

An abstract network diagram on the left side of the slide. It features a complex web of green lines connecting various nodes. Some nodes are represented by 3D cubes, a cloud, and a ship's steering wheel. The overall theme suggests a networked system or enterprise architecture.

Enterprise application integration and API management

asst. prof. Miloš Bogdanović, PhD
COMING Computer Engineering
Faculty of Electronic Engineering, Niš

An abstract network diagram on a black background. It features a complex web of green lines connecting various nodes. The nodes include several 3D cubes, a cloud, and a ship's steering wheel. The overall theme suggests a networked or distributed system.

Ever-changing IT...

Distributed systems...

Cloud native applications...

Microservices architecture...

Internet of Things...

Web API management...

Information integration solutions...

Revolution or Evolution?



Has the goal changed?

“You have to know the past to understand the present.” – Carl Sagan

Enterprises rely heavily on underlying software applications

Variety of vendors, standards, technologies, architectures

Disparate software applications have to work together

Clients expectation - unified set of functionality!

...and the goal repeats - comprehensive integration platform

Where do we stand?

Did you know?

65 information integration patterns recognized

4 categories



File Transfer



Shared Database

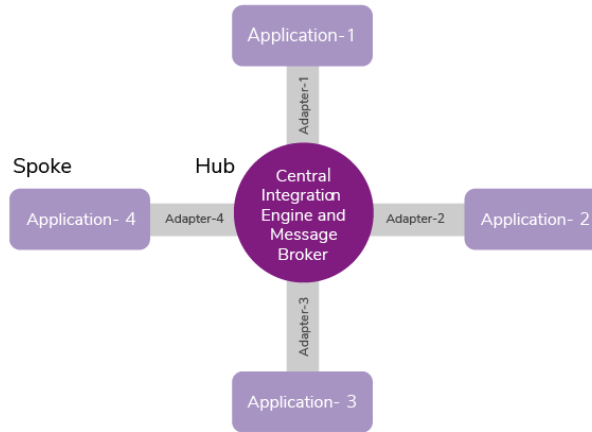


Remote Procedure
Invocation



Messaging

Hub/Spoke Architecture



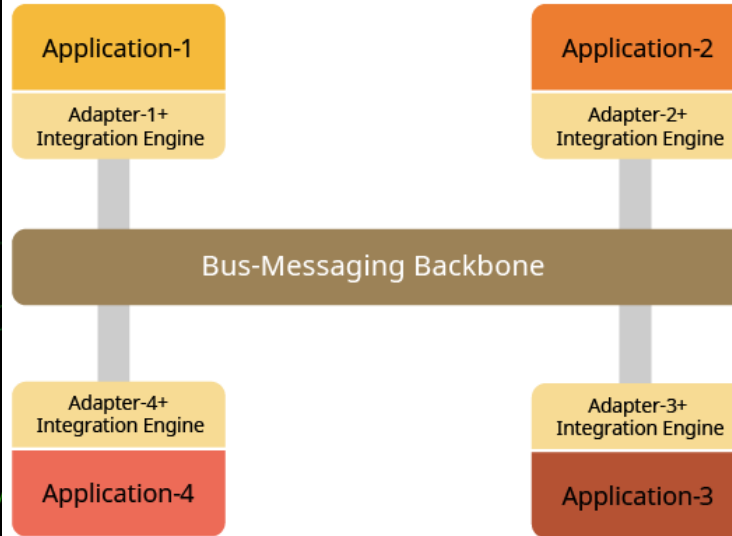
Avoid point-to-point interactions

Loose coupling

Central broker (hub) connects all applications

Single point of failure!

Bus Architecture



Solves the scalability issues

Messaging bus can be scaled horizontally

Proprietary nature of the EAI bus architecture!

SOA – a quest for the holy grail...

Foreseen to be the foundation of enterprise architecture

Realized in the form of Web services

Software applications replaced with Web services

Lead EAI to ESB!



Enterprise Service Bus – a glance



Message mediation

Service virtualization

Protocol conversion

Quality of service

Connecting to legacy and proprietary systems

Connectors to cloud services and APIs

Extensibility

Primarily designed for internal interactions

Service contract complexity?

Service versioning support?

Monitoring and analyzing?

An abstract network diagram on a black background. It features a complex web of green lines connecting various nodes. The nodes include a ship's steering wheel, a cloud, several 3D cubes, and small circles. The overall theme is digital connectivity and network architecture.

SOA, Integration, and API Management: a family!

The disruptive forces - mobile, data, cloud, and social networking

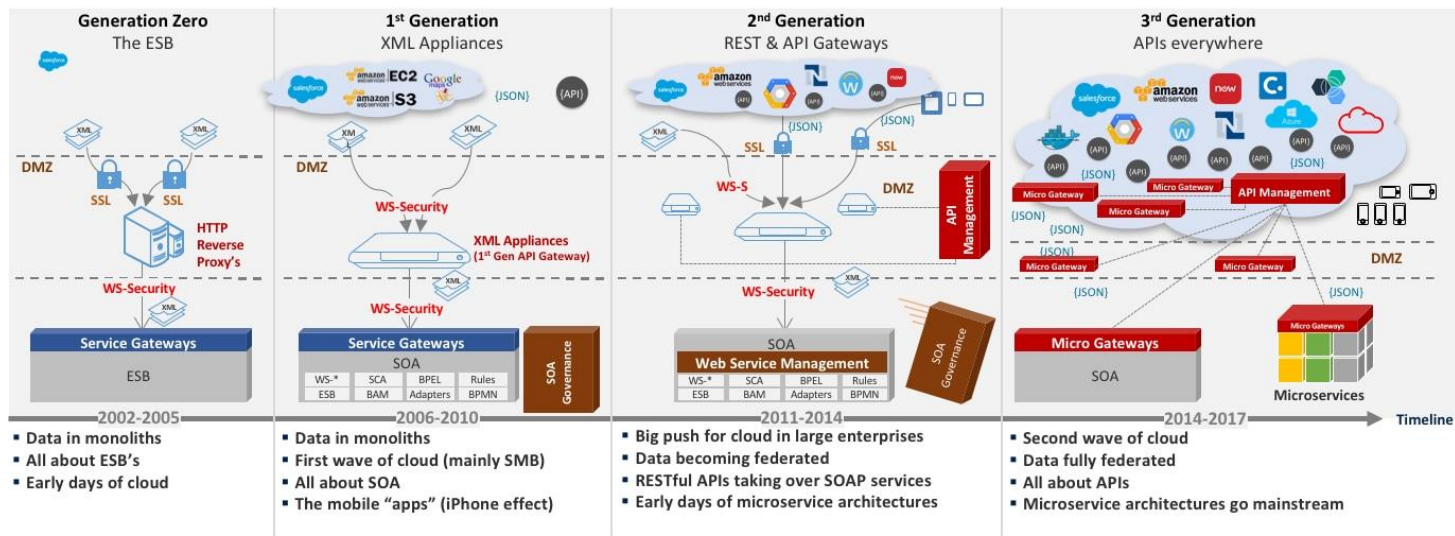
APIs cannot replace integration!

Let integration solutions do the “plumbing”, place your API management on top of it

Divide your needs, conquer requirements!

API management!

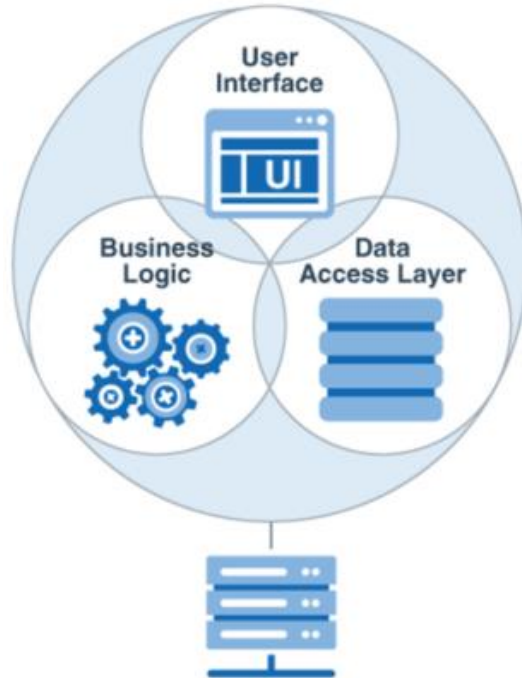
Generations



As seen by Luis Weir, Director of Software Development at Oracle

(Sleeping) Beauty and...

Monolithic Architecture

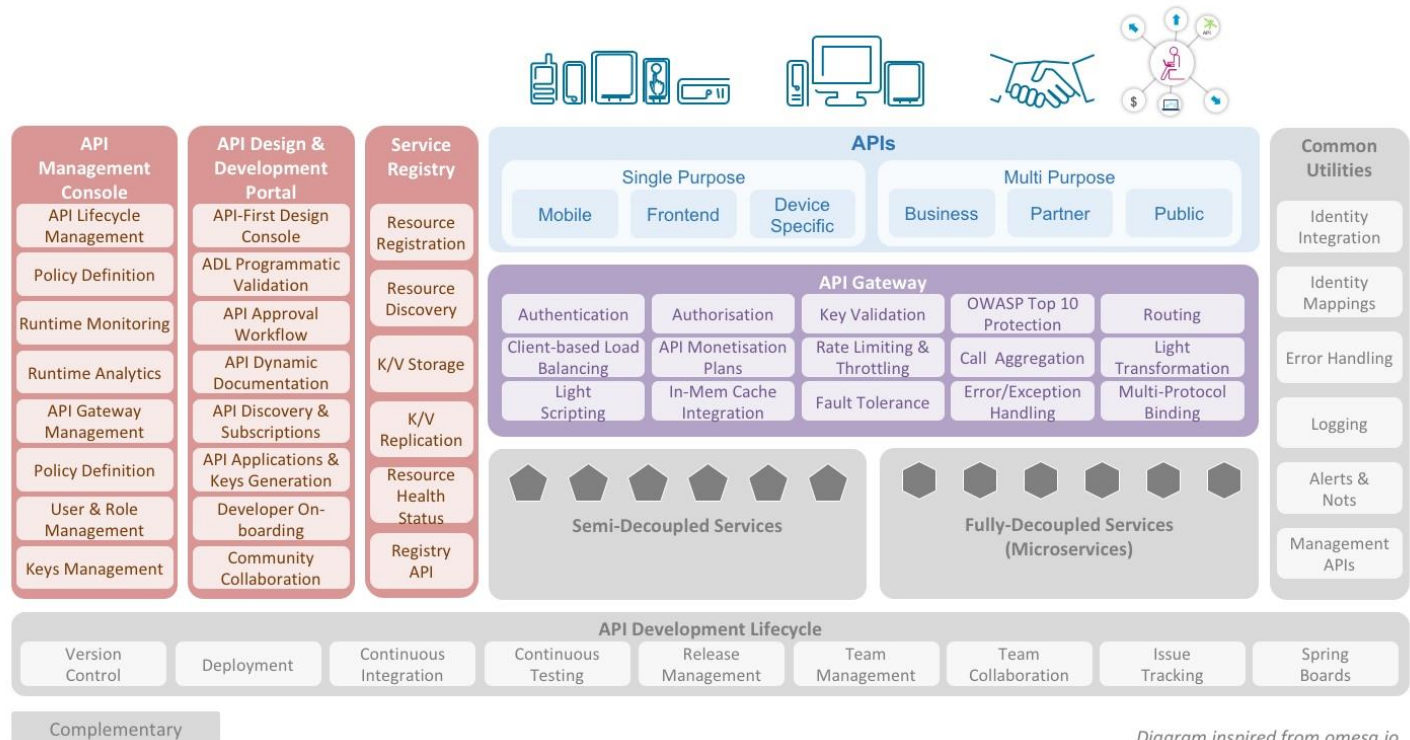


Most significant characteristic:

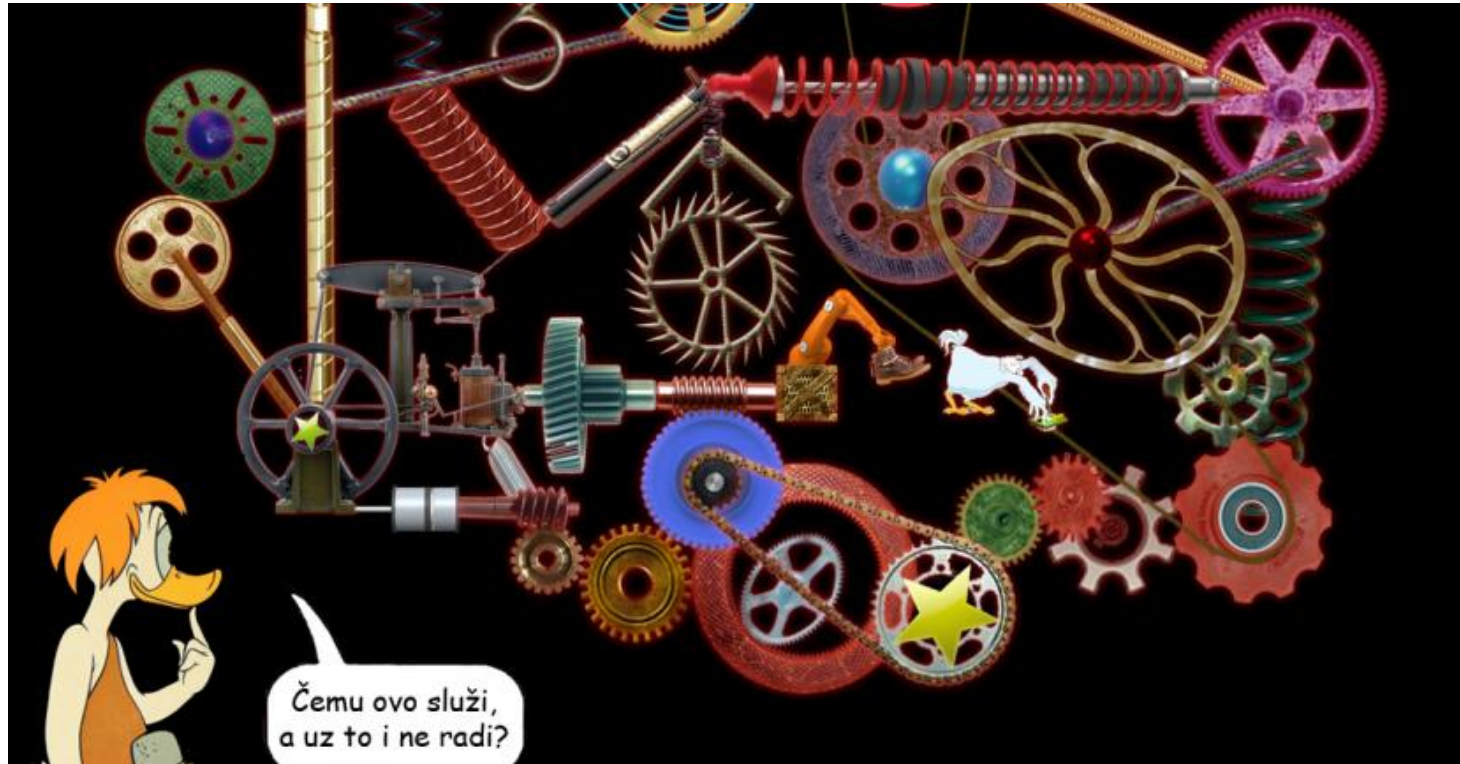
IT WORKS!



...and the Beast



At first sight...





Expectations

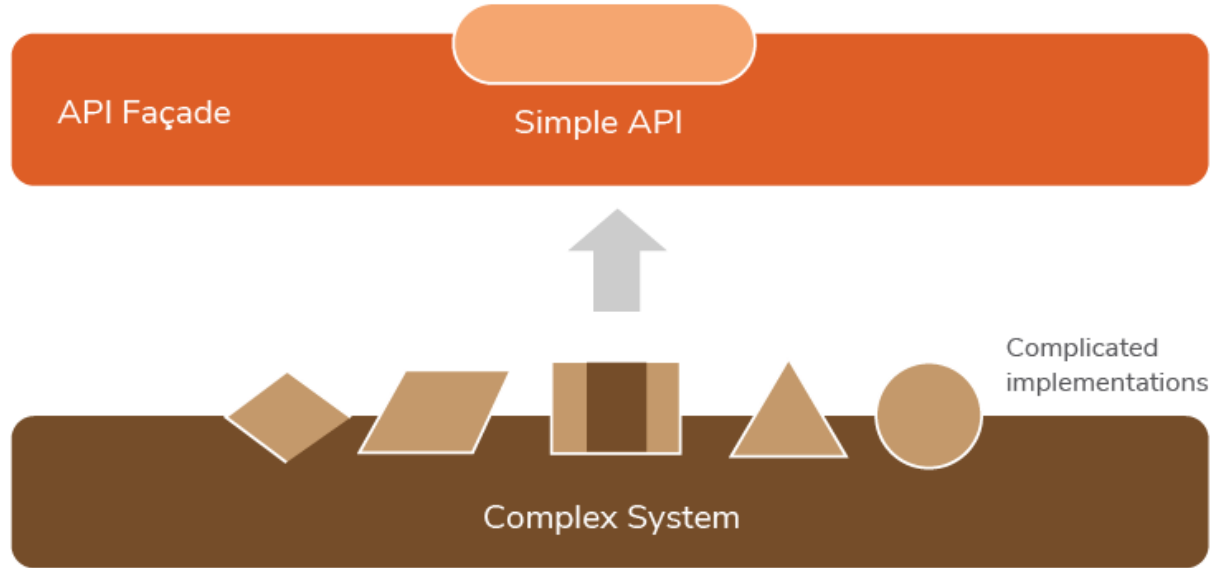
- APIs anywhere (in any vendor's cloud or on-premises)
- A self-service developer portal
- *Gives information owners full visibility and control over their information by letting them decide how and by whom their assets are accessed*
- Delivers strong security to protect information assets against all major threats
- Is lightweight, appliance-less/ESB-less
- Suitable for Microservice Architectures -- ideally, using containers



Expectations

- Can scale easily
- *Is centrally managed regardless of the number of gateways, APIs and their location*
- *Makes meaningful use of statistics so operations data can be used to gain business insight and not just to monitor and troubleshoot*
- Is subscription based, with no CPU-based licensing

API Façade Pattern






Expose a business functionality without the underlying complexities

Retain management capabilities on the business level

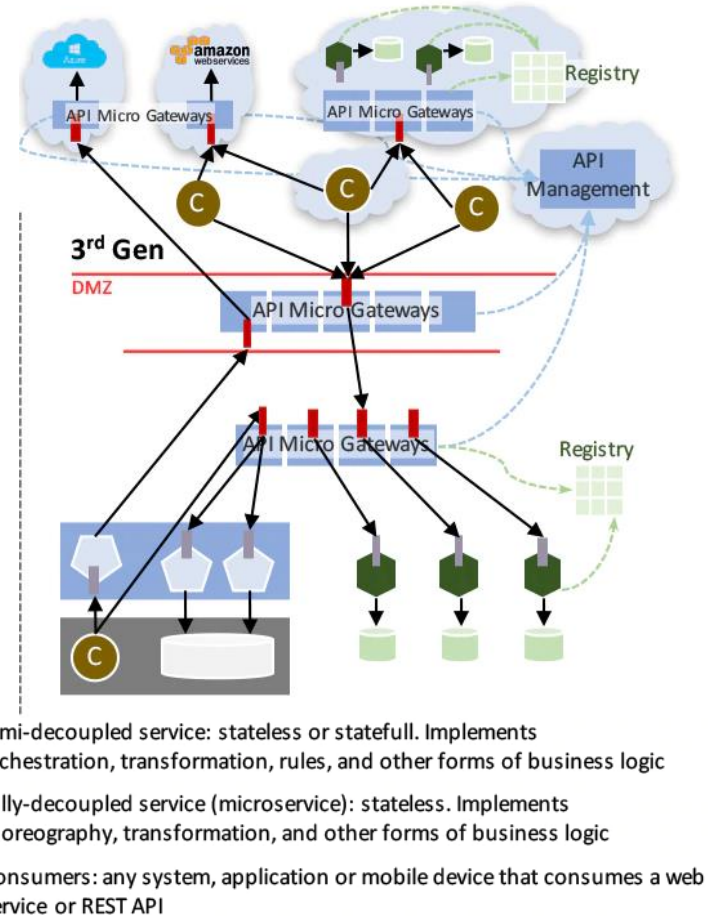
Logical division

All roads lead to...

API management

-  Web service policy enforcement point
-  Managed API: endpoint with policies applied
-  Unmanaged API: endpoint with no policies applied

Where have the layers gone?





API management

- API Discovery (Catalog, Search and Provisioning)
- API Security (SSL, PKI, threat protection, schema validation, encryption, signatures, etc)
- API Identity (API key, OAuth, LDAP, proprietary IAM, token translation & management)
- API Orchestration (adaptation of multiple services, workflow operations, branching policies, etc.)
- Uniform interface/proxy to multiple backend messaging protocols (JMS, RMI etc)
- Operational Integration (System Monitoring, Clustering, Scalability, Migration)

An abstract network diagram on a black background. It features a complex web of green lines connecting various nodes. The nodes include small green circles, larger green cubes, a green cloud, and a prominent green ship's wheel. The overall aesthetic is futuristic and technological.

API management

- Community Management (Blogs, Forums, Social features)
- API Lifecycle governance (Versioning)
- Traffic Mediation (SOAP to REST mediation, data format transformation, legacy application integration)
- Traffic Shaping (Rate limitation, Caching etc)
- Analytics & Traffic Monitoring
- API metering, Billing and Monetization
- Data Protection (Data encryption)
- Mobile Optimization (Pagination, Compression, JSON etc.)
- Deployment Flexibility (on-premise, cloud, managed service, SaaS, hybrid)



API management is today's news!

- Mulesoft Anypoint Platform
- Apigee
- Azure API management
- Kong
- SwaggerHub
- CA API management
- WSO2 App Cloud
- Akana
- SnapLogic
- Mashery
- Postman
- Agama API
- Dell Boomi
- Apiary
- Oracle API Manager
- Google Cloud Endpoints
- Tyk
- Cloud Elements
- Red Hat 3scale
- webMethods
- AWS Cloud Trail
- Sentinel
- SAP Cloud Platform
- ...



To all colleagues still awake

Thank you for your time!

Brainstorming email: milos@coming.rs