

The Rise of the API's

A. Danesh Hussain Zaki

APIs (Application Programming Interfaces) have been as old as structural programming languages and anyone who is a programmer has used them. According to Wikipedia, *APIs are a specification to be used as interfaces by software components to communicate with each other.* APIs have served to communicate and integrate components and applications locally and remotely.



SOAP Web Services vs. REST APIs

Web services are currently the primary means of exposing APIs over the web. SOAP (Simple Object Access Protocol) and REST (Representational State Transfer) are the technologies used to do so. While SOAP is more suitable for enterprise-wide business services, REST is being preferred for B2B use and exposing simpler CRUD (Create Retrieve Update Delete) operations.

SOAP based web services are more suitable for composing multiple (fine-grained) web services that can perform business operations such as checking availability of products, notifying the manufacturing application, providing status updates etc.

Since REST services are meant to be invoked when a particular URI is accessed, they are modeled to be more or less atomic. They perform operations such as search (retrieval), insert, update or deleting records. These are viewed and referred to as APIs. In common parlance, APIs now mean REST based web services while the term "Web Services" by itself denotes SOAP based web services.

API Explosion on the web

Organizations have been looking to become more transparent and share data and services on the web. By using APIs, they have been able to provide data/services that can be used in other web applications or to build Mashups, which are web applications that are composed of web APIs. Some of the popular use cases for APIs are:

- Social networking services
- Product reviews, catalogs and shopping
- Advertising management
- Information on specific industries such as construction and real estate
- Shipment tracking and shipping
- Credit card validation and payment processing
- Traffic and weather updates
- File, video and image sharing

Lately, organizations have also started looking at APIs for application integration within their organization and with their customers, vendors and third parties. The approach is to expose data in a data store through APIs that can be invoked by other applications. This approach can be employed where there is no complex business logic or sequencing that needs to be performed by the API.

Challenges in Managing APIs

As the number of APIs increase, they present a few challenges. Some of the key challenges/requirements are listed below.

Access Control and Security

Mechanisms need to be implemented for registering APIs through user tokens/API keys and validating on invocation. For sensitive information such as credit card numbers, policies need to be enforced for encryption of data.

Usage Throttling

In order to ensure the availability of APIs and to maintain an optimum performance, the number of API invocations needs to be controlled. This is commonly known as throttling.

API Versioning

Versioning requirements arise as the APIs undergo changes. Version management needs to handle the multiple versions of the APIs in production.

Availability and Infrastructure

APIs need to be available at all times (unless they are used internally and their non-availability is accepted). Based on the requirements, the infrastructure that hosts the APIs could be “on premise” or Cloud based.

Products for API Management

The challenges in managing APIs have resulted in the emergence of products for API management. API management products address the challenges/requirements presented by APIs as follows.

Security

API management products issue and manage keys, perform OAuth authentication and handle API registration

Usage Throttling

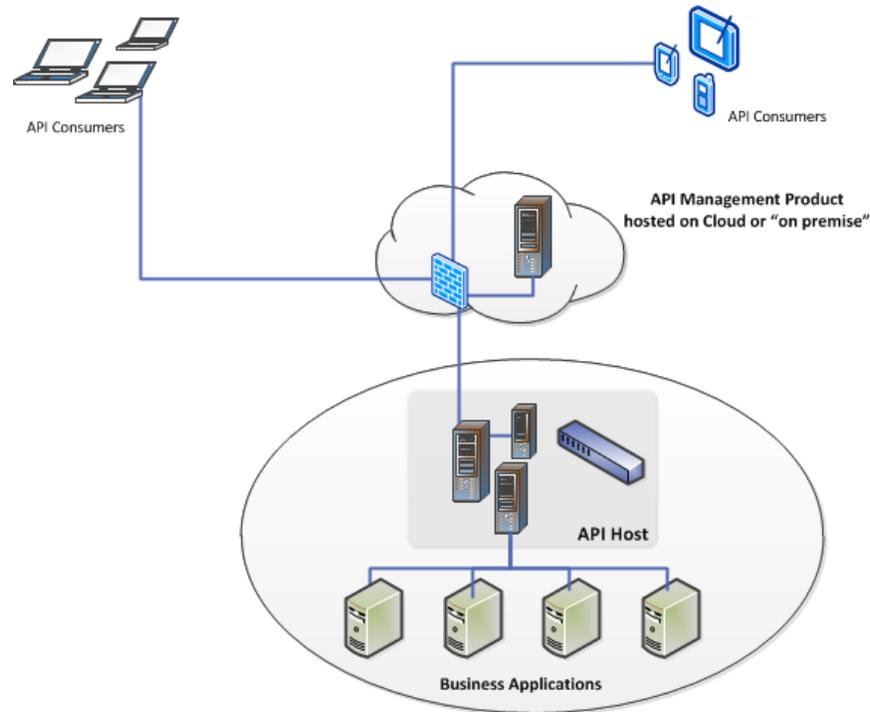
API management products perform usage throttling by checking IP addresses, API keys, user tokens and based on applications/domains. The API access can be suspended for a period and allowed later.

API Versioning

API management products provide version management capabilities through an in-built service repository for WADL (Web Application Description Language) and XSDs (XML Schema Definition).

Intelligent Caching

By caching frequently requested data, API management products reduce the number of queries to external data sources and aid in improving the performance of APIs.



Most of the API management products are available as a service on the Cloud where customers are provisioned. Some products provide a localized or "on premise" installation, where the product is installed within the organization's network.

In addition to providing solutions for the challenges in managing APIs, the products also provide the following:

- Dashboard and metrics for API usage
- Developer portal with API documentation
- Mechanism for API billing and invoicing

The leaders in the API management space are:

- SOA Software
- Layer 7
- Mashery
- APIGee
- 3Scale

What Lies Ahead for APIs?

Forrester Analyst Jeffrey S. Hammond in an enquiry session on API Management mentioned that one in six enquiries they receive is on the API space. Players in the media domain such as NetFlix are leaders in API adoption and leading product vendors such as IBM are entering the API Management space.

As more and more customers look to using REST based APIs within and outside the organization, this space is going to mature and there would be tremendous opportunities for system integrators to build, manage and support APIs.

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Author

A. Danesh Hussain Zaki is a Senior Architect in the Enterprise Architecture practice of Wipro Technologies. He has a total of over 15 years of IT experience. He can be reached at danesh.zaki@wipro.com

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