Environmental Information Exchange Network

EN2017

HARNESSING APIS AND OPEN DATA TO CREATE A MORE AGILE, EFFICIENT, AND EFFECTIVE ENVIRONMENTAL ENTERPRISE

Mike Gilpin, *Gartner*

Dwane Young, *U.S. EPA*

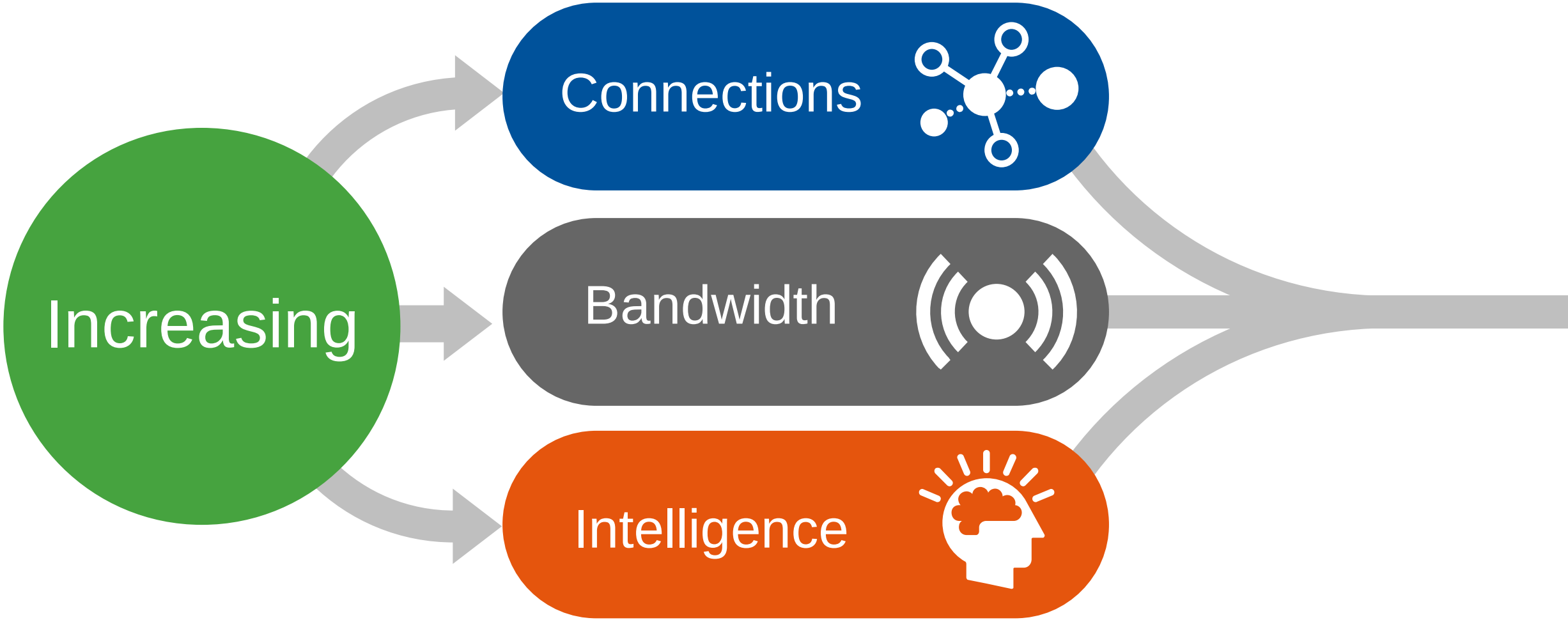
2017 Exchange Network National Meeting

Innovation and Partnership

May 15-18, 2017
Sheraton Philadelphia Society Hill Hotel
Philadelphia, Pennsylvania
#EN2017
http://www.exchangenetwork.net/en2017

All Organizations Exist in Business Ecosystems

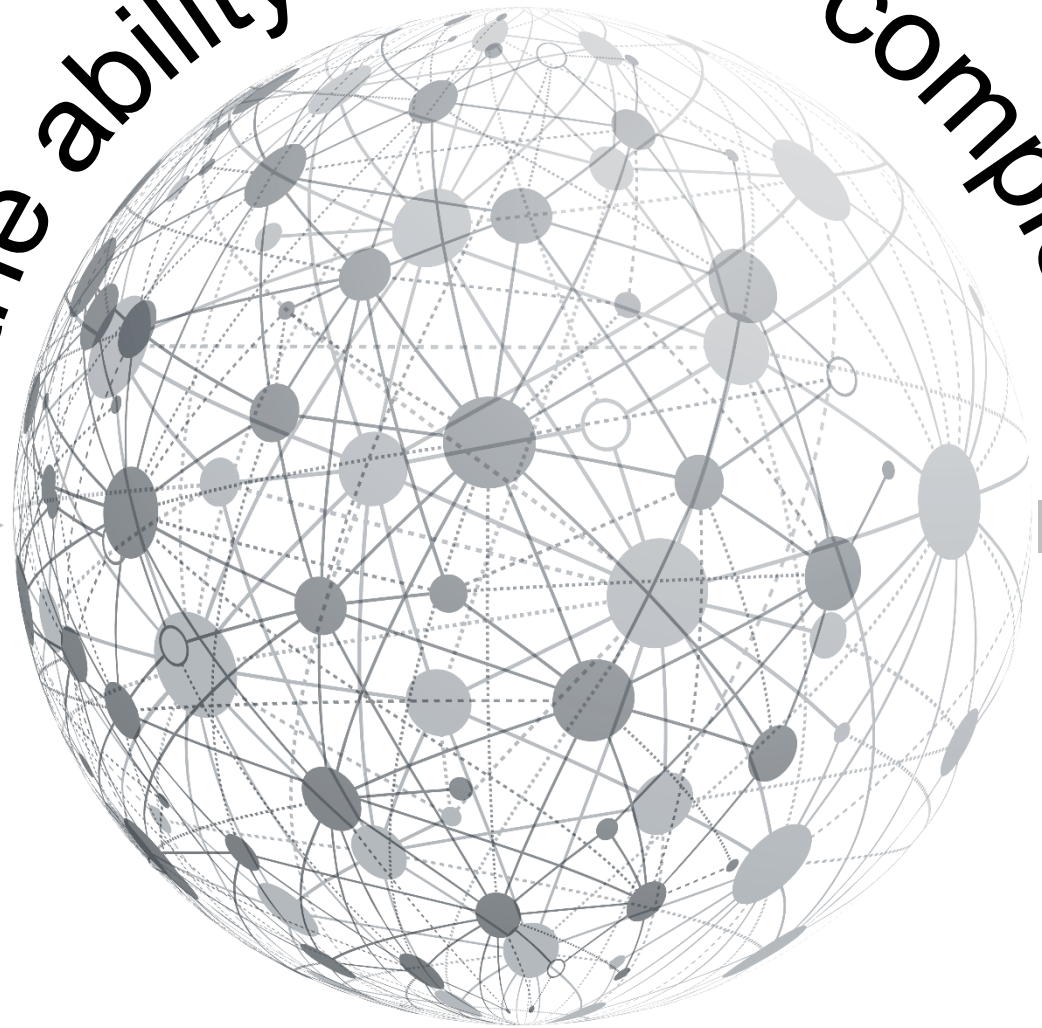
Business Ecosystems Enable Faster Business Innovation



Gartner

Leads to

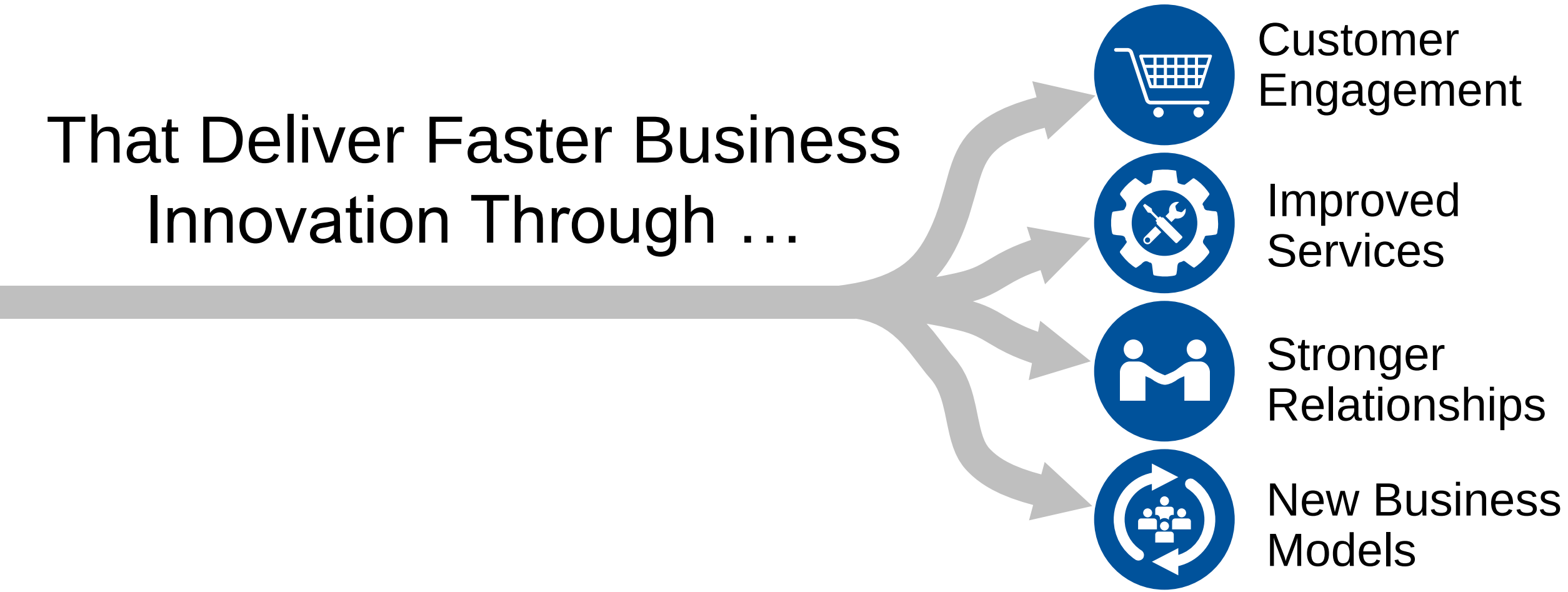
the ability to create complex



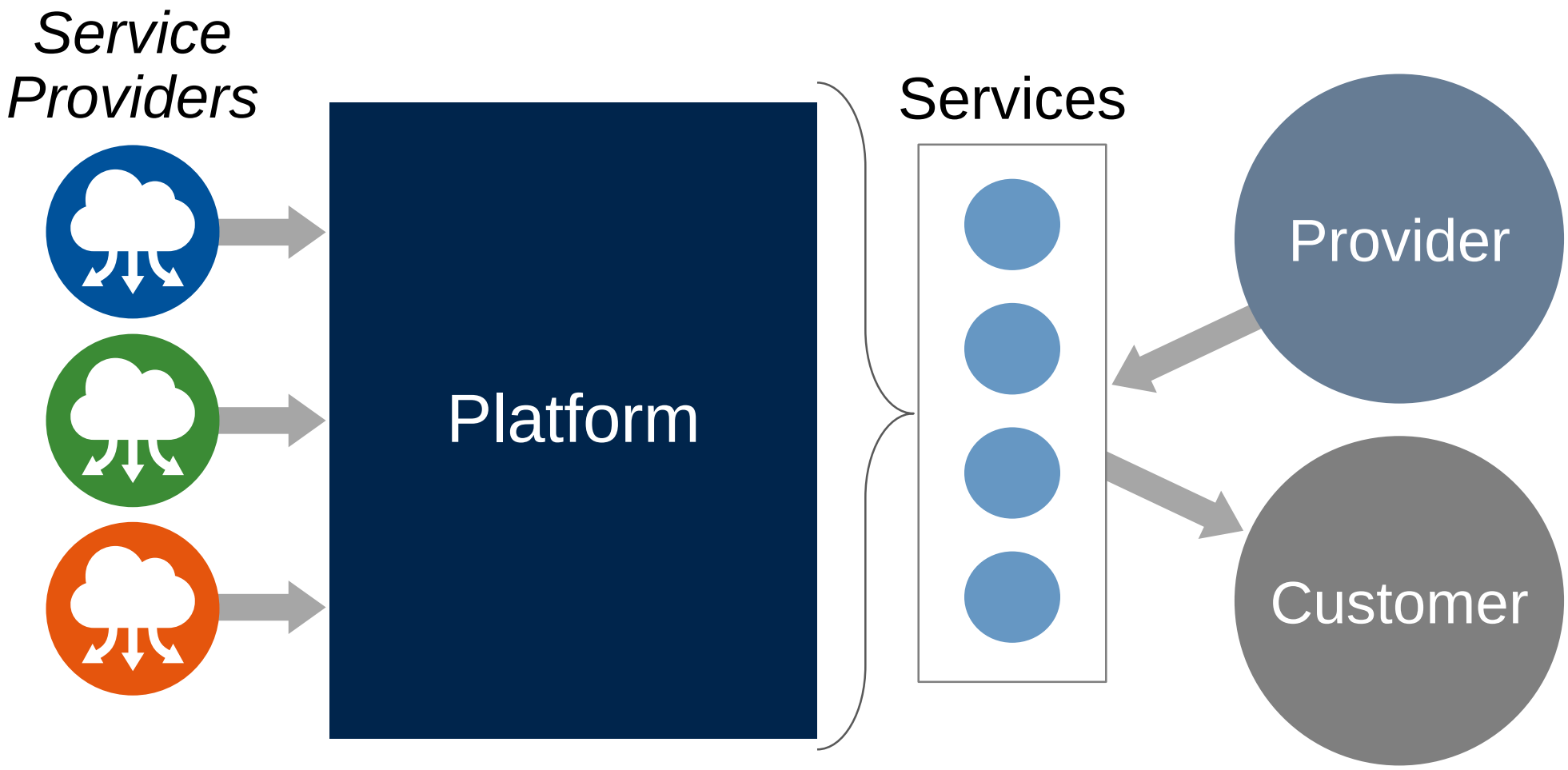
ecosystems

Gartner®

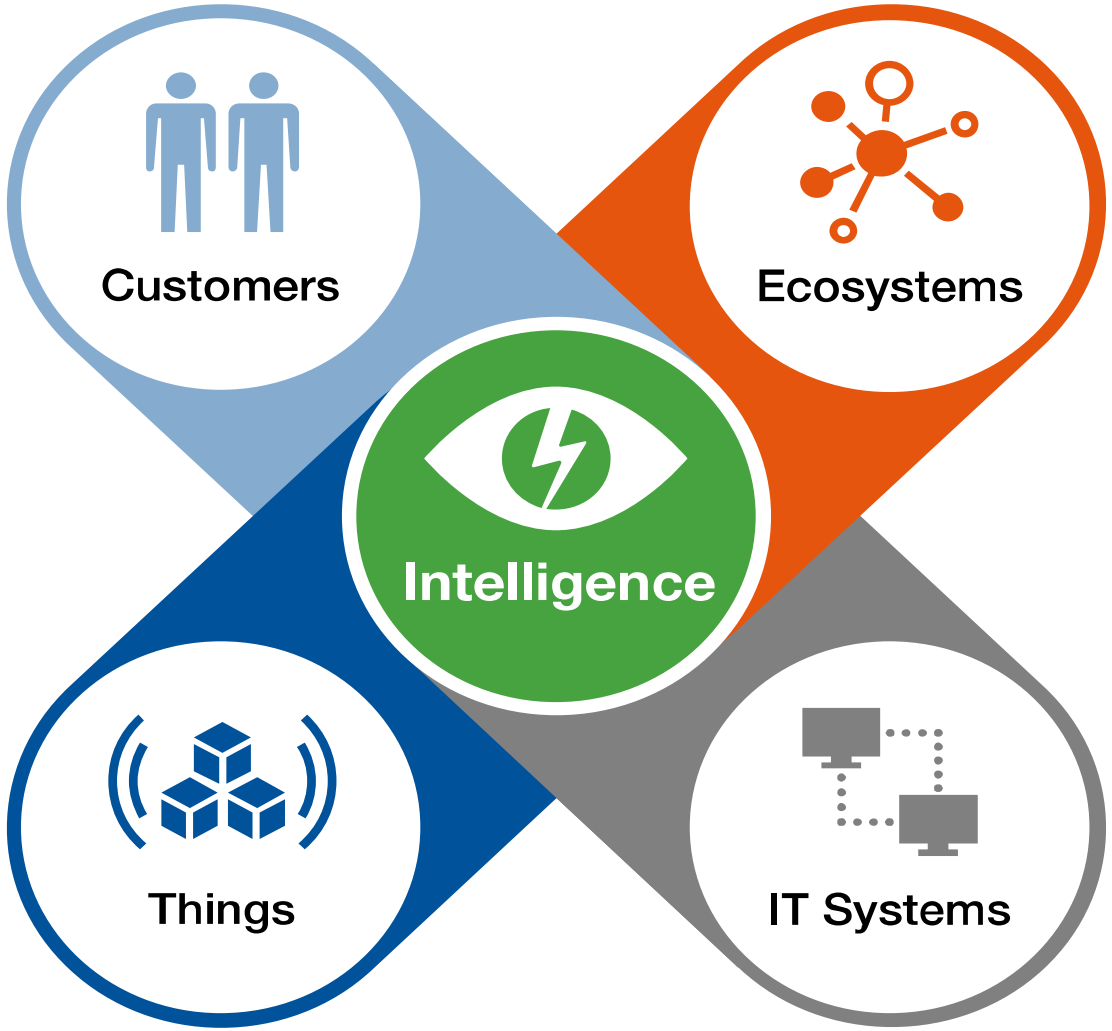
That Deliver Faster Business Innovation Through …



Digital Business Platforms Enable Business Ecosystems

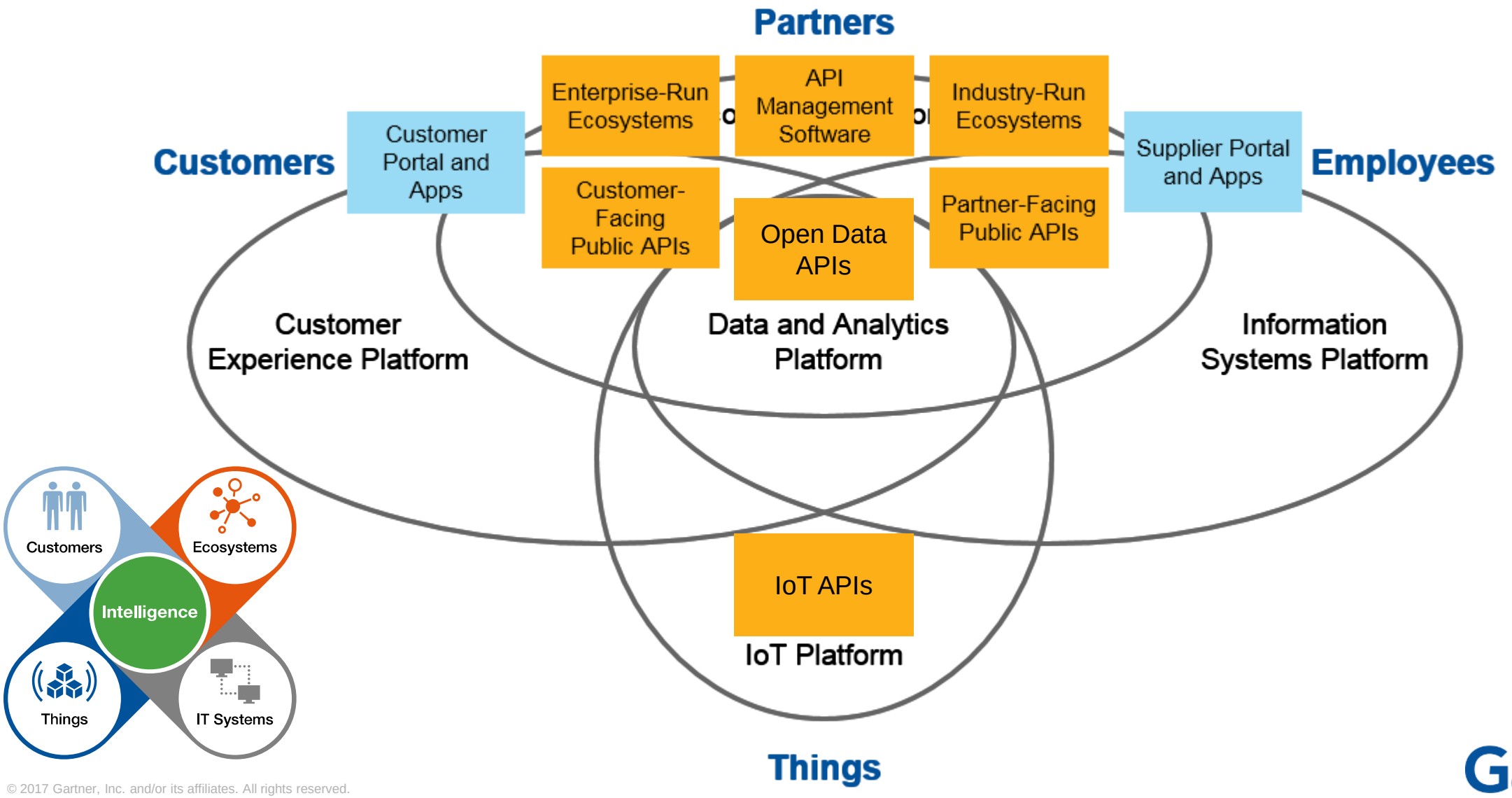


Digital Platforms Are the Focal Point for Integrating Ecosystems of People, Business, Government and Things



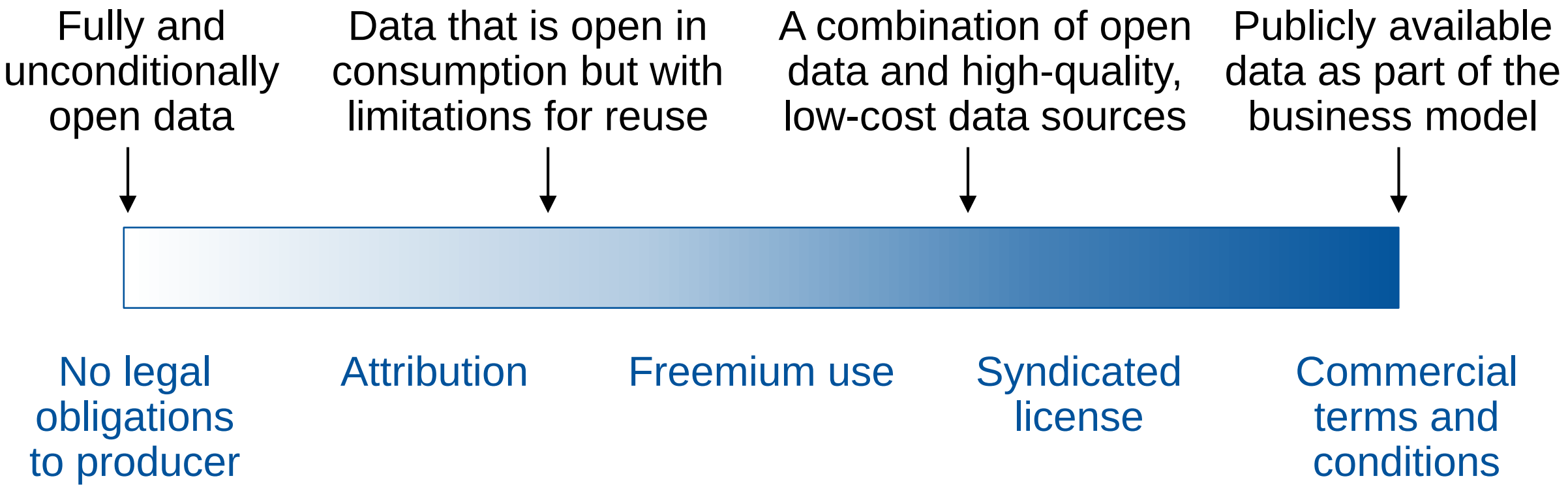
Gartner®

The Digital Business Technology Platform



Gartner

Spectrum of Open Data Accessibility

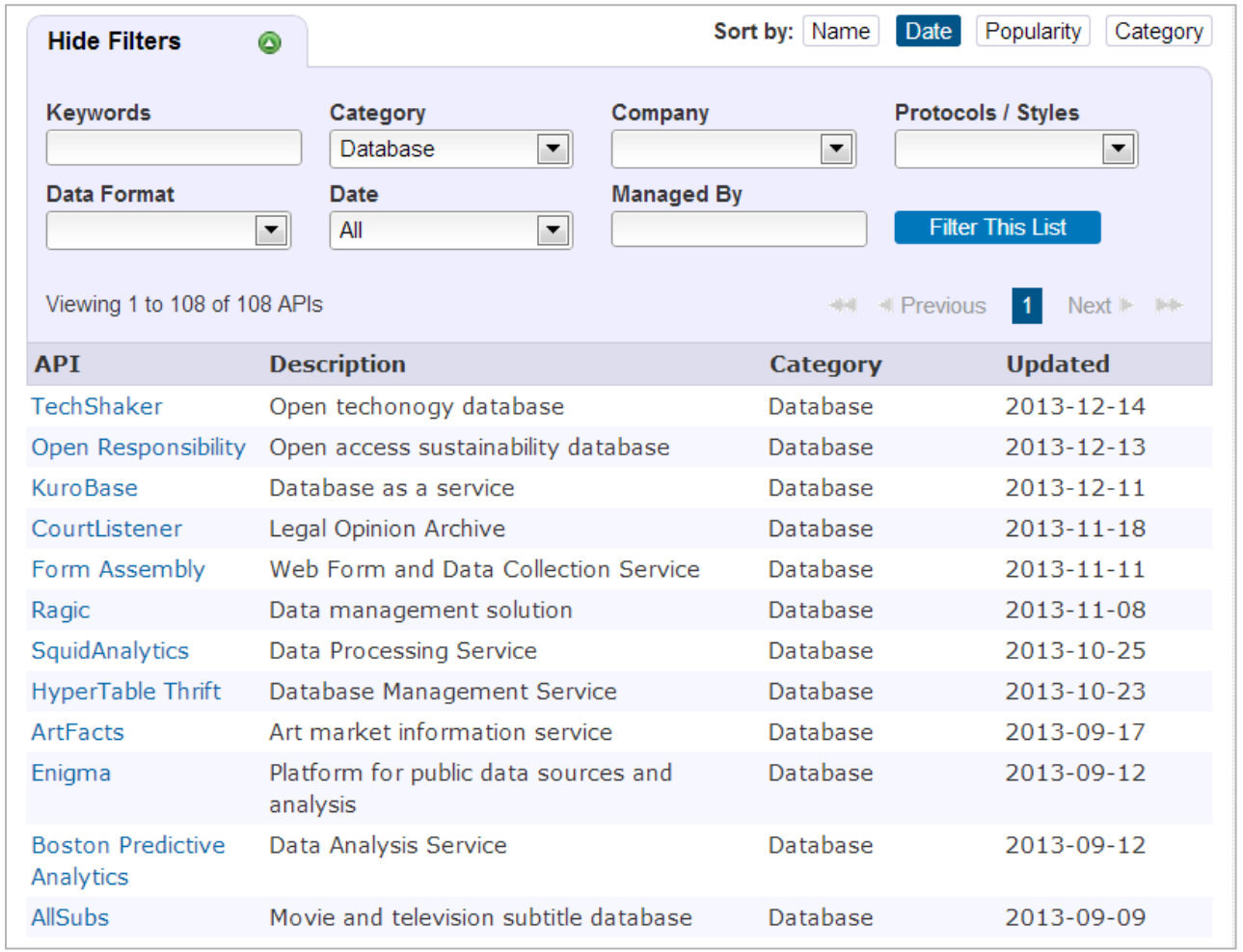


Open Data is Exposed Via APIs

programmableweb

500+ Public Sector APIs

10,000+ Commercial APIs



Hide Filters

Sort by: Name | Date | Popularity | Category

Keywords | Category: Database | Company | Protocols / Styles

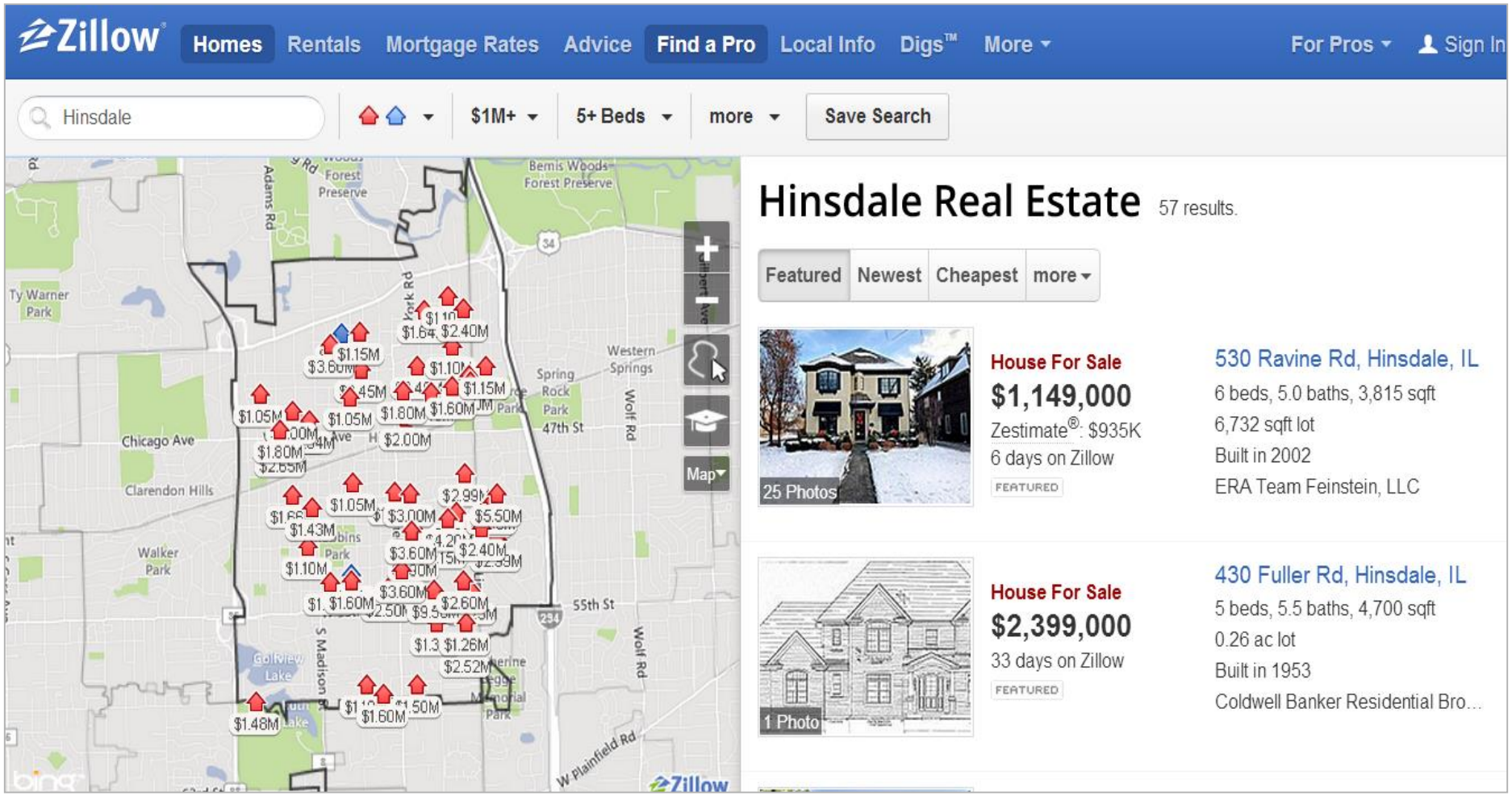
Data Format | Date: All | Managed By | Filter This List

Viewing 1 to 108 of 108 APIs — Previous 1 Next

API	Description	Category	Updated
TechShaker	Open techonogy database	Database	2013-12-14
Open Responsibility	Open access sustainability database	Database	2013-12-13
KuroBase	Database as a service	Database	2013-12-11
CourtListener	Legal Opinion Archive	Database	2013-11-18
Form Assembly	Web Form and Data Collection Service	Database	2013-11-11
Ragic	Data management solution	Database	2013-11-08
SquidAnalytics	Data Processing Service	Database	2013-10-25
HyperTable Thrift	Database Management Service	Database	2013-10-23
ArtFacts	Art market information service	Database	2013-09-17
Enigma	Platform for public data sources and analysis	Database	2013-09-12
Boston Predictive Analytics	Data Analysis Service	Database	2013-09-12
AllSubs	Movie and television subtitle database	Database	2013-09-09

Gartner

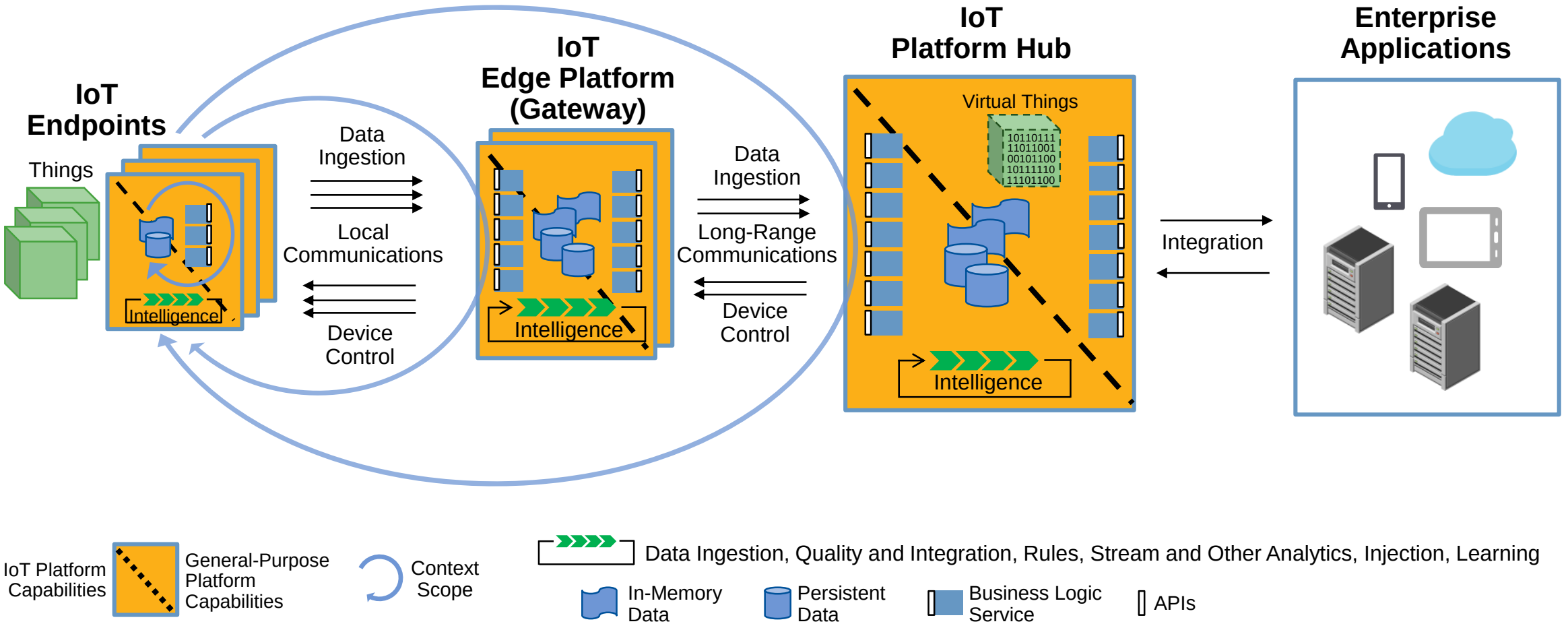
Open Data is Crucial to Many Digital Platform Business Models



www.zillow.com/homes/for_sale

Gartner

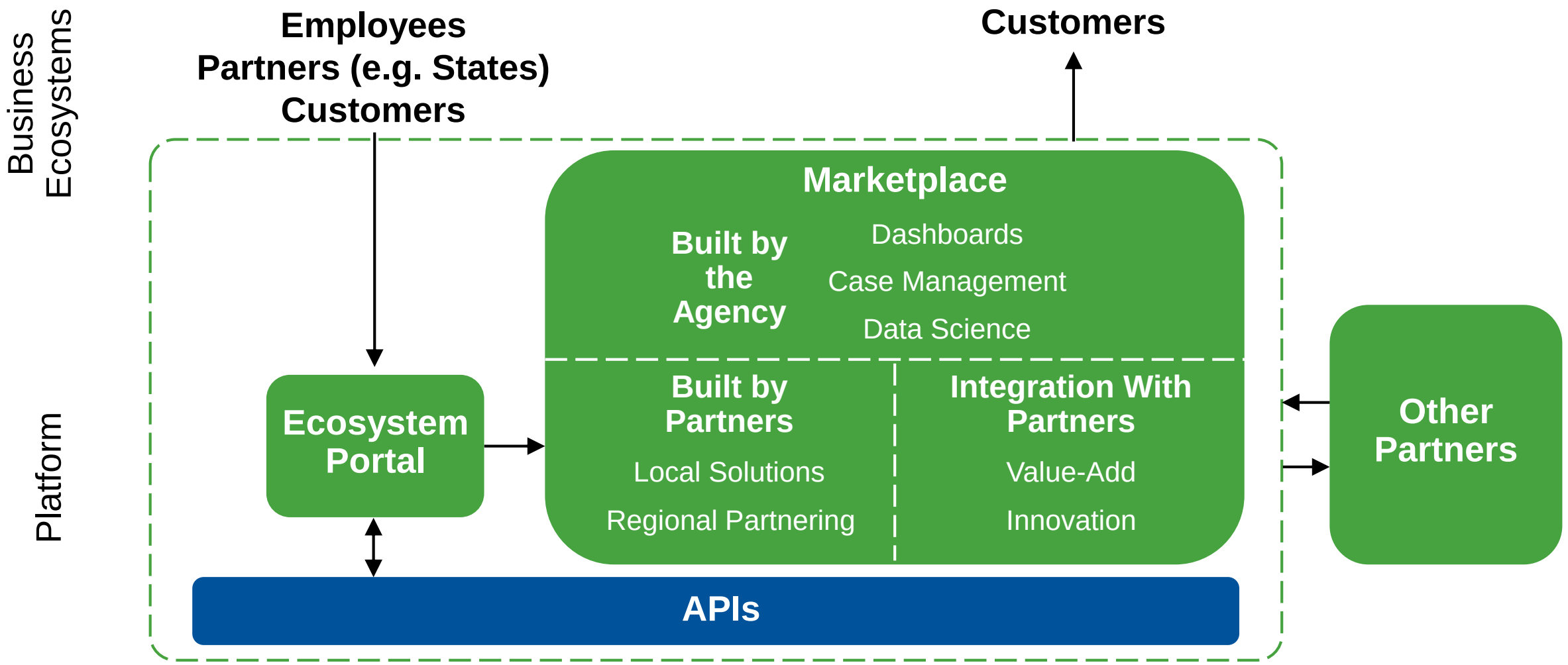
The IoT Platform Is a *System* of Platforms



Source: "Plan Your IoT Solutions Using the IoT Platform Suite Reference Model" (G00311536)

Gartner®

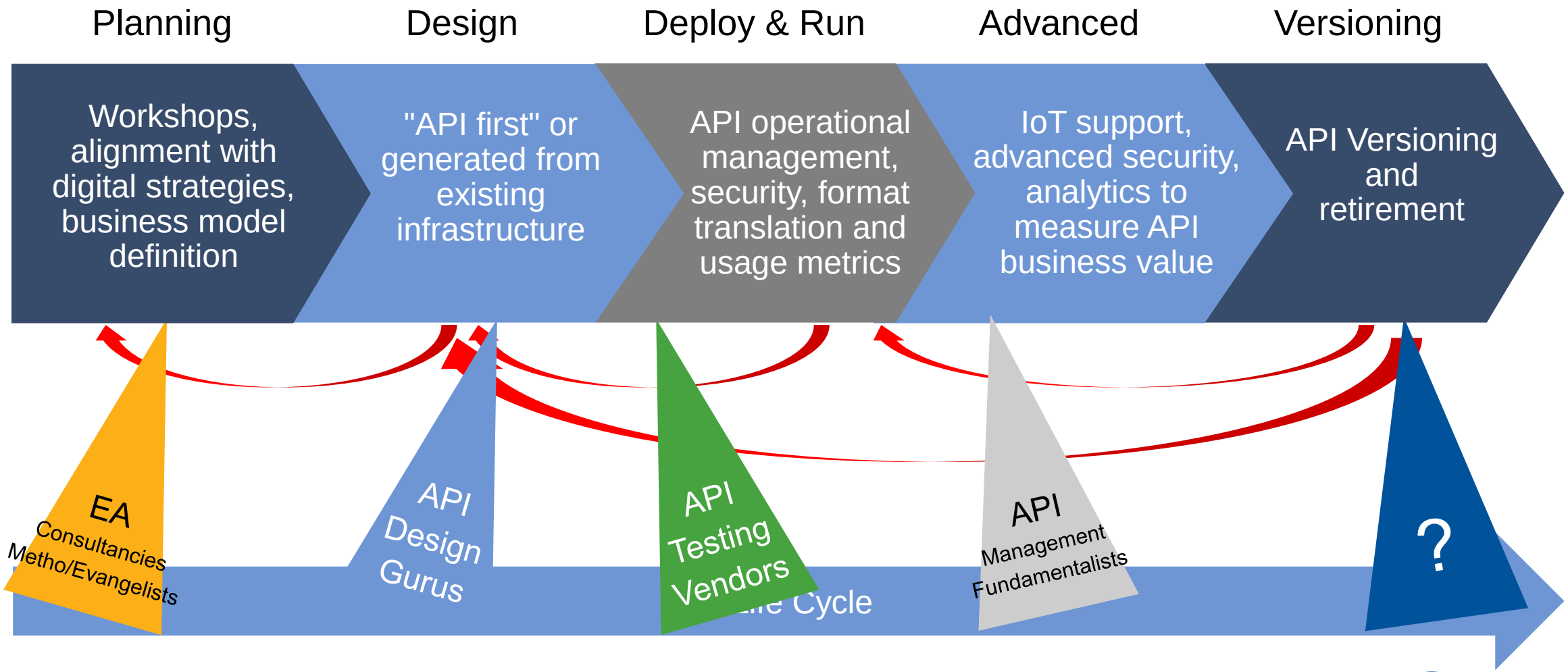
API Ecosystems Enable Marketplaces of Partner Solutions



Source: Gartner (July 2016)

Gartner®

APIs are Products, and Need to be Managed -- Meet Full Life Cycle API Management



API Product Management Is Spawning a New Role

Developers

API consumers

Create solutions using APIs

API Product Manager

Obtain visibility into API usage

Manage the API roadmap

Prepare for API monetization

Optimize developer experience (DX)

Developers

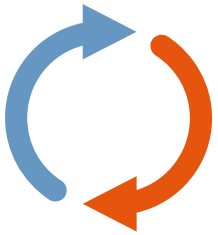
API producers

Create APIs

Gartner®

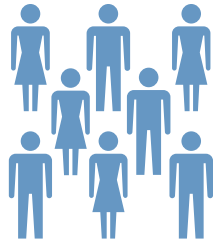
API Platform Providers Run Hackathons To:

Change Culture



Improve Customer/
Employee Experience

Attract Talent



Engage New Business
Ecosystems

Reduce Costs

Reduce Applications

Develop Solutions for Regulatory Reporting
(e.g., CWA)

Gartner®

Integrating Data Across Office of Water: An API Use Case

- **Outline**
  - **Big Picture: Telling a story about water**
  - **Integrating across OW systems**
  - **Enabling Integration beyond OW**
  - **Principles of Integration**
  - **Characterization of Pre-event conditions – example of where APIs could make a difference**
  - **Additional benefits: new tools for discovering/analyzing data**

What can you tell me about my water?

Is it safe to drink?

Is there enough water?

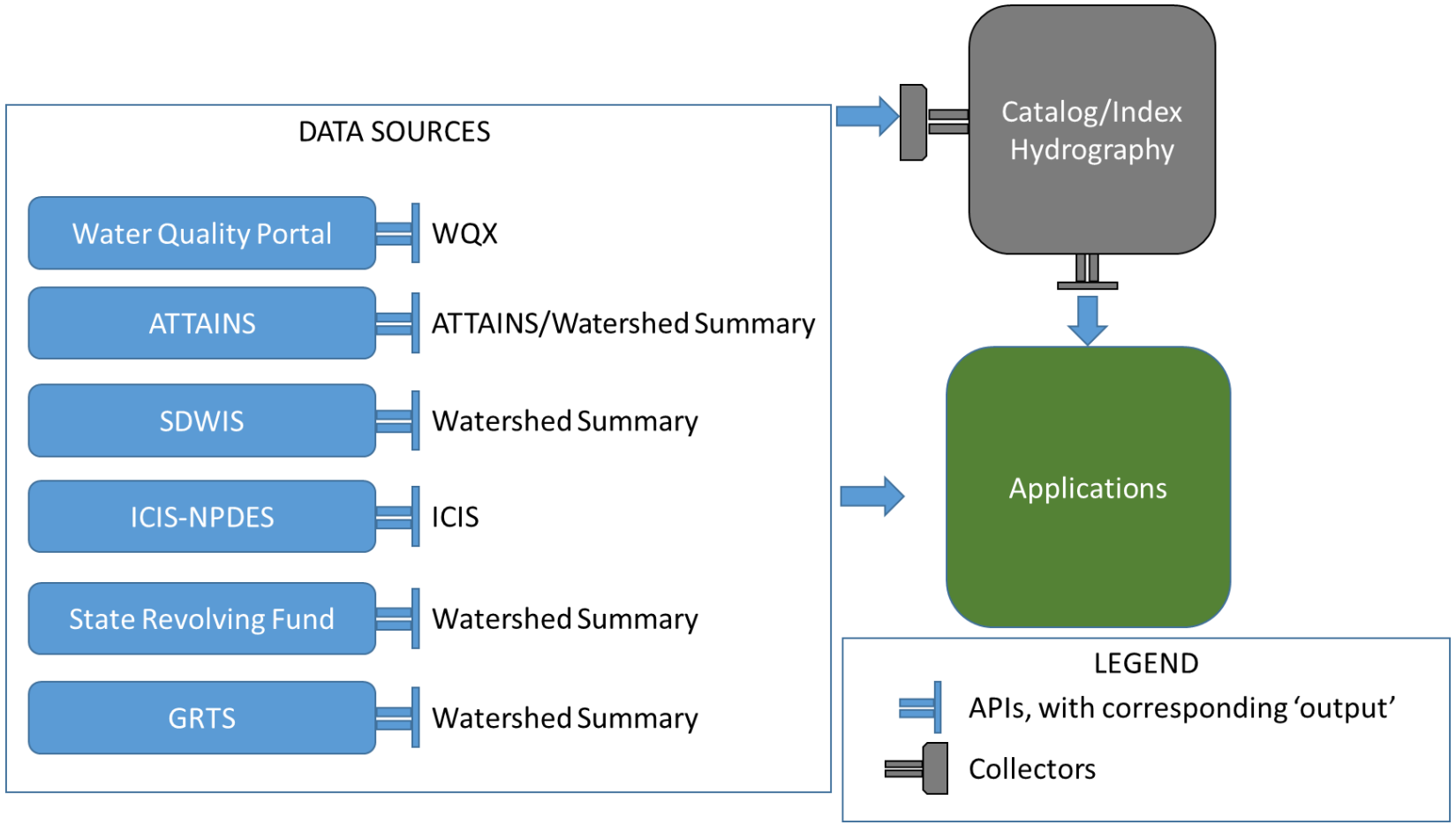
Can I swim in it?

Is it polluted?

If it is polluted, what are you doing about it?

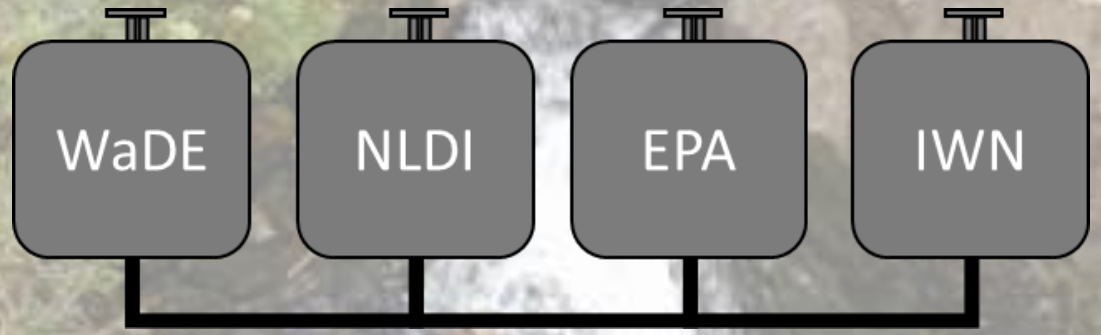
If it isn’t polluted, what are you doing to protect it?

What can I do to help?



- Each system supports an API with a defined output
- Where common, generic outputs can be defined, those outputs are used
- Points of integration are also defined between systems
- All data are indexed for quick discovery as well as referenced to a common hydrography to enable advanced searches/discovery

Systems Tell That Story



Connecting Outside Data

- Catalogs/Indexes allow for quick discovery of data across entities and programs
- A Common Hydrography enables search across entities
- Defined data standards enable data sharing across catalogs

This probably starts to sound somewhat familiar…

Principles of Integration

- No direct database access. All interaction is through an API (this is true for the system owners as well)
- Identify points of integration between systems to enable easy discovery and entry points across systems
- Data indexes (catalogs) allow quick discovery of data
- Data indexes can also facilitate common search functionality across systems
- Data are all connected to a common Hydrography

Points of Integration:

- Assessment Units ⇔ Monitoring Locations
- Assessment Units ⇔ Permitted Facility
- Assessment Units ⇔ Restoration Actions
- TMDLs ⇔ Permitted Facilities

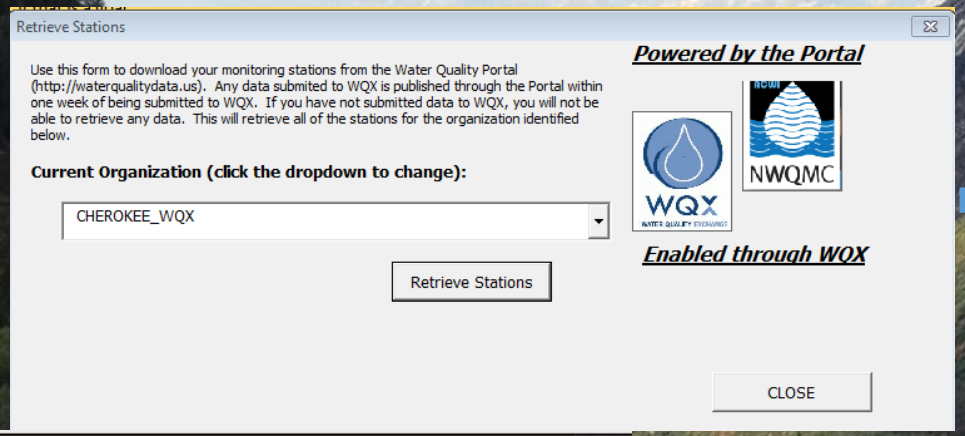
Characterizing Pre-Event Conditions – A Use Case

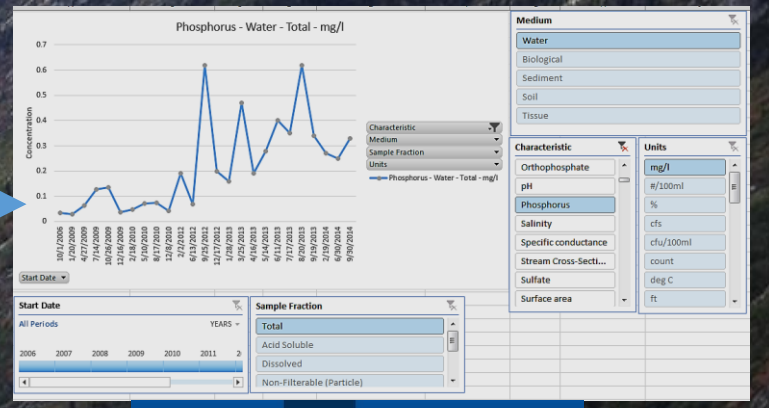
- When an event occurs, a common question that is asked: "What did it look like before the event?"
- In August 2015, there was only one API available for characterizing pre-event conditions (Water Quality Portal API)
- Synthesizing data took a fair amount of effort from several people, and was not easily updatable as new data came in

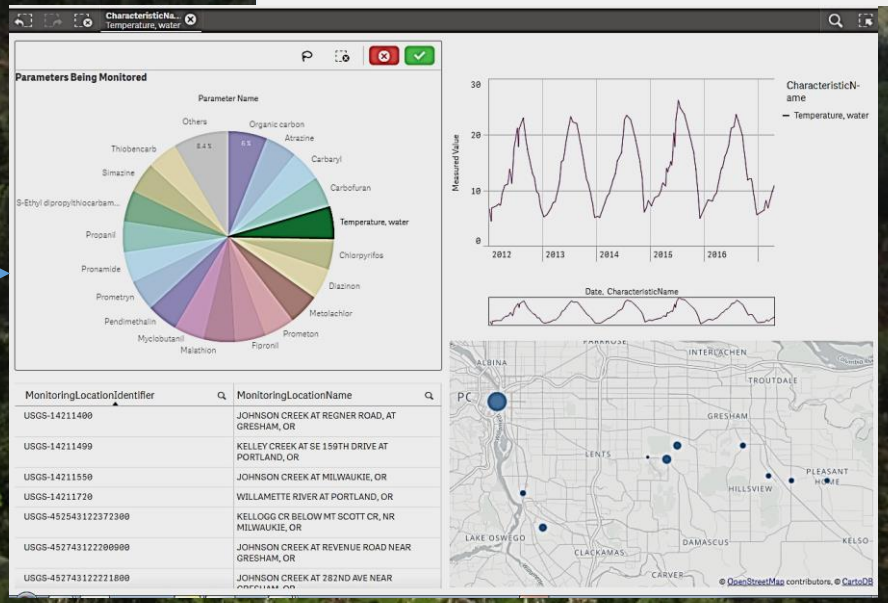
With new APIs there is much broader capability

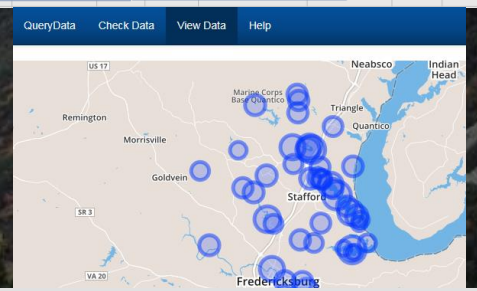
- Downstream services:
  - Would allow immediate discovery of monitoring locations, and immediate data download
  - Quick discovery of impaired waters downstream
  - Quick discovery of potentially impacted drinking water facilities
- Sensor Network Services:
  - Allow access to real-time data as the event occurs
- Watershed Characterization:
  - Non-point source activities in the watershed
  - TMDLs in place
- Water Use:
  - Potential irrigation withdrawal points to identify potential impacts to agriculture

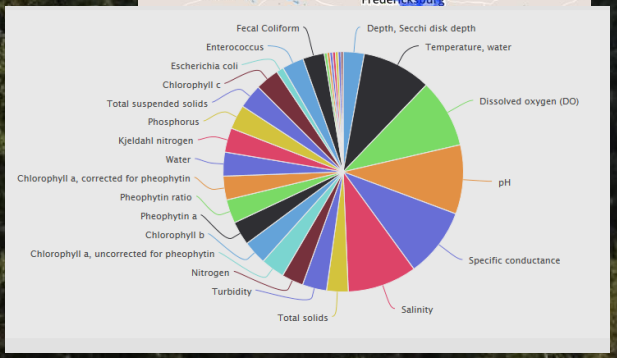
APIs Open Up Broader Usage Outside of Your Application



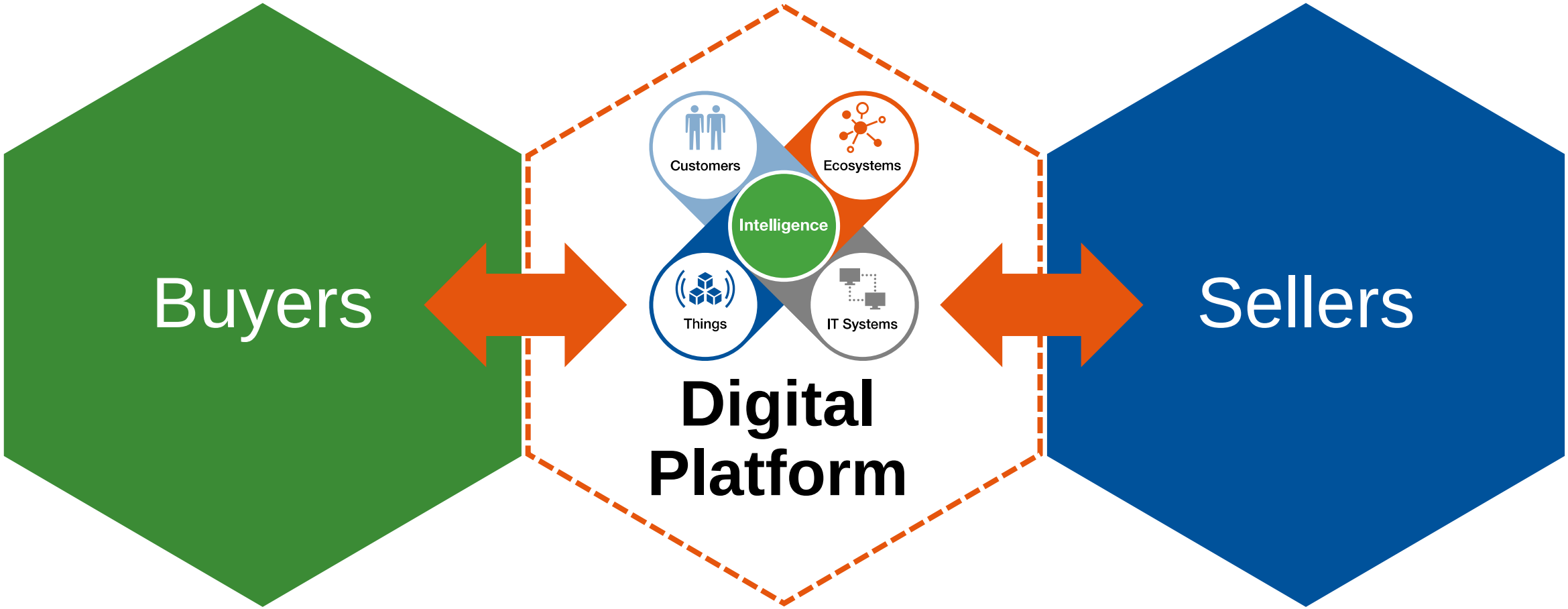






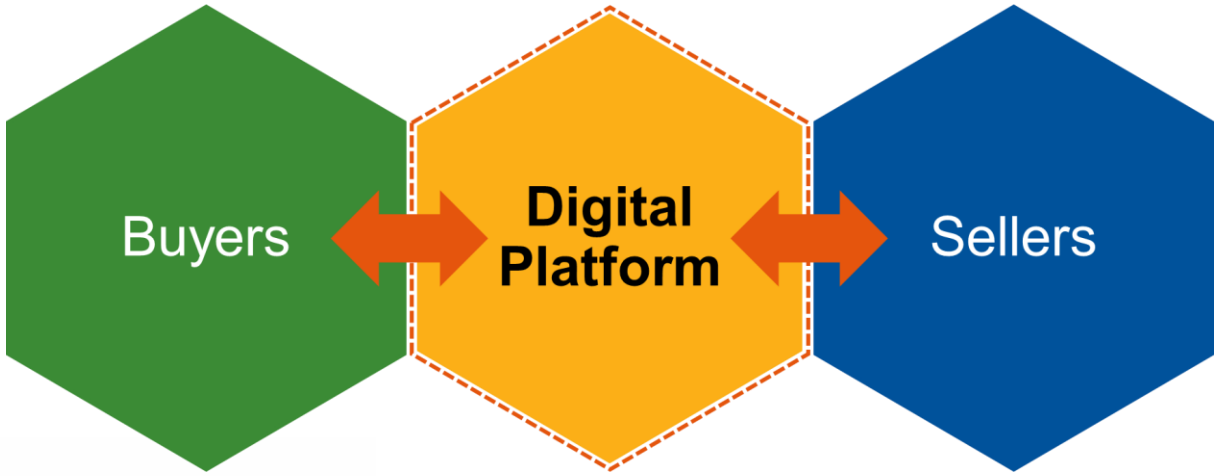


API Platforms Have *Sides* – This Example Has *Two*



Gartner®

2-Sided Platform: Examples



Each “Side” Needs an API Product Manager to:

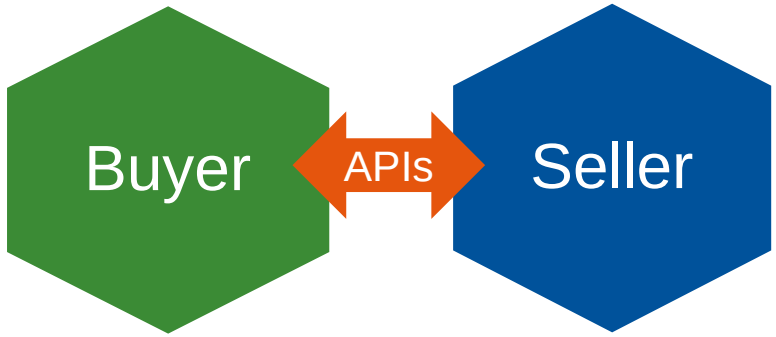
- **Research customers and partners** for that “side”
- **Deliver platform *experiences* and *capabilities*** that create value for that side
- **Solve problems** better than the alternatives, for that side
- **Build and nurture** the ecosystem for that “side”
- Over a **sustained period**

To do this, API Product Managers must work in a team focused on the *overall success of the platform,* balancing *priorities* and *winners/losers* across all sides.

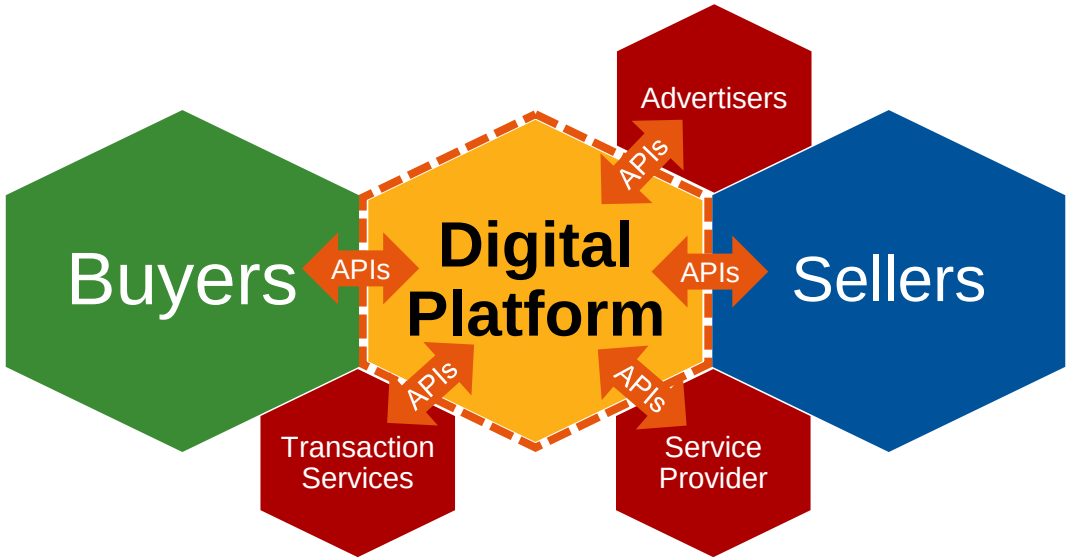
Gartner®

Multisided Platform Styles

One-Sided (traditional commerce)

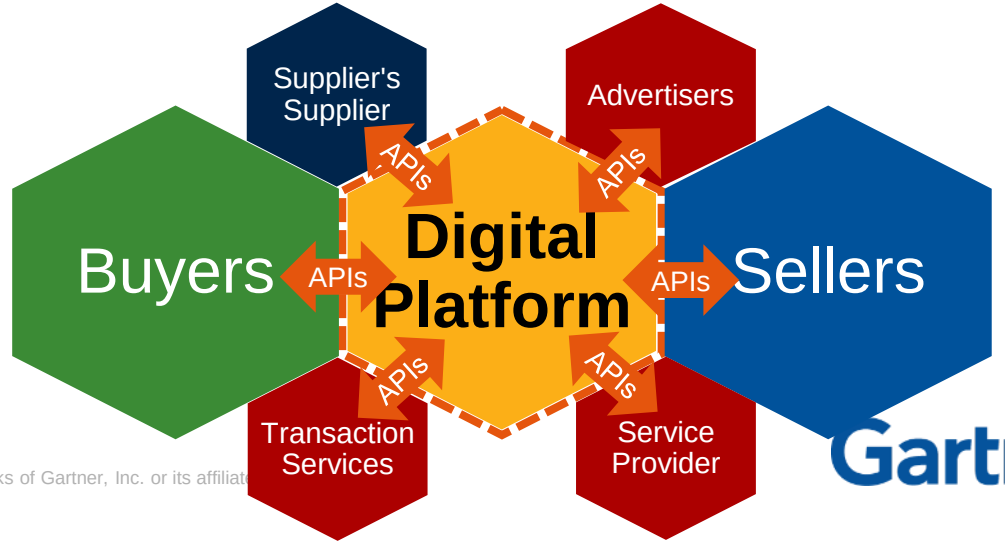


Three-Sided



Two-Sided (brokered interaction)

n-Sided



Gartner®

Product Managers Do Platform Strategy in Three Phases

Observe

Understand your ecosystem, its members and the exchanges that happen

Hypothesize about the potential services that would connect and bring value to participants

Test

Prototype your ideas, test potential services with users quickly

Iterate to learn from your users, evolve your platform

Scale

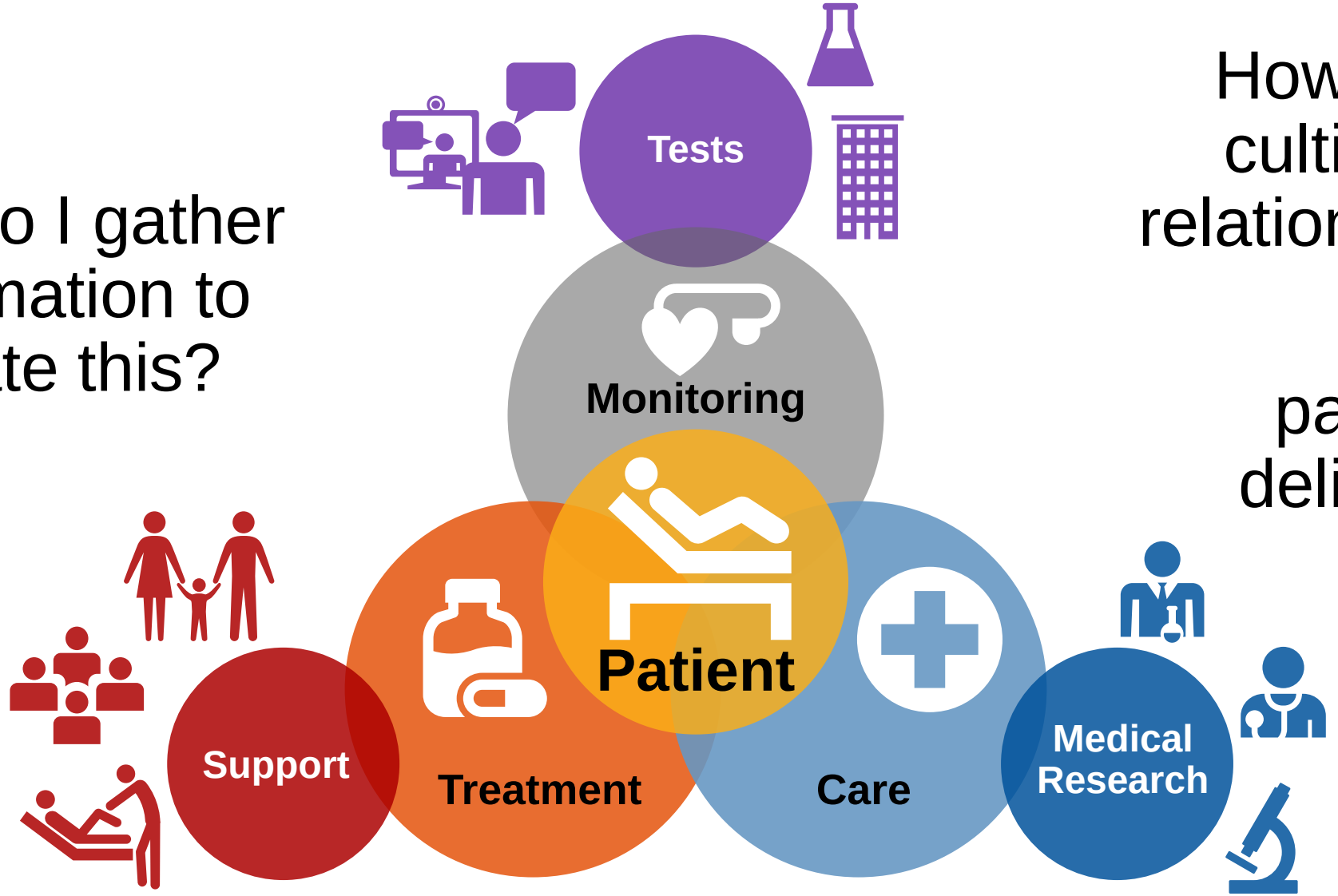
Identify the capabilities, processes and technologies needed to support your platform

Grow the product management capability to oversee further development

Gartner®

1: Observe: Relationships and Exchanges

How do I gather information to create this?



How do I cultivate relationships?

How do participants deliver value?

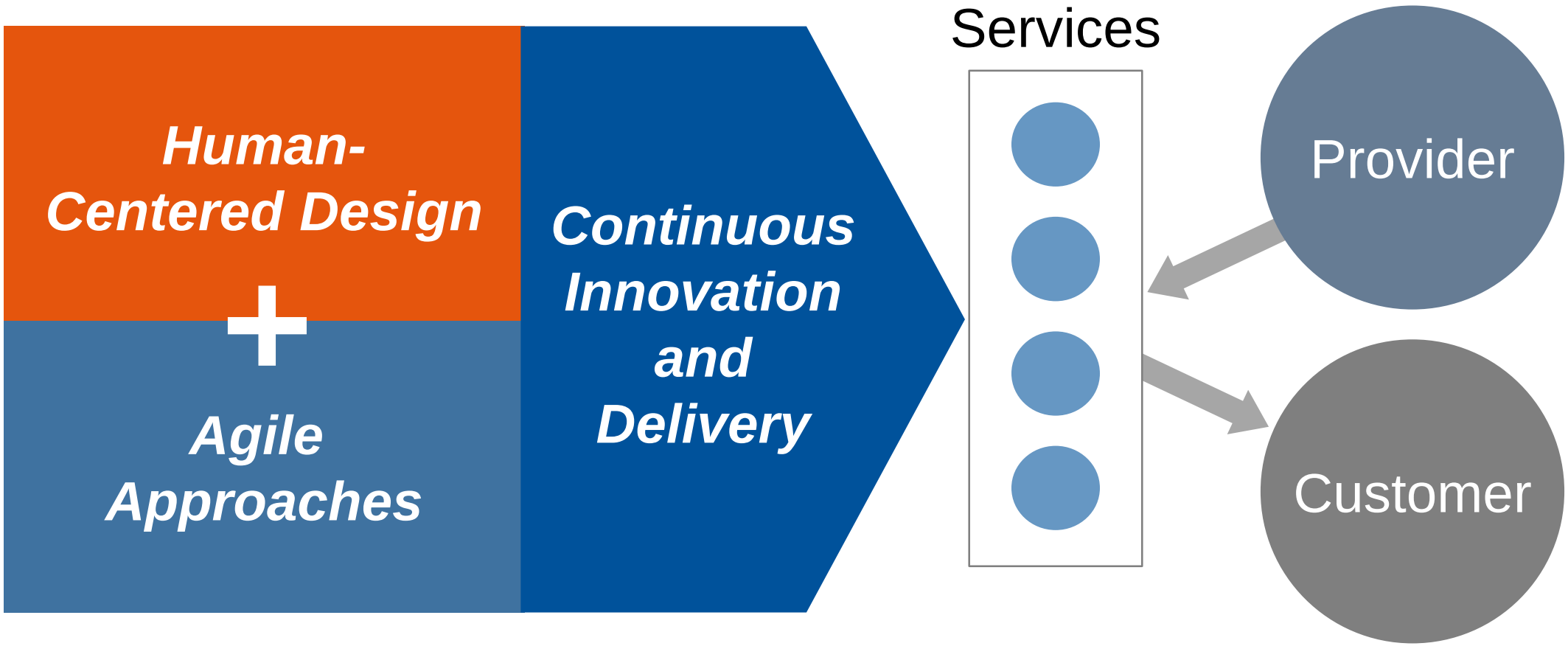
Gartner®

2: Iterate to Learn, Evolve and Test the Design

Initial release to pilot group	Increased functionality, wider release	Release to other areas	Patient-oriented apps	Researcher support
Security, MDM, private cloud	*IA, cloud/mobile solutions, real time*	*Wider integration, scaling up, platform base*	*Apps, wearable devices, IoT platform*	*Use of AI, ecosystem build out*

Implications

3: Scale the Digital Platform Using Design Thinking



Here is How it All Comes Together

- Well managed APIs are how you extract the extra value from your data and applications to deliver *Platforms*
- The API Economy gives you the rules to deliver the extra value in *Ecosystems*
  - and suggests who / what can consume it
- Digital Business is the science that will turn all the additional value delivered to those users into an advantage for your agency and its partners

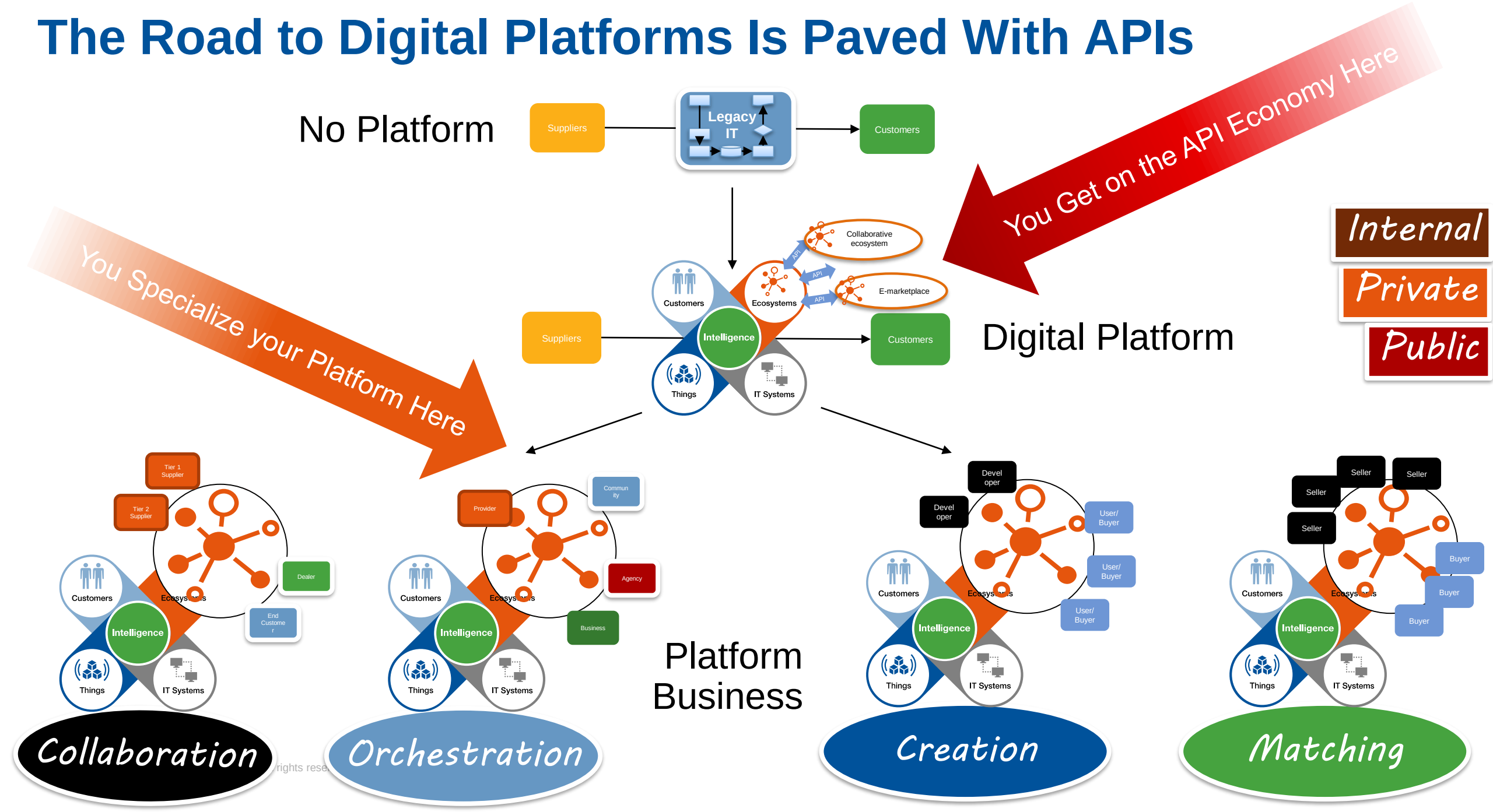
The API Economy Is Growing Rapidly

- Tens of thousands of public APIs are available
  - Check GitHub, ProgrammableWeb, Mashape or your favorite API marketplace
- Every month, hundreds more APIs get published
- Every day, thousands of them are tried and tested by many kinds of developers

- You Tweet
- You Slack
- You Register
- You Check In
- You Deposit
- You Pay
- You Post
- You "Pokemon"

Gartner®

The Road to Digital Platforms Is Paved With APIs



Recommendations

1. Determine Your Roles in Your Ecosystems
2. Define a Digital Business Platform Strategy and API Strategy to Support Those Roles
3. Manage Your API Product and Open Data Portfolio with Partners - Openly
4. Pursue Digital Platform Style Business Models
5. Iterate and Evolve Your Digital Platform Strategy

Recommended Gartner Research

- **The API Economy: Turning Your Business Into a Platform (or Your Platform Into a Business)**
  Paolo Malinverno (G00280448)
- **Bimodal for Applications Hinges on APIs**
  Paolo Malinverno, Simon Mingay and Mary Mesaglio (G00292792)
- **Use Ongoing Hackathons to Accelerate Digital Transformation**
  Kristin Moyer, Paolo Malinverno and Others (G00302409)
- **Create the Role of API Product Manager as Part of Treating APIs as Products**
  Mark O'Neill, Paolo Malinverno and Others (G00320767)
- **Top 10 Things CIOs Need to Know About APIs and the API Economy**
  Paolo Malinverno, Kristin Moyer and Others (G00318859)

For more information, stop by Gartner Research Zone.

Gartner®