Identifying API use cases: Telecommunications industry

IBM

Executive summary

Many telecommunications enterprises are planning their journey and participation in the API economy. One of the most common questions from companies starting the journey is about the potential use cases within their industry. This paper focuses on several objectives:

- Identifying the common business drivers for API initiatives
- Describing an API identification methodology
- Supplying telecommunications-specific examples using the methodology
- Discussing the current state of regulatory requirements and industry standards
- Providing recommendations for starting an API initiative

Determining an API economy strategy and planning a roadmap offer significant benefits, including:

- Consolidating and standardizing common APIs—or simply business services—within an organization
- Lowering cost of operations by having a central repository and index of enterprise business services such as *retrieve credit score*
- Accelerating digital projects and improving time to market with safe, quick access to business services by both internal and external parties
- Identifying a partnership ecosystem—especially outside your own industry—for formulating new value-add products and services to be more competitive
- Defining new business models for monetization purposes such as the mobile marketplace; that is, curating your company's business capabilities aggregated with your partners' business capabilities to provide a diverse range of related or complementary services

This paper is intended for business and IT leadership in the telecommunications industry interested in jump-starting API initiatives by learning about industry use cases.

What is a business API?

API Application programming interface (API) is a very old term that has been used to describe technical interfaces for software programs where one software program calls another through its API. Often, these APIs were extremely complicated and not really meant for wide consumption. A few other software programs inside the enterprise might use the API to invoke the program; a partner outside the company might use it as well, but with great difficulty.

This long-standing definition is not what's getting businesses excited about an API economy. The excitement is instead around what is referred to as a *business API* or *web API* (although sometimes the additional qualifier is left off). These business or web APIs are easy-to-understand interfaces for a recognizable business asset—for example, a customer record, an account, a product catalog, a price, an order and so on.

A business API is a public persona for an enterprise that exposes defined assets, data or services for consumption by a selected audience of developers, either inside or outside your organization. Business APIs are simple for application developers to use, access, understand and invoke. And because a business API extends an enterprise and opens new markets, application developers can easily leverage, publicize and aggregate a company's assets for broad-based consumption.

Common business drivers for API initiatives

Companies that are executing successful API initiatives focus on one or more of four key drivers: speed, reach, Internet of Things (IoT) and domains.

- **Speed (also known as two-speed IT, bimodal IT or multispeed IT):** This driver focuses on allowing the business and IT organizations to run at different speeds. Traditional IT management of core systems of record can be changed at a certain rate. Trying to force rapid changes into core systems in the enterprise can result in outages or security exposures. Yet the business needs to react very quickly to new opportunities and competitive threats. It needs a higher rate of change than can be delivered by the controlled changes required to the systems of record. Using APIs, you can prepackage core system assets for consumption by the business to create new and innovative systems of engagement.

- **Reach:** To reach new markets and obtain new customers, you can make APIs available to other enterprises, such as partners who through their interaction with clients can generate additional revenue and new customers for your enterprise. For example, a wireless carrier can partner with a major media firm or sports entity to create a direct-to-customer media production for consumers to view on their mobile device.

- **Internet of Things or devices:** In many industries, devices are used in conjunction with APIs to provide new and innovative solutions. Because of the central role of communications in many IoT ecosystems, telecom companies are increasingly investing in IoT (or machine-to-machine) technology. They are targeting the monetization of additional connections and network traffic, and developing a variety of new services.

The combination of IoT/devices and APIs tends to work in one of three ways:

1. A device sends data via API call, such as a plug-in monitoring device in a car sending information about a teenage driver's behavior (braking and acceleration, for example) to the telecom company, which sends it to the driver's parents to view via mobile app. The service is charged on the phone bill.
2. A device is sent a command via API call, such as a security office issuing a command to pan a remote security camera to the right.
3. A device sends data through a non-API call using other technology such as MQTT—a high-volume messaging protocol and transport for telemetry devices—because not all data calls require an action. However, APIs can access the data inside the enterprise and look for or react to particular situations or events. For example, medical monitoring devices are constantly collecting and sending data. Data analysis is used to try to spot issues; if an issue is found, an API can alert the doctor and patient. Many telecom companies partner with their own business customers who have innovative machine-to-machine devices, such as industrial flow monitoring equipment, that require connectivity. APIs can be used to create flow threshold alerts for those devices.

- **Domains:** Typically, domains refer to interactions across multiple lines of business. They can largely work independently, but benefit from sharing data. APIs allow the data to be shared in a controlled, secured manner. Domains can also be seen as physical locations. Companies that have multiple locations, which may include cloud and on-premises data centers, sometimes use APIs as a method to secure and control the flow of data between locations. Considerations for regulatory and compliance constraints based on geographical and country specifications become evident.
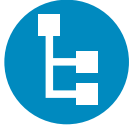
Businesses often start with a focus on the requirement for speed. After initial success in this area, they address the other drivers. It is not uncommon for businesses to benefit from APIs across all four drivers.

API identification methodology

Who should identify the business APIs? Figure 1 identifies several roles in a high-level organizational structure. Note that several people may be in each role, and a single person may be assigned to multiple roles.

A key role in the structure is the API product manager. The person or people in this role own the success of the APIs and the API initiative. Tasks associated with the API product manager role include:

- Working with the domain owners to identify desired business APIs to bring to market
- Working with the API developer to drive the creation of the API
- Reporting to executives on metrics
- Defining the product characteristics of the API (monetization, rate limits, audience and so on)
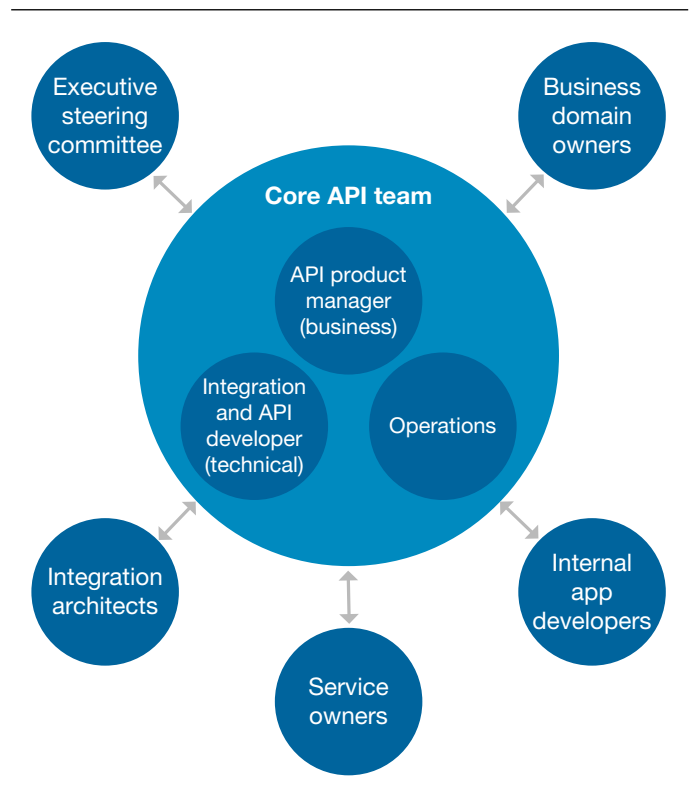- Communication

Figure 1. High-level organizational structure for an API development team.

Identifying good APIs is one of the most critical factors in achieving API initiative (and associated business) success. APIs must be focused on the needs of the consumer and should be simple. Three questions lead to a good API:

- Who is the audience?
- What do they want?
- Under what terms and conditions are you willing to make the asset available?

Notice that none of these questions ask or refer to the systems of record that will ultimately deliver the response to the API request. Many companies incorrectly define their APIs by looking at what the systems of record do and adding an API in front of them. This approach may simplify the process for the API provider, but it does not meet the needs of the consumer.

When identifying a candidate API, the API product manager needs to understand the API user being targeted (question one). The second question is probably the most important of the three. Understanding what the audience is trying to accomplish can result in the best API. If the definition is focused on consumer need, then the interface is more likely to be useful to that audience and also more likely to stand up to change (versioning). The third question is related to the policies you want to have around the API. What security measures are required to allow the API to be used correctly? Are there rate limits that must be enforced?

"The business of APIs: Best practices" white paper provides additional information on organizational structure and several other important topics. Download it here.

Once you have answered these three questions, the API product manager and API developer must work together and potentially iterate to define the API. The API developer needs to map the proposed consumer interface for the API to the back-end system of record interfaces—and possibly to many other systems—to provide only the desired result back to the consumer. New business logic may need to be added at a microservice layer in front of the existing systems of record. If the existing systems do not completely address the requirement, the API developer may have to write additional code to add business logic to the existing environment.

Next, consider six categories in which APIs are often used, along with these top questions that can help identify potentially useful APIs in each area.

- **Internal developers (mobile)**
  - What data and transactions would your own mobile apps need?
  - Does generic data exist that is the same for all app users, such as business locations, rates and so on?
  - Is there data specific to existing customers that should be accessible through your app, such as account balance or open account status?
  - What features of the mobile device—for example, the GPS or the camera—might be useful in conjunction with your APIs?
- **Partners**
  - What data and transactions do you share among your current partners?
  - Is partner onboarding a long, difficult process?
  - Would self-registration of partners be of value—increasing the number of partners and broadening geographic coverage, for example?

- **Public**
  - What apps might others write that could use your data and transactions?
  - What information are you currently making available on your website?
  - If there was a comparison app for you versus your competitors, would you want to be listed as an option? What data would the app need?
  - What other industries or processes might also use your products?
  - Think mashups: What other APIs might make sense with yours? Mapping? Social?
- **Social**
  - How do your systems interact with social media? Can you spot trends in social media and raise alerts or take action?
  - Can you gain insight on your brand and your competition through social media?
  - Can you do real-time analytics combining current customer status, behavior and history with social interactions?
- **Devices**
  - Does your company handle devices such as security or sports cameras, appliances, sensors or meters?
  - What scenarios can apply to the device? For example, needing repair/supplies, needing to send status information, controlling device behavior or enabling interaction between the device and enterprise systems.
  - How are you positioned to integrate the next UI technology, such as wearables like smart clothing or augmented reality glasses?

- **Data and analytics**
  - What data do you collect about your clients? Would this data be of value to a larger audience inside the enterprise?
  - Can your data identify market segments that would be of interest to a non-related industry? For example, identifying that expensive cars are often purchased in one neighborhood, or lots of child-related purchases occur in another neighborhood.

Identifying API use cases in the telecommunications industry

Now we will take a look at some examples that apply the API identification methodology to the telecommunications industry.

Internal developer (mobile app development)
General information
General information is information that is not tailored to the specific customer using the app. It may include information about the telecommunications company and its offerings, such as plan options, mobile phone models, accessories, store locations, ratings and reviews.

Custom information and transactions
This example offers information and transactions that are tailored to the customer using the app. Obviously, these APIs require additional security to help ensure appropriate access. APIs that fit this category may include:

- Checking usage data
- Assessing upgrade eligibility
- Checking account balance
- Paying a bill

- Changing account features
- Performing account maintenance (password, address and so on)
- Ordering new phones and features
- Monitoring order status and tracking

Mobile advantages

Customers using the app on a mobile device can benefit from using phone or tablet functions in conjunction with APIs provided by the telecommunications company. Users can take advantage of device functions such as the camera, GPS services, near-field communication (NFC) and digital wallet. Another mobile example involves using the store location list with a mapping API and GPS to provide directions to the nearest store and schedule service appointments. Customers can also use their phone's GPS geolocation capability with an API to locate family members.

Partnering

APIs help make it easy to do business with you. Telecoms can create a platform that other companies can build on using APIs. APIs can access services provided directly by the telecom or through partnership arrangements. Here are some examples of APIs that can be included:

- Content services: Streaming media, news and stock information
- Online services: Social media, video chat, messaging, search and shopping
- Technology services: Hosting such as cloud, caching and payments
- Connectivity services: Support for intermittent connectivity
- Device integration: Smartphone, wired telephone, tablet, computer and television
- Business services: Analytics, billing, accounting and coupons

Other businesses can build on these services to add value while relying on the telecom to manage the infrastructure and selected business services. Another API opportunity involves providing easy onboarding of partners to supply services and bringing on new partners for new capabilities.

Industry vertical partners can use telecom APIs to build business-to-business (B2B) offerings. Business customers may also want to take advantage of certain platform capabilities, such as billing services or messaging services that can be offered à la carte. Other industries can be attractive partners as well. For example, partnering with travel providers or planners can help customers with their phone needs when they arrive at their destination—driving plan upgrades to you.

Companies that partner with telecoms can provide real-time pricing for agriculture, commodities and securities. They can integrate with software that perform facial recognition of any person on your phone. Car reservations, television streaming and video rentals can all be integrated into a mobile device, TV or online offering for a new revenue source and customer benefit. Odd-couple partnerships can exist between telecom firms and companies such as publishing, photo sharing and energy-wise/smart-city firms. The list is endless … if the telecom company wants to explore the possibilities.

Public APIs

Telecoms can deploy many of the same APIs they use internally and with partners as public APIs to drive additional business and acquire new customers. For example, you may choose to make APIs available for a comparison app, enabling your company to compete for new business. Making available APIs to access plan offerings, accessories, phone selections and so on allows enterprising developers to create shopping apps that sell and offer the telecom's products.

AT&T, Orange, TELSTRA and Verizon APIs are available on the global developer platform portals for all these major telecommunications organizations. These APIs can assist developers creating programs that access their global communications infrastructure.

Extending your reach to other industries that can send business to you is a significant incentive for moving to an API economy. For example, you could offer people looking for holiday or birthday gifts some telecommunications alternatives along with gift options from other industries. By providing APIs to apps in other industries, the telecommunications provider has the opportunity to obtain new customers, not just support its existing customer set.

Uptime, security, load capacity and scalability are all concerns to consider when developing and testing APIs within the telecommunications industry. But they must be considered to an even greater extent when supplying or using public APIs. The world depends on telecommunications; if telecommunications halt, the world halts.

Many companies have made public APIs available. Here are a few telecommunications industry samples from ProgrammableWeb:[1]

- Humbug Analytics API: Connect any application or PBX to its service for in-depth reporting and fraud alerts. This API can authenticate phone numbers during call setup, submit PBX events for analysis, submit call detail records for analysis and more.
- Lipisha: Based in Kenya, Lipisha offers a payment platform for businesses that enables them to collect, process and integrate payments from customers and clients using mobile money such as M-Pesa or Airtel Money. This API allows developers to integrate with the Lipisha payments system. It also carries out a number of activities including creating a new payment account, querying for transactions, sending mobile money, charging a credit or debit card, transferring funds between different Lipisha accounts and more.
- Offline Geolocation: Allows cell phones to derive a location without being connected to the internet or data networks. The service is designed as a failover system when a user has no Internet connection because of roaming or coverage problems, and GPS has not been turned on or is not available indoors.
- Orange Telco Personal Cloud Storage API: A telecommunications provider's cloud APIs enable access to the personal storage of millions of its users who trust their telecommunications providers to automatically back up their important content including photos, videos, documents and music on any device, even while on the go. What does it mean? It means additional revenue streams to offset declining average revenue per user (ARPU). It means happier customers because good Net Promoter Scores (NPSs) are key.

- Recharge My API: An online mobile recharging, bill payment, and e-commerce platform that allows users to pay bills, manage payments and recharge their mobile phone airtime and data. This API allows developers to access and integrate the functionality of the Recharge My API with other applications.
- StreamWIDE Call Screening API: This API allows users to filter calls using acceptance and denial lists, time-based filters, behavior-based filters, delays on incoming or outgoing communications and more.

Social

The majority of interaction with social networks is through the smartphone; therefore, customer interaction on social networks should be one of the first areas telecom companies explore to determine opportunities for APIs.

You might already act as a consumer of social APIs from companies such as Twitter or Facebook, mashing up this information with your own APIs. Acting on specific mentions of your company and trends in social media can provide business advantages that enable you to take advantage of opportunities or head off problems. Among other things, you can combine Twitter feeds that reference your company with your own analytics to help determine if you must take action to rectify customer satisfaction issues or promote positive comments. A customer complaint that is quickly acted upon with an offer can turn negative comments into recommendations to do business with your company.

Check out IBM Bluemix for your API needs

If you are exploring the API economy and interested in public APIs, IBM offers the IBM® Bluemix® platform as a service (PaaS). IBM handles the security, management, operations, scalability and performance for telecommunications providers that place their APIs on its branded mobile marketplace hosted on the IBM Bluemix Cloud platform.

In addition, references to consumer or business needs might allow you to take actions related to your products. For example, searches or comments about network connectivity problems or broken phones might prompt you to offer phone options to promote satisfaction among your existing customers, or to convert a customer from a competitor's service. Or, social comments about planned international travel could indicate a plan upgrade marketing opportunity in addition to the direct partnering option mentioned previously.

Device integration and wearable devices

Telecommunications is an industry based on devices: the phone itself, cell towers, cable boxes and so on. These devices can provide usage and location data or act as a presence in the home to deliver services. For example, an unusually large number of devices in an area may indicate crowds to avoid while traveling or to target for marketing.

As commuters travel with their cell phones—hopefully using the hands-free feature—you can track their path for use with analytics. A fence API can be used to create a geofence to detect whether a user is within a particular area. Detecting whether a user is walking or driving is another option. And a cable box can be a point of presence in the home to coordinate home management systems—climate controls, lighting controls, home security systems and so on.

Despite being based on devices, the telecom industry is not tied to the telephone in its current form. As phones give way to wearable devices and whatever the next user interface will be, the value of APIs will allow companies to support the new interface with limited impact on existing corporate systems. Wearable devices are still in their infancy, but the burgeoning industry of fitness bands, sensored clothing, virtual reality goggles and more has tremendous opportunity for growth. Devices with embedded chips can be connected to the wireless network and billed by the telecommunications provider directly, or on behalf of their business customers. Examples include:

• Backup routers for business continuity and disaster recovery
• Sensors and modules within vending machines, parking meters and utility smart meters
• Handheld devices for inventory management and remote signatures
• Ruggedized field tablets and laptops and portable trackers for trailers or construction assets
• Supervisory control and data acquisition (SCADA) monitors
• Fleet GPS trackers

The growth for telecommunications lies in the rise of connected devices in industries such as manufacturing, energy and healthcare, and to be ready for the expected increase of connections to an installed base of 21 billion units by 2020.[2]

Data and analytics

Telecommunication companies gather data on their clients' behavior and often perform analysis to help identify marketing opportunities. Typically, the data and analytics are targeted to a specific internal audience. Through APIs, organizations can make the data and analytics more easily available to other internal audiences and provide additional value from data that has already been collected.

APIs can also provide access to the "dark data" that the brick-and-mortar telecommunications providers have hidden away in the back rooms. Giving developers access to this data helps them create applications that benefit and enhance customer and employee satisfaction.

Plus, telecoms are able to track mobile customers as they move between cell towers when commuting or traveling. Knowing common customer patterns can inform marketing opportunities and help organizations plan for changes in capacity. Firms can use that intelligence as a new revenue stream such as selling data to trusted third parties and other B2B firms—even outside the industry.

"The Internet of Things (IoT) API category will witness the fastest growth rate followed by SDM. ...The average volume of API transactions for a Tier 1 wireless carrier will significantly increment over the next five years eventually reaching 188 billion transactions a month on average."

— Mind Commerce, "Telecom Network API Marketplace: Strategy, Ecosystem, Players and Forecasts 2015-2020"[3]

Established telecommunications organizations can achieve cost efficiencies using network function virtualization (NFV) and software-defined networking (SDN). Simply integrating NFV and SDN into existing operational support systems (OSSs) and business support systems (BSSs) will not unlock the potential new revenue streams that virtualized networks offer. A need to exploit network virtualization and to drive new revenue streams from products and services exists that is not available today. An API initiative to create global applications that utilize the telecommunications provider's network value can facilitate competitive advantage.

APIs can also give third parties access to data assets in aggregate—for example, the data identifying commuting patterns (for a fee, of course) that was mentioned previously. For additional value, and with appropriate opt-in support, telecoms could target specific customers with offers from other industries. In addition to the commuting example, third-party access can also apply to home services offered through the in-home cable connection.

You can combine internal data sources accessed through APIs in conjunction with APIs to access the recent IBM partnerships with Twitter and The Weather Company to present a dynamic dashboard on a mobile app. This approach can also be used to create actionable insights for policy- and decision-makers and to develop marketing offers that can be pushed out in real time to specific users on their mobile apps for new promotions and increased sales.

Industry standards

The telecommunications industry is very familiar with standards. They enable the world to communicate across country boundaries and telecommunication providers. These standards have been in place for many years and will continue to be enhanced when new technologies and interaction tools emerge.

Business APIs are not expected to replace these types of standards for interoperability. However, business API industry standards are almost certainly in the future for telecommunications. The industry is very comfortable with standards and using them to provide value across the industry. Telecommunications organizations are expected to compete on value-add services that are integrated with their partner ecosystem, heightening digital engagement and personalizing offerings to their clients, but are not expected to have different API interfaces.

The IEEE Standards Association (IEEE-SA) agrees that developers should be offered additional education on building security into their initial designs, possibly implementing an attack tree or use-case security framework. Because there are so many types of APIs, no standard way exists to implement this framework. In Nice, France, Axiata, Bharti Airtel, BT, China Mobile, China Unicom, NTT Group, Orange, Telefonica and Vodafone agreed to an operator-centric API alliance and to adopt 18 open APIs designed to boost operators' digital capabilities. They adopted an API Manifesto that states, "As service providers, we recognize that by using, endorsing and requiring a suite of common industry open APIs, we can unlock a range of growth and efficiency opportunities."

As APIs become more accepted in the industry, the simplicity and speed to consume business APIs is expected to help drive adoption of standards more easily than the complicated options that have gone before.

Closing thoughts and recommendations

The telecommunications industry is becoming active in the API economy. Typical telecommunications API initiatives fall into the four primary categories mentioned previously: speeding new offerings and capabilities to market, reaching new customers and marketplaces, taking advantage of devices combined with analytics, and sharing assets across lines of business—that is, domains.

If your company has not started strategizing and planning for business APIs, the time is now. Do not wait until you know all the answers and have everything in place to get started—the market is moving too fast. Plan stages for the rollout, and then build on what you learn.

If you have already begun your API initiative, look to build on your successes and quickly identify false starts. Explore additional business drivers and use cases to obtain additional value for the business.

As we move into the API economy, huge opportunities exist for new and innovative solutions. IBM brings significant knowledge of the telecommunications industry and the API economy and would like to be your partner on your API journey. Let us share our expertise and experiences to help maximize the value for your enterprise.

To understand more about the IBM perspective on the API economy, visit the IBM API Economy and Digital Transformation websites. IBM API Connect™ is a complete foundation to create, run, manage and secure APIs. You can find more information about IBM API Connect at the API Connect website, and you can download a trial version of API Connect here.

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[1] Examples of public APIs came from a keyword search for "banking" on www.programmableweb.com. This information is not intended as a recommendation of these specific APIs, nor a statement about their capability or quality. ProgrammableWeb acts as a repository where any company can promote its public APIs. Consumers must evaluate the functionality and quality of any API and decide if it meets their needs before deploying.

[2] "Forecast Analysis: Internet of Things—Endpoints, Worldwide, 2015 Update," Gartner, December 15, 2015, https://www.gartner.com/doc/3178626/forecast-analysis-internet-things-

[3] "Telecom Network API Marketplace: Strategy, Ecosystem, Players and Forecasts 2015-2020," Mind Commerce, May 2015, www.mindcommerce.com/telecom_network_api_marketplace_strategy_ecosystem_players_and_forecasts_2015__2020.php

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