THE 6 KEY BENEFITS OF BEING AN API-CENTRIC ORGANIZATION

FOREWORD

Digital transformation is about more than adopting the latest technologies. It is about maximizing value by using technology to improve efficiency and productivity, drive engagement and growth, and ultimately make the lives of customers, partners and staff better. APIs play an integral role as the connectors between the systems, data, and people that enable digital transformation initiatives. This guide, the first in our series exploring API best practices, therefore focuses on what APIs are, how they work, and outlines six benefits they offer for achieving organizational goals.

Radical I/O is a people-first technology consultancy and lab in Vancouver, BC that specializes in data-driven enterprise software development with highly performant API architecture at its core. We understand that the needs of private and public organizations are continually evolving, and we enjoy working collaboratively with our clients and partners to create forward-thinking technology solutions.

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THERE'S AN API FOR THAT.

Apple famously trademarked their slogan, *"There's an app for that™"*, but with organizations of all sizes and from every industry undertaking digital transformation journeys, a better catchphrase might be: "*There's an API for that*".

APIs are foundational tools that support an increasingly connected world by providing a way for software systems to interact with one another. The most commonly understood role of APIs is within software applications - as a way of allowing the parts of an application to work securely with one another - but, with strategic thought and creativity, they can also be used to create new business opportunities, and to improve products, services, and operations. Whether your organization is in the early, developing, or maturing stages of a digital transformation, APIs are essential tools to help realize your vision and achieve your goals.

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WHAT IS AN API?

Software applications, scripts, and programs are usually created because an organization wants to provide a service. While many of us think of this in terms of providing a real service to a customer, in technical terms, a *service* refers to useful functionality within an application.

APIs are commonly used tools that perform these services. The term API is an acronym for "Application Programming Interface": the **application** is the software that contains one or more services; while the **programming interface** refers to the component that allows a software developer to integrate with that service.

We often use the word "application" to refer to the entire software system, but in this context it also refers to each of the software components that constitute that system. Taking a common system design as an example, within one system we might find two components: a web user interface (UI) and a backend processor that writes to a database. In this design, an API is often used to allow the web UI to talk to the backend.

The API, therefore, becomes the **boundary** between the parts, enabling the user to interact with the functionality that the API exposes, and not interact with the parts that it does not expose. The API can also, therefore, play a role in enforcing security and authentication, by permitting access only via an authorized request for the service.

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Here's a useful analogy: think of an API as being similar to a border officer at the airport. When you travel, you arrive at your destination where you are required to *request* entry by supplying the necessary travel papers and explain why you want to visit, then the border officer performs the *service* of deciding whether or not you may enter and provides you with an authorized stamp of approval or denies entry. With an API, we *request* data by supplying a data input message, then the API carries out the *service* of allowing you to have what you requested, or returning an error message.

The data access that an API provides is largely dependent on the *type* of API that is provided.

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TYPES OF APIs

There are four types of APIs:

- An **open API** provides unfettered external access to data without requiring authentication. For example, a government organization might use open APIs to readily share information with the public.
- A **public API** opens selected services to authorized developers, for example from an organization's partners or clients. This provides a mechanism for the organization to share and receive data beyond their own boundaries in an authorized way, allowing broader use of that data.
- A **private API** is used within an organization by their developers to integrate and leverage their own systems and applications, and to share information within that organization.
- An **internal API** is for use within one system. It is similar to the example mentioned earlier with the web UI and backend that interact via an API, but is used in internal-only systems processes.

It is important to note that a single service might be used by more than one of these API types at the same time, depending on the design and the application. The API type will also impact the security, privacy, and protection of the system.

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WHAT DO APIs DO?

An API defines the interface for application software. It is the code that defines the rules, data formats, and protocols to interact with that software.

From a technical standpoint, APIs permit access to the functionality of the data, without requiring developers to share the entirety of a system's codebase. APIs usually apply a simple common data format (called JSON) for any data exchanged, allowing software applications to communicate with each other, regardless of their architecture, location, or programming language.

> Essentially, APIs connect, facilitate, translate, and bridge. Most importantly, APIs help solve problems.

As a side note, integration and APIs often go hand in hand, but they are not the same thing. Integration is an umbrella term for connecting systems and applications, while APIs are the software components used to connect those systems and applications, and are often used to accomplish integration.

APIs are software intermediaries, or access points for information. APIs make it possible for applications to interact and securely exchange data and information with other applications.

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THE 6 KEY BENEFITS

Now that we have covered the basics of what APIs are and what they do, we will move on to the benefits of an API-centric systems approach.

1 Unlock the power of data.

Data is an incredibly valuable asset, but many organizations do not utilize it as such. They might be collecting vast amounts of data, but without the right tools and processes, its value remains unrealized.

By connecting systems and data, APIs link day-to-day operational activities with strategic goals. APIs enable historical and real-time data to be collected, collated, processed, and then shared as reports, visualizations, and analytics via internal- or customer-facing dashboards. An organization can then easily measure KPIs, track resources and engagement, identify patterns, and develop new insights. These insights can in turn be used to inform and prioritize business decisions that increase efficiency and productivity by streamlining processes, generate revenue through new and improved products and services, and ultimately create value.

Data can also be made more accessible with APIs. For some organizations, this might mean having an open data platform. Open data is data (or code) that can be freely used, re-used, and distributed. It also offers increased transparency, which is useful to, or required of, many public and private organizations.

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2 Increase collaboration.

Disconnected systems and data do not just impact an organization's ability to manage and use data. Silos impact their ability to work effectively and collaboratively towards a common goal. Shared tools, platforms, and data are the foundation for strong collaboration.

> Organizations require connected systems, centralized data, and shared infrastructure in order to learn quickly, pivot easily, and collaborate effectively.

APIs allow data to be pulled from a source, without compromising the system that holds the data. APIs therefore support all teams by providing the connection between the reliable, up-to-date, and accurate 'sources of truth' and each team's processes, thus reducing duplication, manual work, errors, and inefficiencies.

APIs also support cross-functional management and help facilitate the coordination of work by:

- Connecting the tools that teams are already using, in order to reduce the time needed to find the content or data needed and thereby increase productivity.
- Creating a common platform for managing and tracking activities, in order to clarify responsibility, make accountability transparent, and thus demonstrate how individuals contribute to the organization's succes.
- Automating knowledge sharing, which increases accuracy and improves communication, and therefore ensures all teams are operating based on the same information.

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3 Bridge the technology gap.

Before organizations begin their digital transformation journey, they may notice an outdated application or system no longer works with a business process. They may have existing infrastructure that supports integral services or processes, and be experiencing legacy system limitations that they don't know how to overcome. These challenges might make teams overly cautious in undergoing modernization initiatives or introducing new technologies. That's where APIs come in.

> APIs are able to bridge the gap between legacy systems and new technologies, and ensure they work together in harmony.

Having APIs at the core of organizational infrastructure means not having to start from square one. APIs allow organizations to leverage their existing systems and data when introducing new and emerging technologies (such as artificial intelligence, machine learning, and automation).

APIs are also critical when designing (or re-designing) an architecture built on a microservices approach. Developing systems and applications as microservices provides further flexibility in managing, enhancing, extending, and deploying systems. Thus, APIs provide the connections between the components that make it possible to realize the benefits of a microservices architecture.

By thinking of internal systems as building blocks and APIs as the connectors between them, organizations can easily structure and restructure internal systems to support new projects and technologies in an ongoing and flexible way, which allows them to plan for and respond to new business opportunities.

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4 Manage resources.

At their core, APIs provide data through an interconnected digital ecosystem. Following are some examples of how APIs support organizational resource management.

Real-time and historical data can be combined and processed via APIs to define, measure, and track Key Performance Indicators (KPIs), which support informed decision-making and responsiveness across the organization.

As outlined in benefit #2, APIs create the conditions that support an organization's collaborative workflow, processes, and communications. This increased collaboration realizes operational efficiencies, and the resulting time and cost savings.

Reinforcing the concepts in benefit #3, APIs give organizations the flexibility to use and reuse their existing physical and virtual IT resources - systems, services, assets, and leverage the functionality therein - negating or delaying the need for, and cost of, whole system overhaul.

All organizations can now be considered technology companies, reflecting that technology not only supports but drives the activities of teams across the organization. This puts IT teams and software developers at the core of operations. APIs are a critical interface to development teams by:

- Providing a focus for communication and collaboration between development teams.
- Disconnecting backend, system-focused work from frontend, customer- or staff-facing applications so that system changes, enhancements, and extensions do not affect or break front-facing products, services, and tools.

Finally, APIs can also help manage and control digital and physical assets, by assigning and tracking their location, usage, maintenance, and history.

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5 Mitigate risk.

Data can be susceptible to security threats and risks from internal or external sources, due to insufficient coding, validation, or authentication issues. APIs can operate as a security layer, offering protection against internal or external threats.

> With the options of public, private, or internal APIs, an organization can securely control access to their systems and data.

By building security provisions or limits into the API code, access can be controlled and data, security, and regulatory compliance ensured. Users require permission and credentials to be given authorized access, which both protects sensitive information and provides an audit trail.

We will explore the role of APIs for ensuring security of data, as well as creating secure APIs, in a future guide.

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6 Increase speed to launch.

Data and information that come from APIs can also be used to reveal new opportunities, including conceiving new products, services, and delivery models.

APIs enable organizations to speed up innovation by supporting faster development processes. For example, if an organization wants to create a new web or mobile app, they no longer have to build their own mapping, payment, or communication tools. They can use APIs, or plug-ins, to incorporate this functionality into their product. This results in faster development and time to launch.

APIs also allow organizations to scale up quickly and easily, and to speed up their deployment processes by leveraging cloud technologies and implementing automated integration and deployment pipelines.

Lastly, leveraging APIs can also speed up the frequency of new app delivery and updates as well as streamline content updates. For example, an app could automatically access the most up-to-date information through the use of APIs instead of requiring manual updates by a developer, also freeing up development time.

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THE RESULT?

With a smart, connected digital ecosystem, enterprise and government organizations can harness the power of their data to streamline operations, build better relationships, and make informed business decisions to support new processes and innovation.

> APIs allow organizations to easily access data, increase collaboration, bridge the technology gap, manage resources, mitigate risk, and increase speed to launch.

Ultimately, APIs help solve problems, so that you can achieve your digital transformation and business goals.

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ABOUT RADICAL I/O

Radical I/O is a people-first technology consultancy & lab in Vancouver, BC that specializes in data-driven enterprise software development with highly performant API architecture at its core. We work with government, ethical enterprises, and education organizations to build impactful technology with purpose.

Connect, automate, and analyze data from multiple sources and systems with Radical's API-centric technology solutions for web and mobile.

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