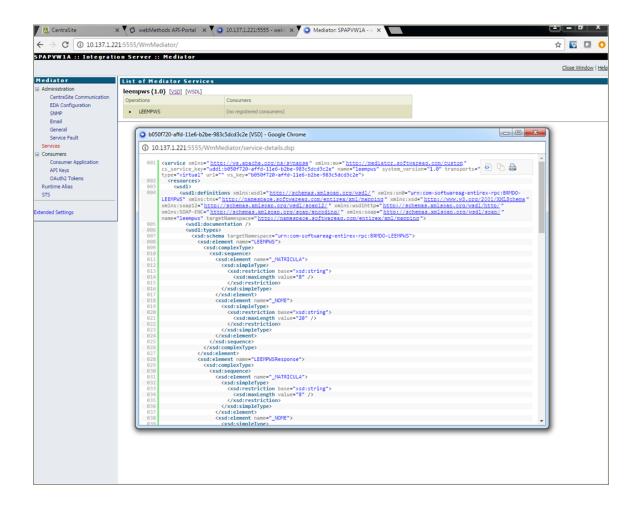
Virtualizing the service and publishing to Mediator











Visualizing the API in API-Portal

