Deloitte.

API-enabled digital ecosystems

The next growth driver
April 2021

Contents

Foreword

Application Programming Interface (API) enabled digital ecosystems are fostering because a business can package the functionality as an API product or attribute, making it available for an entirely new use case that could not have been anticipated by the API's publisher. This has further been acknowledged and accepted by industry leaders, governments, regulators, and developers alike.

For example, an enterprise products and services firm can launch a digital partner platform through a series of APIs. As a result, companies will be able to directly apply for commercial products and services online using the firm's digital properties or third-party partners. The firm uses APIs to expose its business capabilities to a digital ecosystem that invites partners to participate in the co-creation of monetary values. This has further been acknowledged and accepted by industry leaders, governments, regulators, and developers alike.

OpenID Foundation has created a popular digital ecosystem that is a legal entity providing infrastructure to promote and support expanded adoption of OpenID. An open source community created OpenID to solve the problem of disparate identities or credentials for logging into multiple websites. OpenID is a decentralised ecosystem open for everyone and controlled by none. People can use OpenID to offer their customers an easy way to login to their own websites or even become OpenID providers themselves. The free access (without registration or approval by any organisation) has led to the rapid adoption of the ecosystem with more than one billion OpenID-enabled user accounts and over 50,000 websites accepting OpenID for logins. Several large organisations either issue or accept OpenIDs, including Google, Facebook, Yahoo!, Microsoft, AOL, MySpace, Sears, Universal Music Group, France Telecom, Novell, Sun, and Telecom Italia.[1]

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[1] https://openid.net/what-is-openid/
    https://www2.deloitte.com/content/dam/Deloitte/au/Documents/financial-services/deloitte-au-fs-open-banking-why-apis-matter-260418.pdf

API-enabled digital ecosystems

API is a set of routines, protocols, and tools needed to build software applications. An API specifies how software components should interact and provides building blocks, making it easier to develop a programme.
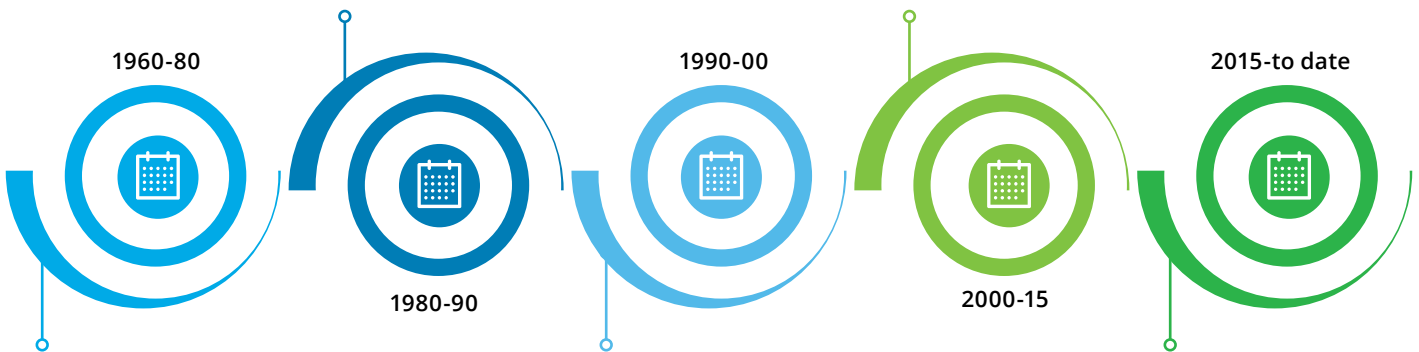
API economy in today's context

The ability to innovate at an unprecedented pace is the key to be successful in today's dynamic digital space. In the past few years, many businesses have realised that APIs are an effective way to enable the digital transformation of their enterprises. This has increased focus on the API economy that can be explained below:

In today's digital world, organisations have the ability to use their systems, processes, and data by publishing an API to create value and potentially a revenue stream for both themselves and their business partners. The multiplication of this effect across organisations and industries gave birth to an economy known as the API economy. This led to the creation of value that not only operates independently but also enables the creation of new and unique applications from a combination of several APIs fueling novel and innovative business models.

- **Shift:** Creation of interfaces with function & logic
- **Techniques:** Point-to-point interfaces, screen scraping, RFCs, and EDI
- **Functionality:** Information shared in meaningful ways allowing remote interaction across a network

- **Shift:** APIs were built to enable and accelerate new service development and offerings
- **Techniques:** RESTful services, API management
- **Functionality:** API layers manage the OSS/BSS of integration and API management leading to monetisation opportunities

1960-80   **1990-00**   **2015-to date**

1980-90   **2000-15**

- **Shift:** Basic interoperability enables the first programmatic exchanges of information
- **Techniques:** ARPANET, ATTP, and TCP
- **Functionality:** Simple interconnect between network protocols

- **Shift:** New platforms enhance exchanges through middleware
- **Techniques:** Message-oriented middleware enterprise service bus
- **Functionality:** Tools manage the sophistication and reliability of messaging

- **Shift:** Development experience and community management; cloud-based API management
- **Techniques:** Integration as a service, cloud orchestration, Industry Standards
- **Functionality:** Centralised API management creating API ecosystems that has enriched monetisation opportunities

Source: Deloitte Research

As the API economies have evolved, API ecosystems have emerged. The best example to understand the API ecosystem's current state is food delivery from a small restaurant using a food delivery aggregator to deliver food across the city. A global food delivery company could successfully integrate APIs, maps, analytics, restaurant directory, payment gateway, and push notification within its processes. It also created a unique product for end-users that can be availed through a mobile application. In addition, this innovative API integration has changed the entire food delivery industry for everyone.

Broadening use of APIs

The idea behind APIs has existed since the beginning of computing. However, in the past 10 years, they have grown significantly not only in number but also in sophistication. They are increasingly scalable, monetised, and ubiquitous. APIs' evolution can be broken down into the following eras:[2]

Overview of API-enabled digital ecosystem

Mutual value creation fuels platforms, marketplaces, and ecosystems. The API ecosystem is primarily made up of the following elements:
- Business ecosystems are made up of partners, individuals, start-ups, and customers that access business services from a digital platform that organisations provide.

- The business ecosystem partner creates a new solution from these services and decides to provide or sell it through an organisation's digital marketplace (with access to customers).
- The organisation can provide its solutions through other partners' digital marketplaces or platforms.[3]

Developer portals are incredibly important to the API economy because they are the API provider's face in the developer's world. They are the first step in building an ecosystem.

Think big, start small, and scale fast

The API landscape is rapidly changing and today's key challenges are not easy to address. Companies need to have a vision, perform with the agility of small companies, and be more innovative.

Plan big, start small – Have a strategic vision and start with a pilot. Make a conscious decision that the business owns and runs the programme to ensure that its full business innovation potential is realised.

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[2] https://www2.deloitte.com/content/dam/Deloitte/us/Documents/finacial-services/us-fsi-api-economy.pdf
[3] https://www.gartner.com/document/3773963?ref=solrAll&reval=23

Figure 1: Components of an API Ecosystem

Source: Digital Marketplaces for a Platform World (Published by Gartner on 28 July 2017. ID G00326470)

Build it for partners – APIs need to be built for consumers, partners, and internal business lines. For external partners, including a developer community, providing necessary support in terms of documentation, code samples, testing, and certification tools is important.

Security is the key – APIs expose data, transactions, and services to risks; sensitive data and IP may be compromised. APIs built on solid security foundation are cornerstone of the programme, and must be solved without limiting growth potential and innovation.

No silver bullet – The API journey involves various decisions and trade-offs. Multiple vendors offer API management platforms with different capabilities and features. It also requires a detailed analysis to justify investment.

Embed it in the culture – Thriving external developer/partner ecosystem spurs further innovation and opens up new revenue streams. Develop in-house skills and use tools such as DevSecOps for continuous integration and automated testing.

Partnerships and monetisation

APIs are the cornerstone of what is widely seen as the next iteration of business development and revenue generation, where having well-developed APIs establishes and maintains relationships in a digital economy. APIs are the wholesome version of a web presence, allowing others to access and integrate data and resources into public or private sites and applications.

Identify the right partners and forge the right alliances

Digital has led to novel business models to improve efficiencies and increase profitability by delivering a unique value proposition at an improved margin through identifying the right partners and opening new pathways essential for innovation and growth.

With APIs coming into picture, the traditional way of forming alliances is giving way (physical asset alliances) to "new age " digital alliances where engagement terms are clear, automated, and scalable. A global airline alliance where multiple airlines (5) share physical resources, thereby offering customers a broader set of destinations, and options to collect and use mileage points across those airlines. However, with increasing digitisation and API-based alliances, customers can access different resources where engagement and revenue-sharing terms can be automated. For example, an online travel aggregator's publicly described APIs enabled the integration of huge amounts of data across multiple partners. These partners included competing airlines and thousands of other service providers, thereby seeking more marginal benefits when a partner on-board.

Similarly, a music streaming giant emerging in local markets decided to shift its focus from accepting only global payments to adding support for more local payments. The payment method for the streaming giant was supported in the following three stages: the client with the checkout page, the payment backend, and the payment provider. To support the client with the checkout page, the streaming giant collaborated with a payment platform, thereby adding multiple payment methods and currencies. For smooth functioning of the other two stages, it internally developed two smart API tools – checkout API for payment backend and billing API for payment provider. This helps provide automated alerts, leading to a faster response time to system issues.

Successful API platforms nurture their customers' businesses by entering into partnerships that can help provide the following: a better Customer Experience (CX) and product, benefits, pricing options, distribution and intermediaries, service model and channels, brand, and promotion.

Assessment and prioritisation of APIs and ecosystem elements

In the past few years, the API space has seen explosive growth and is rapidly evolving with the potential to unlock newer opportunities. As a result, 35 percent leading technology organisations generate at least a quarter of their revenue through APIs.[4]

The API economy fundamentally changes the value chain. It forces businesses to rethink their strategies, thereby expanding their horizon into new markets or developing/collaborating with other organisations to provide products/services that add value to business.

Figure 2: Growth of public APIs

Number of global public APIs available

< 400
2006

> 20,000
2019

API management market is estimated to grow at a

34.42% CAGR

Source: Deloitte Research

4   https://deloitte.wsj.com/cio/2019/01/09/the-api-economy-its-game-ti
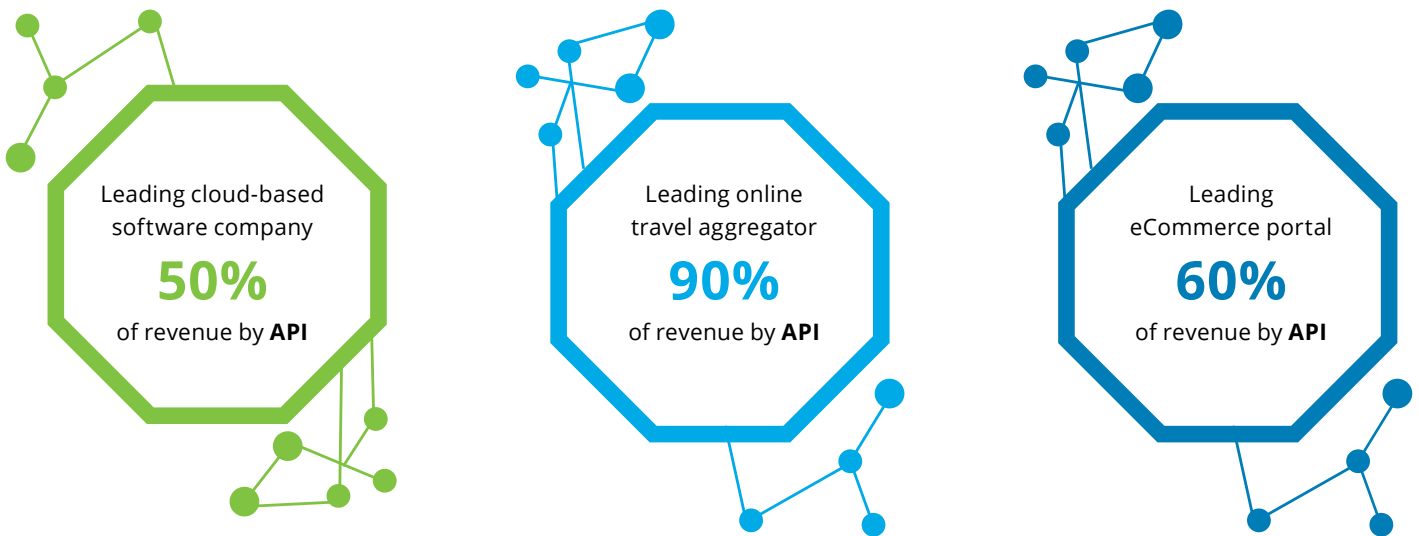
The API Prioritisation Framework aims to determine the level of strategic/commercial attractiveness and feasibility of API products. The framework is prepared by listing APIs in a storage base/catalogue, after factoring in both the addressable and potential markets. This list is then prioritised based on multiple parameters through a rating exercise across different metrics: size of prize, differentiation, practicality, and strategic. To arrive at the right measurement, multiple indices based on business readiness and current implementation capability will be defined to calibrate the final score.

Figure 3: APIs share of revenue

Leading cloud-based
software company
50%
of revenue by **API**

Leading online
travel aggregator
90%
of revenue by **API**

Leading
eCommerce portal
60%
of revenue by **API**

Source: Harvard Business Review

Figure 4: API Prioritisation Framework

Overarching framework prioritising current and additional or future API products

Prioritisation pillars and impact areas

Metrics scored and weighted

Overarching prioritisation pillars

Attractiveness
- Size of prize — Market demand (long term vs. short term) / Growth rate / Current revenue realisation
- Differentiation — Ability to win new / Ability to defend existing

Feasibility
- Practicality — Technology complexity / Existing relationship
- Strategic — Business readiness / API synergy (service offering) potential

Source: Deloitte Research

Need for an adaptive digital transformation framework

Digital transformation is an important element of business evolution. A digital economy means using APIs as a business development tool and a new go-to-market channel that can generate substantial revenues from referrals and usage fees.

As companies are developing new application-based services, they are also creating new digital touchpoints.

Each touchpoint, either an application to facilitate a new way to shop or one that improves customer service, gives companies data that they can use to connect better with consumers. While adding a new digital touchpoint, companies must ensure that it is connected to others in the network. With the right digital infrastructure in place, companies can ensure this connectivity and maintain greater agility.
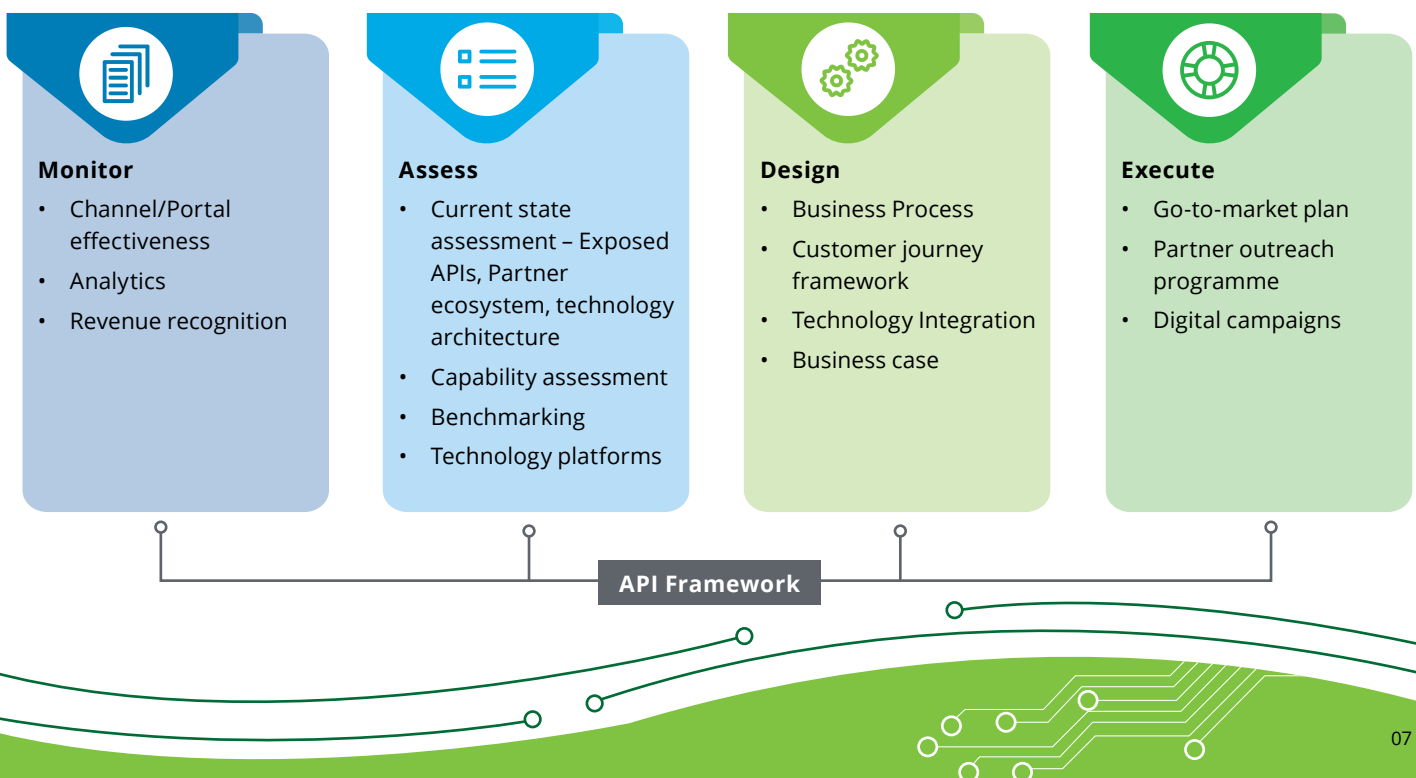
Case study

Using the above framework, Deloitte helped an African telecom client use its unique assets through a digitised acceleration programme. The programme helped the client find new business models for monetisation to drive revenue opportunities, partner engagement, faster time to market, and business innovation through the following:
- **On-boarding -** Manage application partners securely
- **Visibility -** Usage insight, performance, and monetisation
- **Security -** Access and assets protected and monitored
- **Agility -** Meet omni-channel business demands in a highly reusable automated environment
- **Scale -** Manage billions of disparate interactions built for the web

Issues faced by the African telecom were resolved by listing APIs by category and then prioritising them by revenue and ROI potential, and built an ROI template (including API performance monitoring metrics), thereby delivering the following:
- Three phases of prioritised APIs (50) based on attractiveness and feasibility
- Achieved a run rate of 5 million monthly transactions within six months of soft launch
- Reduced technical on-boarding time for partners through the API portal to five minutes
- Commercial on-boarding completed in five days through digitisation of the portal using APIs
- Strategic scaling framework, along with detailed go-to-market 30-day, 60-day, and 90-day plans
- Increased the number of partners considerably through marketing APIs – 10 large-scale partners live

Figure 5: Deloitte's Digital API Framework

Monitor
- Channel/Portal effectiveness
- Analytics
- Revenue recognition

Assess
- Current state assessment – Exposed APIs, Partner ecosystem, technology architecture
- Capability assessment
- Benchmarking
- Technology platforms

Design
- Business Process
- Customer journey framework
- Technology Integration
- Business case

Execute
- Go-to-market plan
- Partner outreach programme
- Digital campaigns

API Framework

Execution and benefit realisation of the API programme

Any great strategically planned APIs can fail without a robust plan, implementation, security, and governance in place. Therefore, equal importance must be given to every stage to maximise benefits from APIs.
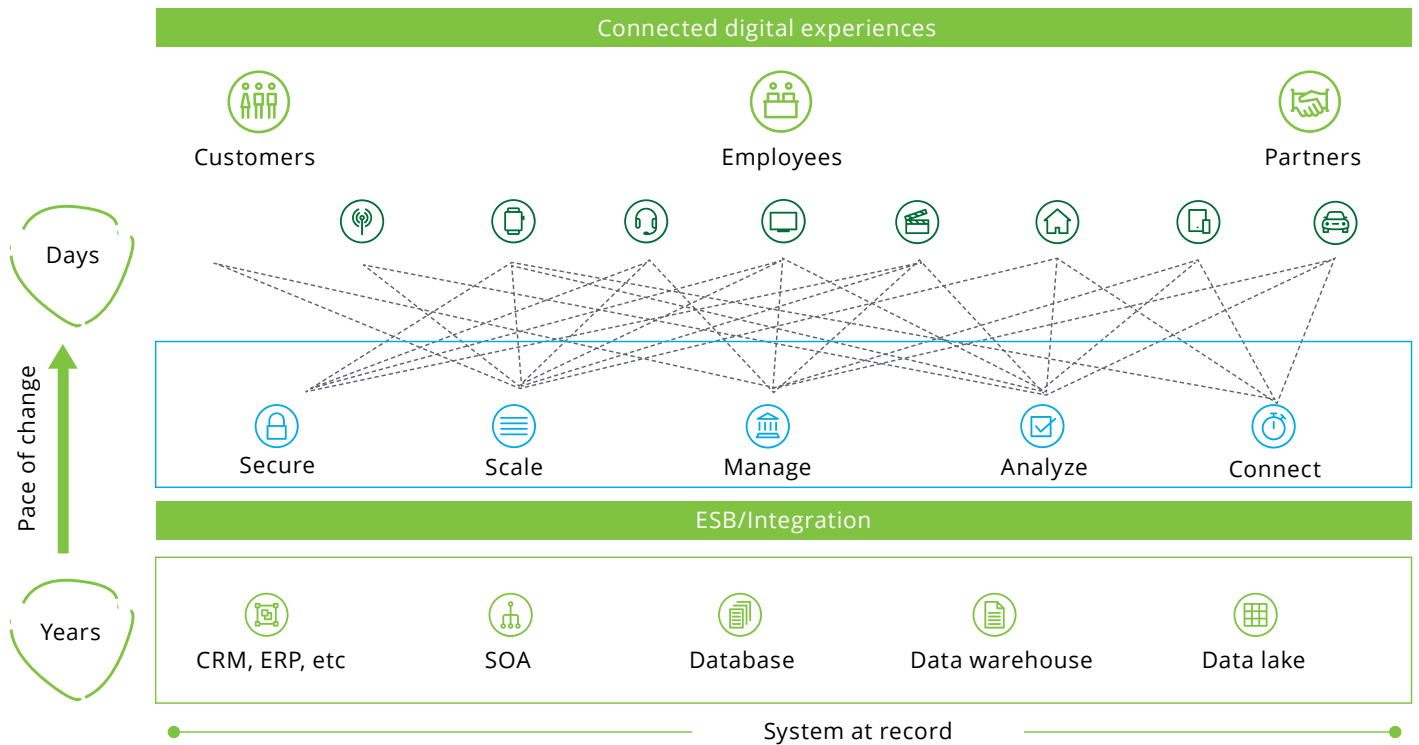
Planning the API platform and infrastructure

The right API platform, along with the right infrastructure, is critical in realising a long-term, secured, and scalable enterprise solution in the digital transformation journey. This involves the following:

- Understanding the client's existing business challenges and objectives

- Having enough visibility into the client's digital strategy roadmap and deeper insights of ecosystems such as partners, third-party integrations, user experience expectations, and details around security, monitoring, analytics, and cloud strategy.

A quick view of an API platform blueprint below:

Figure 6: API Platform blueprint

Source: https://community.apigee.com/questions/43660/what-is-an-api-consumer.html

API platform features/services are classified into below buckets:

- API management and client/partners' on-boarding
  - Out Of The Box (OOTB) features supported by the platform
  - Routing, caching, versioning, rate limiting, throttling, traffic, network management, and micro gateway features that can work with cloud native solution
  - Seamless partner, developer, client on-boarding, and other developer services, such as API publishing, documentation, self-service, and community management
- Identity management integration
  - Authentication and authorisation (OpenID, SAML, OAuth, and API keys)
  - Flexibility and extensibility of user management
- Performance, security, and scale
  - Third-party integration with security schemes and policies for different geographies
- Operations management
  - Health checks, server performance, policies and violations, analytics, logging, and monitoring
  - Business KPIs with analytics and dashboards
- Deployment model
  - On-premises, cloud offering, or a hybrid model using Kubernetes container services
- Monetisation
  - The most critical factor is whether the platform has the ability to support API monetisation features[5]

Choosing the infrastructure

After choosing the right API platform, opting the right infrastructure strategy is equally critical. If the infrastructure is fragile, even the best platforms will not scale and be unable to support the envisaged technology roadmap.

Below are a few key considerations to be made while choosing the right infrastructure:

Clients are moving away from the on-premises model to completely cloud or a hybrid model. Hybrid solutions provide for plug-and-play services to integrate on-premise or other cloud services with platform-specific runtime services on the Cloud.

An example of the hybrid model: MuleSoft re-strategised and redesigned its SOA platform to make it a hybrid model (a mix of the client's services running on its local data centre and mule runtime consoles on the cloud). Apigee also offers a hybrid model on the Google cloud.

Other equally critical key parameters for a best-in-class enterprise API platform are mentioned below.

- Ability to scale seamlessly (auto scale, scale per needs for regions and markets, etc.)
- Security of servers, services, and the platform as a whole
- Clustering/HA and DR capabilities
- 24*7 monitoring and health checks

- Container orchestration and seamless Continuous Integration (CI) and Continuous Delivery (CD) pipelines
- Operations and manageability

Implementing the API strategy

Implementing an API solution should be stringently based on the overarching API strategy that should be in place before the implementation phase.

Understand API value chain

Understanding the overall API value chain is important. A typical API value chain includes API provider, API consumer (developer), client applications, and clients themselves (both internal and external to an organisation).

API classifications

API architects/developers must have a clear understanding of the classification as mentioned below:

- Public APIs – Clients consumption for Northbound interfaces
- Partner APIs – Third-party and partner systems to be collaborated
- Private APIs – APIs and services meant for internal clients consumption within the platform and also for Southbound interfaces

Public APIs

These are for external consumption and client applications can access APIs provided security schemes are met.

Public APIs are predominantly based on OpenSpec, markets/brands/regions agnostic, and generate business opportunities.

Partner APIs

These are meant for consumption of third parties and partners, and help enterprises achieve larger footprints using an API-led community. These are also a great candidate for monetisation with various business models available.
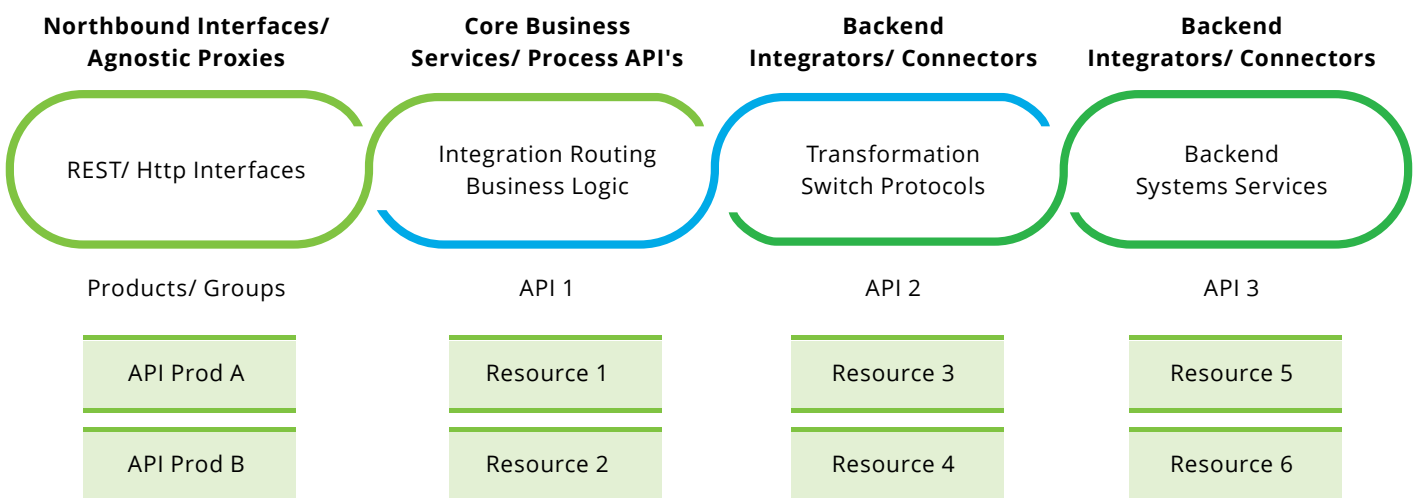
Private APIs

These help clients, developers, contractors, or partners more efficiently create apps for internal usage. Cost savings often represent the key driver as APIs allow new applications to be developed in a cost-effective manner.

API taxonomy

After classifying APIs, they should be aptly grouped to ensure right clients use these interfaces. Besides, the API taxonomy helps with monetisation by grouping API(s) as a product and providing the right set of access privileges (R/W/RW) to partners, clients, and developers.

- Each group:
  - Will have API(s) associated with it, that in turn point to the respective resources
  - Suitable access privileges are granted based on the client consumption needs
- Market/client applications are created based on grouping.

Figure 7: What is an API product?[6]

Northbound Interfaces/ Agnostic Proxies	Core Business Services/ Process API's	Backend Integrators/ Connectors	Backend Integrators/ Connectors
REST/ Http Interfaces	Integration Routing Business Logic	Transformation Switch Protocols	Backend Systems Services
Products/ Groups	API 1	API 2	API 3
API Prod A	Resource 1	Resource 3	Resource 5
API Prod B	Resource 2	Resource 4	Resource 6

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6 https://docs.apigee.com/api-platform/publish/what-api-product
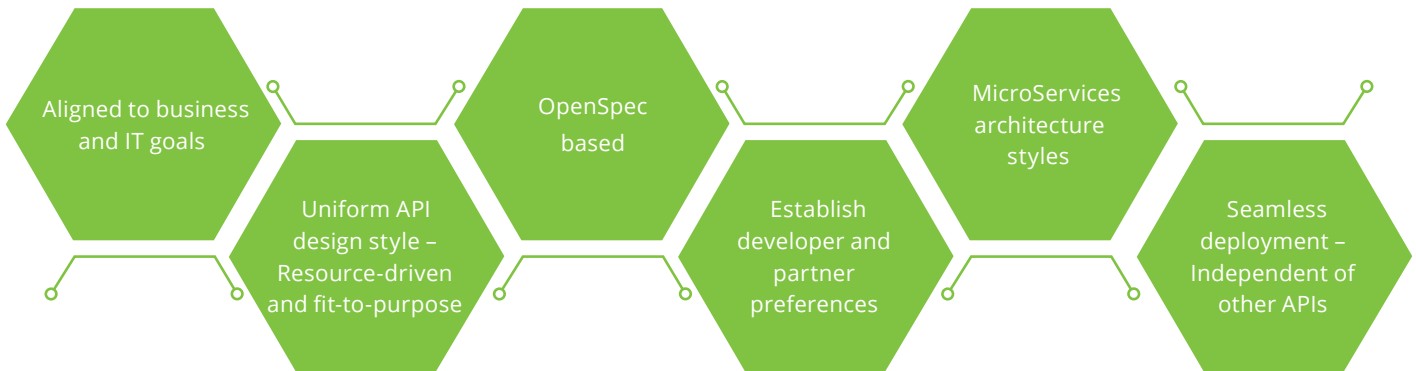
Some key ground rules mandatory for a good design and development of APIs are mentioned below.

Must haves of a good API design

- Aligned to business and IT goals
- Uniform API design style – Resource-driven and fit-to-purpose
- OpenSpec based
- Establish developer and partner preferences
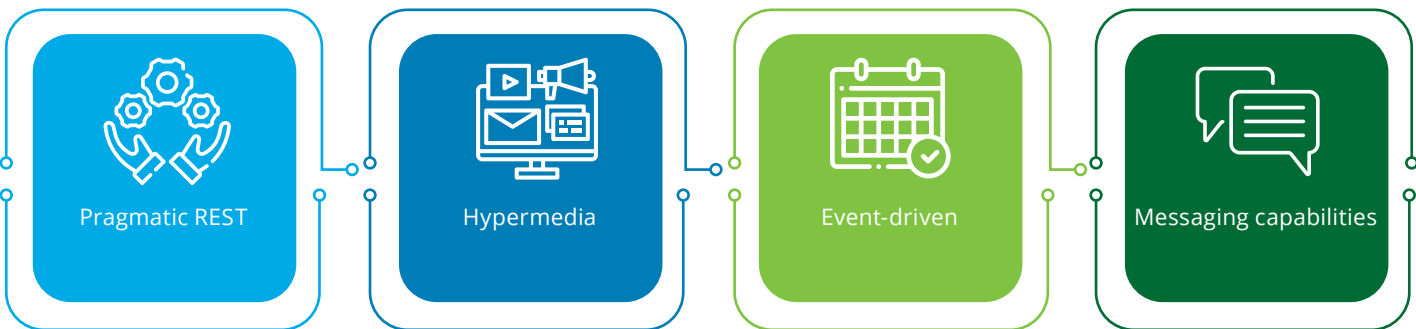- MicroServices architecture styles
- Seamless deployment – Independent of other APIs

Creating a good API

Successful API adoption depends on the extent of problems it solves for both business and IT. Hence, organisations' focus should be around consumers and the API should be simple to adopt.

API design styles

- Pragmatic REST
- Hypermedia
- Event-driven
- Messaging capabilities

Case study

The telecommunications industry is rapidly evolving and revenue streams for communications service providers are in transition due to challenges being posed by Over the Top (OTT) players. Our client, a major telecom player, was able to identify new business models for monetisation leveraging its unique assets through a digitised acceleration platform using APIs evolving into an API-first approach. The telecom major tied-up with 10 large-scale partners to increase their visibility.

The telecom leader was able to set up a robust digital API platform with high availability and scalability. It achieved a run rate of 5 million monthly transactions within six months of the soft launch. Deloitte was able to help the telecom player with technical on-boarding time for partners reduced to 5 minutes using the API portal.

System integrity and information security

Enterprise security is quite a vast topic; the scope of this write-up is limited to enterprise security around APIs alone and cover relevant details.
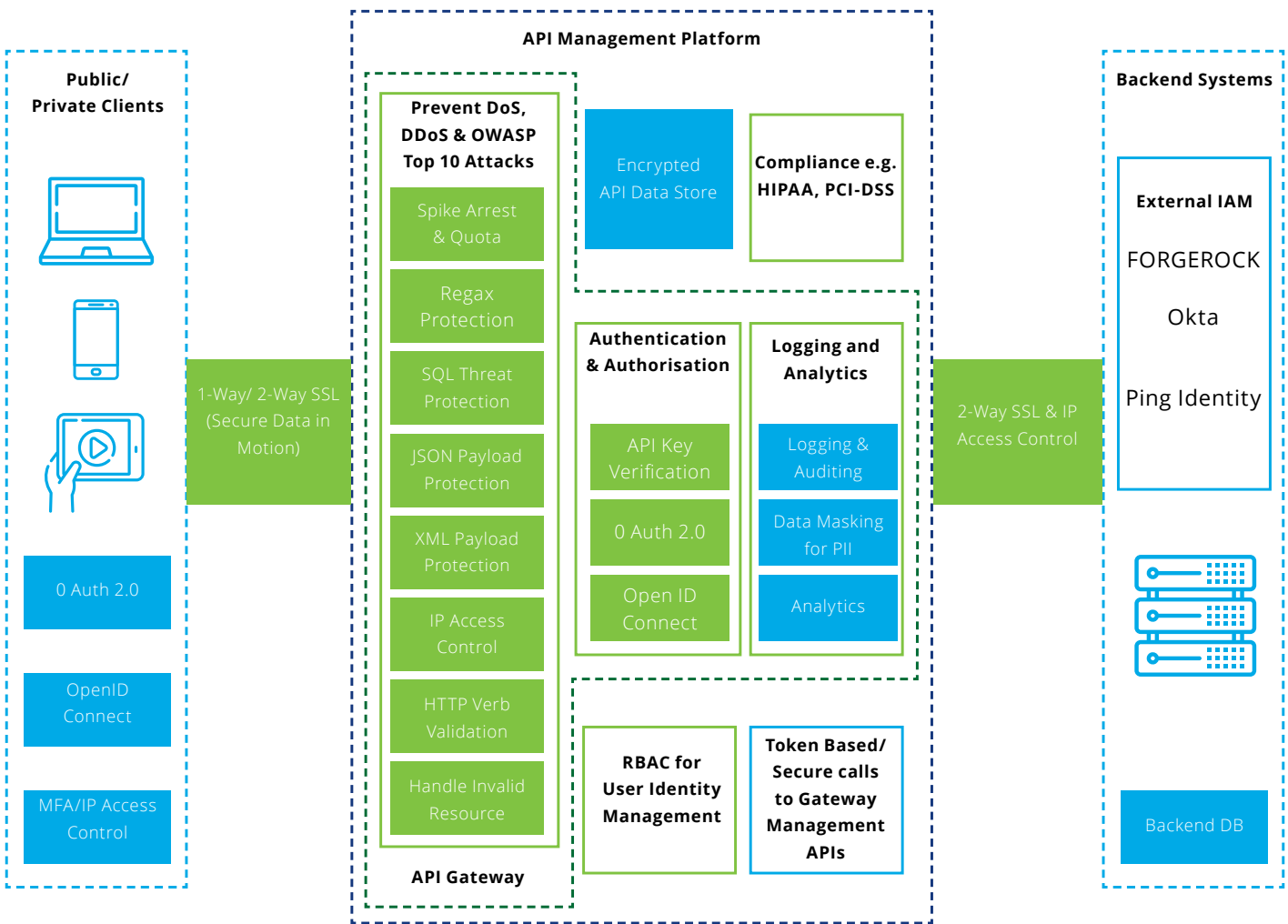
API security is an integral part of the overarching enterprise security schemes. The enterprise platform in a digital world, has the blueprint comprising components such as edge components, such as public internet, public cloud, firewall, CDN, and VPN and API gateways (public and private on a need basis), micro services, and downstream systems to name a few.

API security involving a public API gateway and internal micro services includes the following:

01 Between clients (public cloud entry) and the public gateway

02 Between gateway and internal MicroServices

03 MicroServices and downstream integration touchpoints

A reference security model of an enterprise platform involving pubic API gateway/management:

Figure 8: How do you ensure security[7]

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7   https://dzone.com/articles/how-do-you-ensure-security

The security schemes covering request propagation as depicted in the diagram are mentioned below.

Transport security

Transport Level Security (TLS) enables the privacy and data security over the network or transport.

Authentication and Authorisation (AA)

These are used in tandem using different security mechanisms:

- Authentication is used to identify an end-user.
- Authorisation is used to grant access to the resources the identified user have access to.

Open Authorisation (OAuth) and OpenID Connect are the most commonly used mechanisms to secure API endpoints using identity management servers. Users are validated against an identity system to exchange access tokens, which is further used to access API resources.

Security threats

The common vulnerabilities are mentioned below:

- Weak or lack of authentication and encryption
- Compromised client credential keys
- Data defeating compliance
- Insecure protection of storage assets (for example, AWS S3 buckets/folders, human intervention attack (threats relayed persistently hitting APIs by humans) by API injections (such as XSS, SQLi, and DDoS)

The following key measures need to be in place to address these attacks:

- Apply right security policies:
  - Rate limit policy at the IP address level
  - API key verification against a public API key
  - Quota policy (single or multiple quotas) to be applied to apply a limit on API usage
- Web Application Firewall (WAF)
  - Cloud services have OOTB firewall rules that help mitigate DDoS attacks
- Bot detection
  - Services/Bots to monitor the API traffic and identify illegitimate requests
- Payload validation
  - Regex protection, JSON input validation, XML input validation, and request validation

Privacy and security compliance

- Should have provisions to log actions
- Adhere to industry-wide compliance and restrictions such as PCI, PSD2, GDPR, and the data protection framework from MeitY and other statutory requirements

API governance

After designing, implementing, and deploying APIs, one needs to manage them to ensure business is not at risk. This mandates putting in place a stringent structural governance process.

What does API governance mean?

The governance framework (APIs in our case) defines terms and conditions for APIs, and ensures a high level of security and risk management in line with service level agreements signed with clients. In a large-scale enterprise, the governance framework will be a mix of stakeholders from different teams. Each team operates cohesively to achieve business and IT goals in an agile manner and deliver solutions in line with an organisation's risk appetite.

The team usually comprises the following:

- **Steering committee -** Sets vision and strategy, and manages overall governance
- **API organisation -** Guiding principles, roadmaps, and lifecycle management
- **Policies, standards, and procedures -** Defines operating model
- **Risk control and security -** Governance and controls
- **Technology and platforms -** Tech enablement and foundational services
- **Change management -** Business affects and dependency resolution, and change communications
- **Vendor management -** Manage vendor relationships

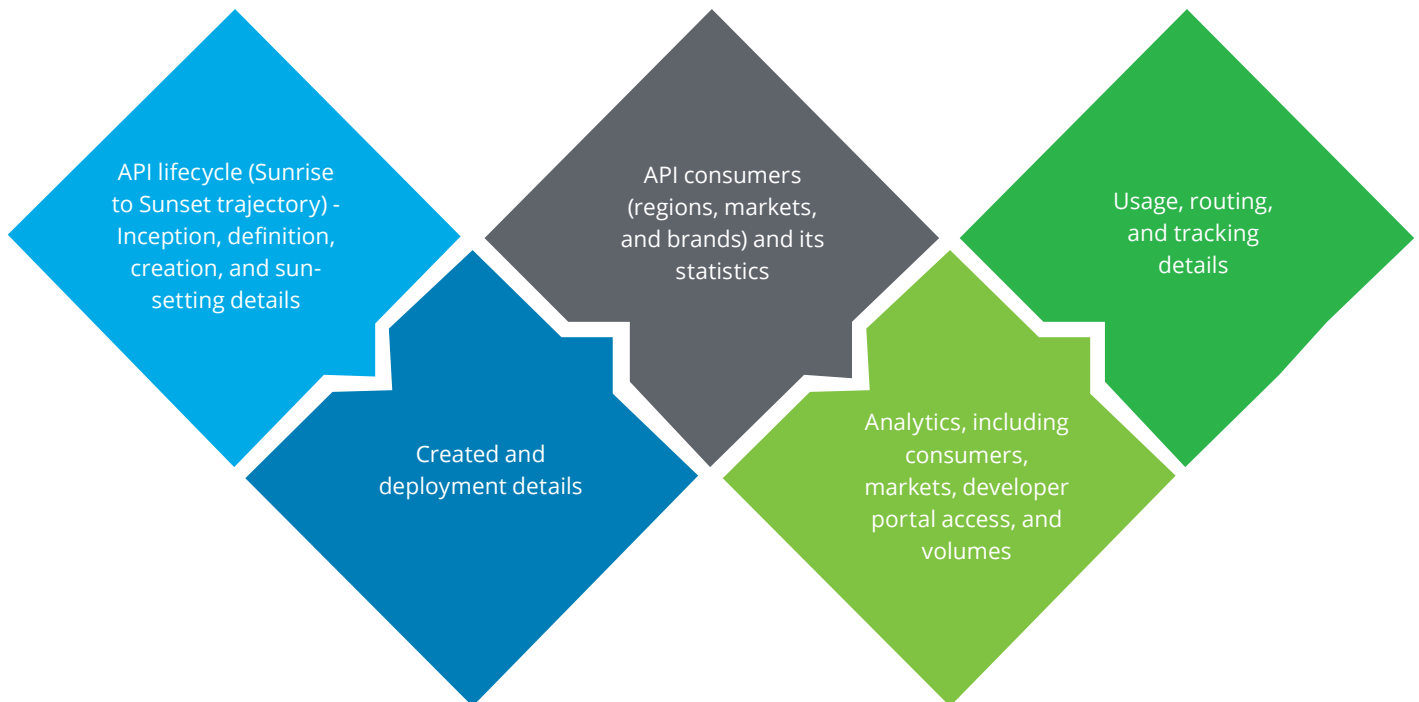**Figure 9: Deloitte API Governance Framework**

The following key KPIs help achieve goals using the framework team.

Business goals
The API governance provides analytics supporting the business value; captures service-tier subscription information; collects usage statistics; presents productivity metric dashboard views; and integrates with billing and payment systems.
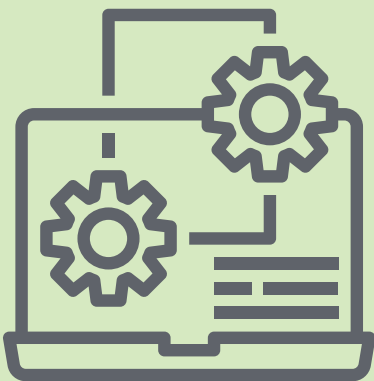
Some key business KPIs are mentioned below:

API lifecycle (Sunrise to Sunset trajectory) - Inception, definition, creation, and sun-setting details

Created and deployment details

API consumers (regions, markets, and brands) and its statistics

Analytics, including consumers, markets, developer portal access, and volumes

Usage, routing, and tracking details

The above-mentioned KPIs mandate that an API management solution should be configurable to enable Keep the Lights On activities that include the following:

- Service level agreements, security, policy enforcements, log, audit, monitoring, API subscriptions, and API meta data

Technical goals

Technical goals
- Best practices, API standards, and naming conventions
- Deployment/publishing (engineering methodologies with a shift-left approach using one-developer principles with the ability to move the code autonomously)
- Security standards include the following:
  - Securing client and API keys, and other credentials
  - Ensuring data is secured and compliant to industry standards (such as HIPAA and PCI)
- Logging and monitoring (regular monitoring of the infrastructure for server utilisation and threshold cut off); for example, use products such as data dogs, app dynamics, or Splunk for logging and monitoring

Ecosystems' management and growth

As APIs are being used every day, API management is a vital component that helps businesses cope with dynamic changes within and outside the organisation and deliver what various consumers and partners need.

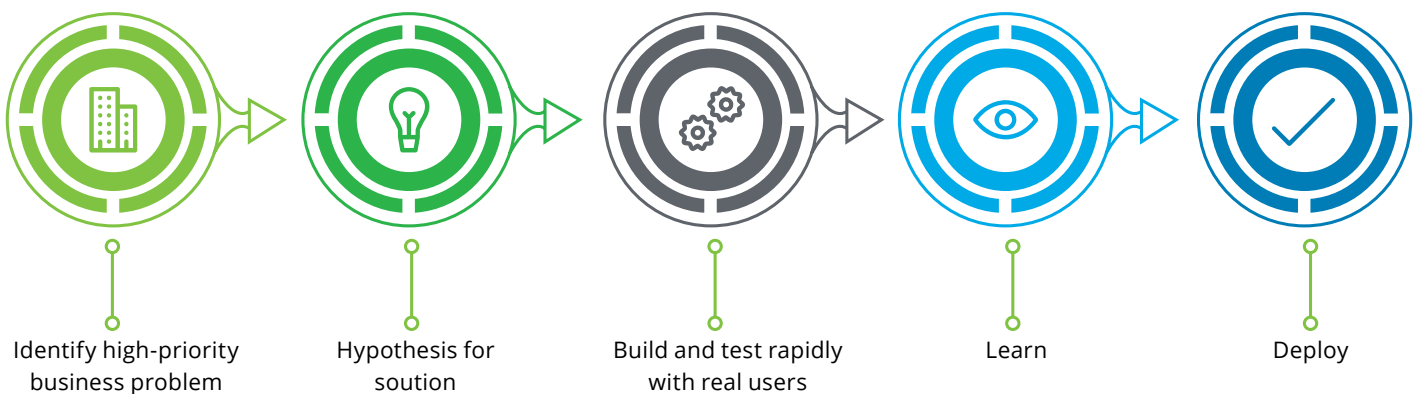**Enterprise agile PMO to support business transformation**

Enterprise agile PMO is a business transformation method based on iterative and incremental development, where requirements and solutions evolve through a collaboration between self-organising and cross-functional teams.

This method manages complexity, unpredictability, and change through visibility, inspection, and adaptation. It facilitates greater transparency and visibility to progress, and demands more discipline than traditional approaches.

The method helps deliver business value as it does the following:

1. Allows responding quickly to changing business needs

2. Reduces the time between problem identification and solution delivery

3. Avoids delivering with quality issues

4. Provides the flexibility to re-prioritise scope to meet evolving needsand objectives

Figure 10: Enterprise Agile PMO

Identify high-priority business problem | Hypothesis for soution | Build and test rapidly with real users | Learn | Deploy

Operating model required to manage ecosystems

Technologies are shifting value from manufacturers and distributors to companies that operate end-to-end platforms and provide outcomes as a service. For many enterprises, that means constant change and disruption, and an increasing threat of market obsolescence.

Operating models are ever evolving driven by feedback from employees and customers, the effectiveness of business processes, and competitive landscapes.

An operating model has nine key, interdependent components. These components are strongly influenced by, and will in turn influence, the enterprise culture and governance. These are financials, decision rights, performance, talent, sourcing and alliances, organisational structure, places, tools, and ways of working.

A change in the operating model will be the result of a change in components. Such changes will require a robust Organisational Change Management (OCM) system. OCM addresses the impact of change on people and organisations.

Project success is shown to improve with the addition of OCM practices by selecting approaches that align with the organisation's culture to ensure shared understanding, a common approach, and consistency in practice execution.

Role of analytics in unlocking the power of API-enabled ecosystems

APIs have become the mechanism of choice for connecting internal and external services, applications, data, identities, and other digital assets. As a result, APIs now have the potential to serve as a similarly valuable mechanism for analytics. They can also provide a significantly easier-to-use alternative to the traditional, ad hoc approaches to data collection and data analysis that have slowed the process of converting information into the intelligence required by today's data-driven organisations.

The data collected by instrumenting API activities can provide enough information to analyse and get a rich understanding of the organisation and its inner workings.

Further, updating the analytics capabilities can be achieved by updating the API management software—one system managed by a single group, rather than involving multiple systems and teams in the organisation. Data collected at the API layer could include information about the following:

- Request and response, including time stamps, headers, full message, message size, and request path URL
- Invocation, IP address, username, and user agent
- Processing, including time started, time ended, outcome, errors, API name, hostname, and protocol

What makes a strategic transformation succeed or fail?

Characteristics of successful transformations

- 64% built their budgets around and allocate specific company resources to their strategies
- 77% translate their strategy into operational mechanisms, monitor progress, and make changes
- Companies with top-quartile operating model indicators have five-year CAGRs 120 basis points higher than those in the bottom quartile

Characteristics of unsuccessful transformations

- Gap between strategy and execution culprit is usually an obsolete/misaligned operating model
- 60% do not link budgets to strategies, meaning resources and capabilities are not aligned to goals
- Executives leave old organisation designs in place, inhabiting change in responsibilities and processes

Sources: Marcia Blenko, James Root, and Nader Elkweet, "When weak operating models happen to good strategy, "Bangkok Post, April 2, 2015; Ron Carucci, "Executives fail to execute strategy because they're too internally focused," Harvard Business Review, Novermber 13, 2017

This data then can be used not merely by creating dashboards and reports but also to predict using complex analysis. For example -

- Detailed analysis of revenue and cost contribution by different business units, APIs, business activities, different customer segments, and geographies on an ongoing basis
- Trend analysis and forecasting of incoming and outgoing money flows based on trends and historical data
- Customer journey analysis that explores how the sales pipeline converts into customers and what activities have a higher likelihood of leading to conversions; fraud detection based on overall activities and individual customers when they deviate from normal behaviour

Use case

Over the Top (OTT) streaming apps globally have successfully used data to forecast concurrent viewership. Service providers integrate information obtained from various internal and external touchpoints with datasets on the cloud. They were successful in building a matrix of concurrent viewership and extrapolated that into requests per second targets for many critical path systems. The combination of both the new capabilities allowed them to better understand and create an optimal scaling plan for their applications.

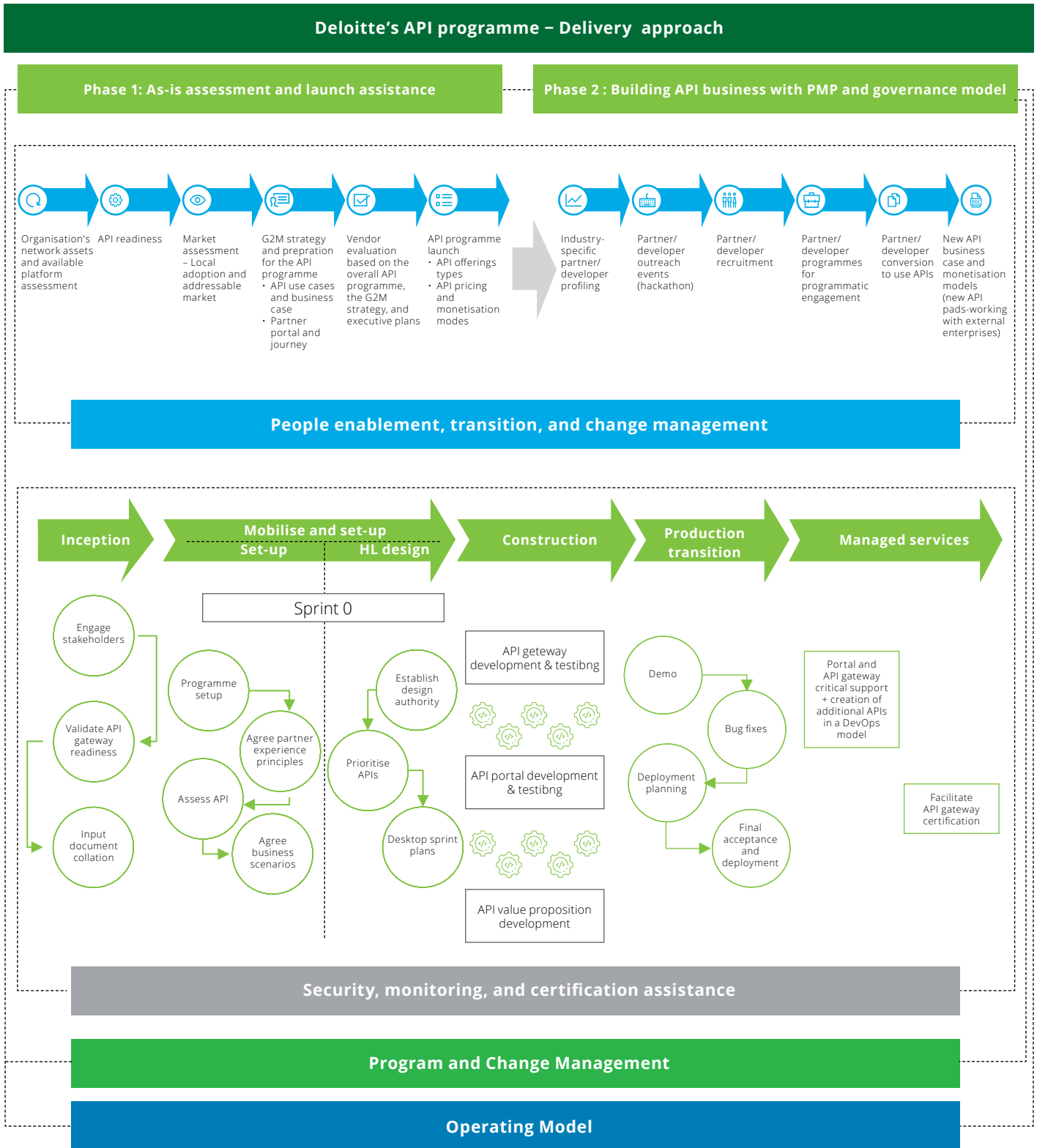### Sustenance of ecosystems' growth

Initial stages of adopting a new business model are known for the rapid pace at which companies develop innovative solutions to increase speed to market. This enables them to receive immediate feedback on prototypes and rapidly improve their products and services, making them more relevant

for their customers. However, when they scale they make it difficult to quickly adapt to innovation due to their sheer size and established processes.

Follow these steps to sustain ecosystems' growth:

- **Adopt an agile approach:** Go to market and iterate often. As you explore possible API strategies and use cases, consider using lightweight prototypes and rapid experimentation. This way, you can factor in feasibility concerns but you will not be saddled (at least for the time being) with the burden of "enterprise" constraints. As compelling ideas gain momentum, you can then shape your solution, refine the business case for it, and explore it at scale.
- **Enhance your talent model:** Just as aircraft manufacturers hire aeronautical engineers to design products and software vendors employ legions of coders with specific skills, companies must pursue API strategies to hire the right people or reskill existing people for the job.
- **Get to know the data you already have:** Many organisations have troves of raw data they have never used. By working with data scientists to analyse these assets before embarking on API initiatives, companies can better understand their data's current value. Data should not be valued based on the applicability today but also determine future value with a higher activity.
- **Create consumer experience/cost synergies –** Help create synergies for consumers by lowering their costs or create production/sales/service synergies for their offerings.
- **Competitive advantage –** Not competing with price, but through value will help create a competitive advantage as the willingness to pay will increase. The more sustainable the competitive advantage, the more difficult competitors find it to neutralise the advantage.

Figure 11: Deloitte API programmable delivery approach

Deloitte's API programme – Delivery approach

Phase 1: As-is assessment and launch assistance

Organisation's network assets and available platform assessment	API readiness	Market assessment – Local adoption and addressable market	G2M strategy and prepration for the API programme • API use cases and business case • Partner portal and journey	Vendor evaluation based on the overall API programme, the G2M strategy, and executive plans	API programme launch • API offerings types • API pricing and monetisation modes

Phase 2 : Building API business with PMP and governance model

Industry-specific partner/developer profiling	Partner/developer outreach events (hackathon)	Partner/developer recruitment	Partner/developer programmes for programmatic engagement	Partner/developer conversion to use APIs	New API business case and monetisation models (new API pads-working with external enterprises)

People enablement, transition, and change management

Inception	Mobilise and set-up		Construction	Production transition	Managed services
	Set-up	HL design			

Sprint 0

- Engage stakeholders
- Programme setup
- Validate API gateway readiness
- Agree partner experience principles
- Assess API
- Input document collation
- Agree business scenarios
- Establish design authority
- Prioritise APIs
- Desktop sprint plans

API geteway development & testibng

API portal development & testibng

API value proposition development

- Demo
- Bug fixes
- Deployment planning
- Final acceptance and deployment

Portal and API gateway critical support + creation of additional APIs in a DevOps model

Facilitate API gateway certification

Security, monitoring, and certification assistance

Program and Change Management

Operating Model

Bottom line

Over many years, companies have built up masses of valuable data about their customers, products, supply chains, operations, and more. However, they are not always good at making it available in useful ways. That is a missed opportunity at best and a fatal error at worst. Within today's digital ecosystems, business is driven by getting information to the right people at the right time.

Staying competitive is not so much about how many applications you own or how many developers you employ. It is also about how effectively you trade on the insights and services across your balance sheet.

In today's rapidly changing digital world, having an API first approach has become an imperative to become more agile and efficient, and create novel business models with platforms at its core. APIs enable the platform economy. Having a modular architecture using MicroServices allows for rapid scalable changes in an agile way.

Therefore, to ensure leadership in a world disrupted by the fourth industrial revolution technologies, APIs are the low hanging fruits that can help reap quick wins and build for future.

However, to realise benefits from API-enabled platforms and ecosystems, a futuristic yet feasible strategy needs to be created and substantiated with existing and potential partners to avoid inertia.

The strategy followed by flawless execution and fraud prevention laying the rails needs effective governance to keep the growth on track. Moreover, with that, continuous improvement and scale using analytics complete the circle for an organisation.

Glossary

API	Application Programming Interface		OOTB	Out of the Box
ARPANET	Advanced Research Projects Agency Network		OSS	Operations Support System
BSS	Business Support System		OTT	Over The Top
CAGR	Compound Annual Growth Rate		RESTful API	Representational State Transfer
CDN	Content Delivery Network		SAML	Security Assertion Markup Language
FI	Financial Institution		SLA	Service Level Agreements
FinTech	Financial Technology		SOAP	Simple Object Access Protocol
MSO	Managed Service Offerings		TCP	Transmission Control Protocol
OAuth	Open Authorisation		TLS	Transport Level Security
OCM	Organisational Change Management		VPN	Virtual Private Network
On-Prem	On-premises		WAF	Web Application Firewall

Appendix

OAuth

OAuth types

3-Legged - Involves three parties: the end-user (or resource owner), the client (the third-party application), and the server (or authorisation server)

2-Legged - Authenticated request without any involvement of the end-user

OAuth grant types
The framework specifies below grant types for an application to gain access token to get hold of a resource over an API call.

Authorisation code: Confidential and public clients use this code to exchange an authorisation code for an access token. After the user returns to the client via the redirect URL, the application will get the authorisation code from the URL and use it to request an access token.

For example, using this grant type is most appropriate in third-party authorisation (such as Facebook or LinkedIn) and credential authorisation to visit a particular website or an application

Client credentials: Clients use them to obtain an access token outside the context of a user. They use these credentials to access resources about themselves rather than to access a user's resources. For example, a typical website or an app where a user tries to fetch data for self over an API call.

Device code: It is used by browser less or input constrained clients to exchange a previously obtained device code for an access token. For example, uses in API invocations where devices such as TV are involved for streaming access.

Refresh token: Clients use it to exchange a refresh token for an access token when the access token has expired. This allows clients to continue to have a valid access token without any further interaction with the user.

Legacy types

Implicit – It is a simplified OAuth flow previously recommended for native/JavaScript apps where the access token was returned immediately without an extra authorisation code exchange step.

Password – It is a way to exchange a user's credentials for an access token. As this involves client management, the user's password must not be used by third-party clients. [8]

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[8] https://oauth.net/2/grant-types/

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