Appendix I – External Inbound API Architecture Requirements and Recommendations

Description and Purpose:

This document outlines architectural requirements and recommendations for the ingestion into the NUAR platform of external inbound APIs developed by third party data providers.

Some requirements are specified for the NUAR platform (as the "receiver" of external API payloads) and some are specified for third parties responsible for the development and maintenance of external inbound APIs. The Supplier will be responsible for communicating these latter requirements to third parties, and for liaising with the developers of external inbound APIs to ensure that they can be ingested successfully, securely and sustainably.

Types of inbound API

The platform will support the following types of inbound API for provision of asset data:

- OGC Web Feature Service 2.0[1].
  - This is the preferred approach for providing data via inbound API, allowing attributed spatial features to be displayed and queried. The following subset of capabilities should be supported:
    - GetCapabilities
    - DescribeFeatureType
    - GetFeature
    - GML, GeoJSON Return type
    - Spatial Query by polygon
  - Data supplied via an inbound WFS must be transformed to the target NUAR data model before being exposed to the platform.
  - The coordinate reference system must be British National Grid (EPSG:27700) or the Irish Grid Reference System (EPSG: 29901) for Northern Ireland.
  - Filtering by attribute may be required depending on requirements around conditional display of assets based on the end user role or type of enquiry
- OGC Web Map Service 1.3[2].
  - Where supply of features is not possible for some reason, data may be supplied as transparent images which can be overlaid with other data.
  - The following subset of capabilities should be supported:
    - GetCapabilities
    - GetMap
  - The coordinate reference system must be British National Grid (EPSG:27700) or the Irish Grid Reference System (EPSG: 29901) for Northern Ireland.

Support may also be required for the OGC Web Map Tile Service 1.0[3] where supply of features is not possible.

It is anticipated that the OGC API - Features[4] standard will gain traction in the future as the standard matures, and will need to be supported in due course.

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[1] http://portal.opengeospatial.org/files/?artifact_id=39967
[2] http://portal.opengeospatial.org/files/?artifact_id=14416
[3] http://portal.opengeospatial.org/files/?artifact_id=35326
[4] http://docs.opengeospatial.org/is/17-069r3/17-069r3.html

As well as the core asset data, it is anticipated that "reference" data may be provided via inbound APIs in the future (e.g. Backdrop Mapping, Protected Sites, Street Data etc).

This data will not be modelled in the core NUAR data model, so no transformation will be required. The key considerations for external reference APIs will include:

- Conformance with OGC standards
- Non-functional requirements such as performance, availability, capacity
- Licensing conditions
- Authorisation and other security requirements

It is **not** expected that the platform will support custom APIs which do not conform to OGC standards.

Security Controls - Platform Host
REDACTED

Security Controls - Third Party API Provider
REDACTED

API Availability and Failover
Special consideration will be given to the availability and performance of external APIs and the implications for end users of service unavailability.

The NUAR platform will have the capability to check the availability of external services, and provide the option to "failover" to data stored in the NUAR database if available.

End users will receive clear notifications if this "failover" mechanism is enacted, and the user interface will make as clear as possible the data currency implications of such an eventuality.

Non-functional Requirements
Non-functional requirements for the ingestion of external inbound APIs will be defined in the following categories:

- Capacity and Volume
- Performance and Availability
- Backup and Recovery
- Support and Maintenance
- Transition and Training
- Hosting
- Build and Deployment
- Security
- Standards

Validation

The Supplier will provide a means for external parties to validate that an API is operating as expected and returning compliant data.

A suitable test harness will be able to:

- Automate the testing and validation process
- Execute a suite of test cases
- Generate test reports for demonstrating compliance

The following test cases would be recommended as a minimum:

- Does the API support the required requests?
    - Call the "GetCapabilities" operation to verify the correct data types, schema, coordinate system and feature types are returned
    - Call the "GetFeature" operation (for a WFS) to check it can handle an AOI polygon request and check objects returned fall within the coordinates of the AOI and that it can handle the GeoJSON return type
    - Call the "GetMap" operation (for a WMS) to check it can handle a spatial filter and check images returned intersect the area specified
- Does the API return the correct schema (in the case of WFS)?
    - Call the "DescribeFeatureType" operation to verify the attribution against what is expected in the NUAR data model
- Is the API performant?
    - Simulate requests every 1 minute per user for 1 hour using concurrent user totals
    - Check response rate for a single request is within the agreed SLA
    - Perform a scaling "soak" test to see how the API responds to increasing load
    - Check the agreed maximum feature/image count returned per request is enforced

Test cases will be developed by the Supplier and executed by the provider of the API.

The following approaches may be taken to the provision of a test harness:

- Use of a commercial off-the-shelf (COTS) product to develop a test suite which can be executed by the API provider without the need for a development environment. The COTS software must be readily available to the API provider and must be configurable to provide tests which are representative of the required interactions with the NUAR platform
- Use of a specialised API testing framework that could be built into the development environment of the API provider

- Provision of a dedicated API testing function within the NUAR platform

Alternative approaches may be suggested by the Supplier.

It is possible that a combination of the approaches outlined above could be deployed, for instance with the NUAR platform providing schema validation services, and more specialised API testing being carried out on the provider side via use of COTS software or a testing framework, depending on the capability and requirements of the provider.