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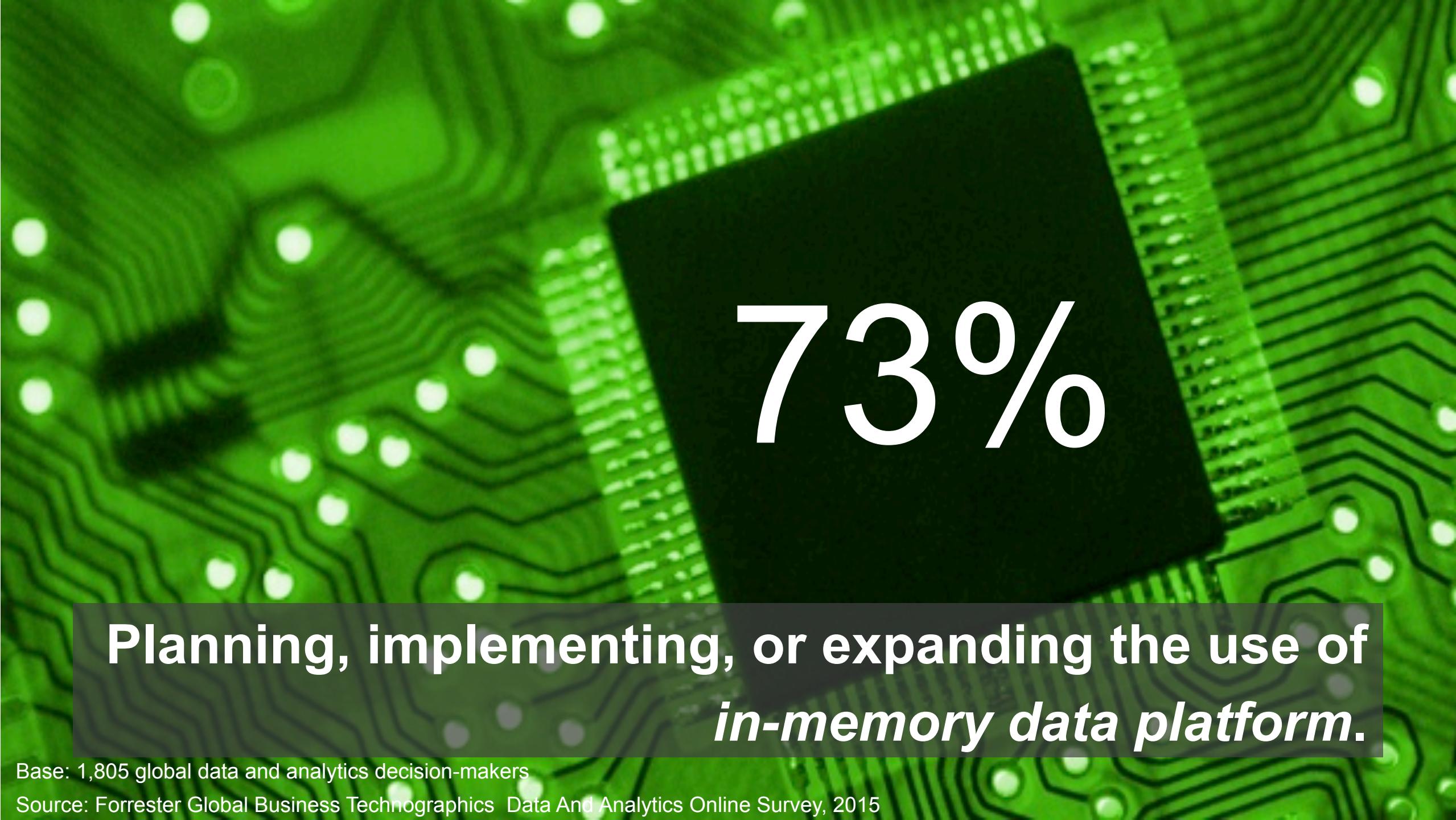
The Velocity Of Business Requires In-Memory Computing

June 29, 2015 San Francisco

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Twitter: @mgualtieri





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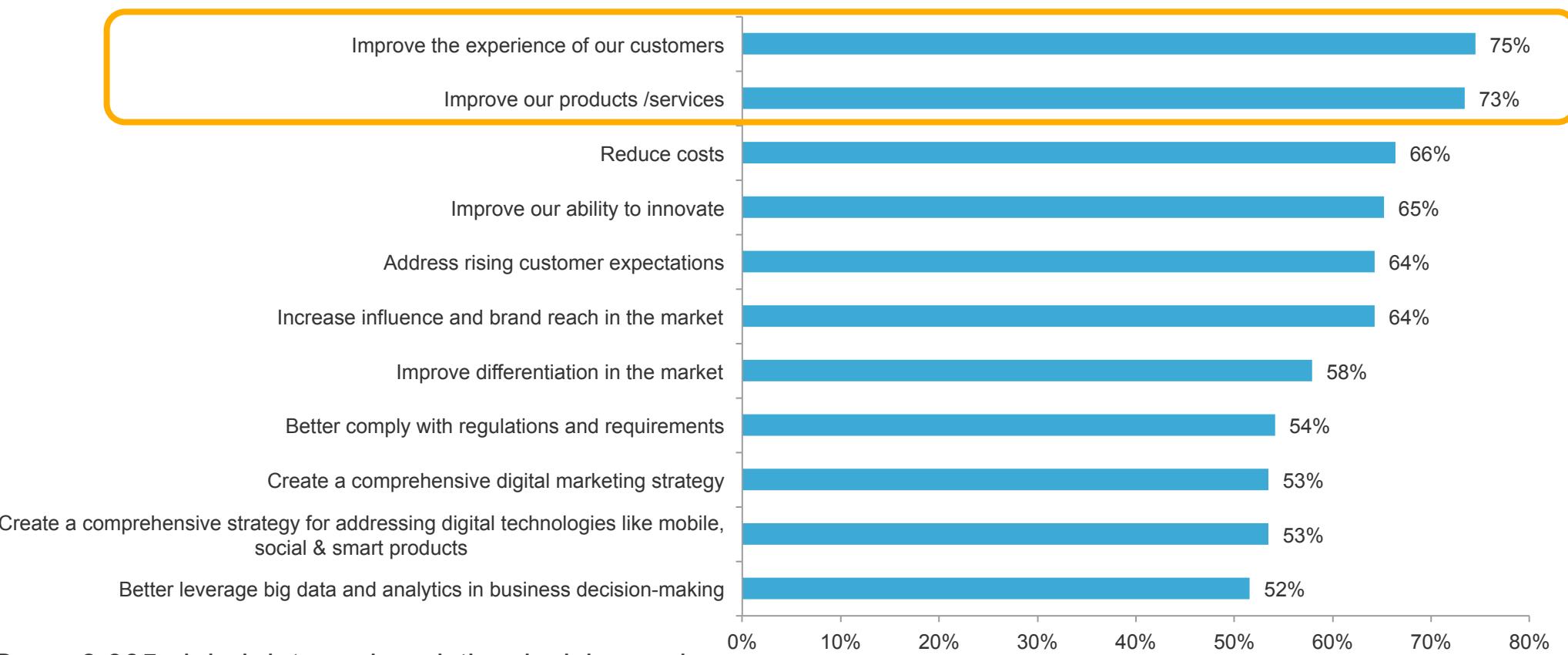
Planning, implementing, or expanding the use of
in-memory data platform.

Base: 1,805 global data and analytics decision-makers

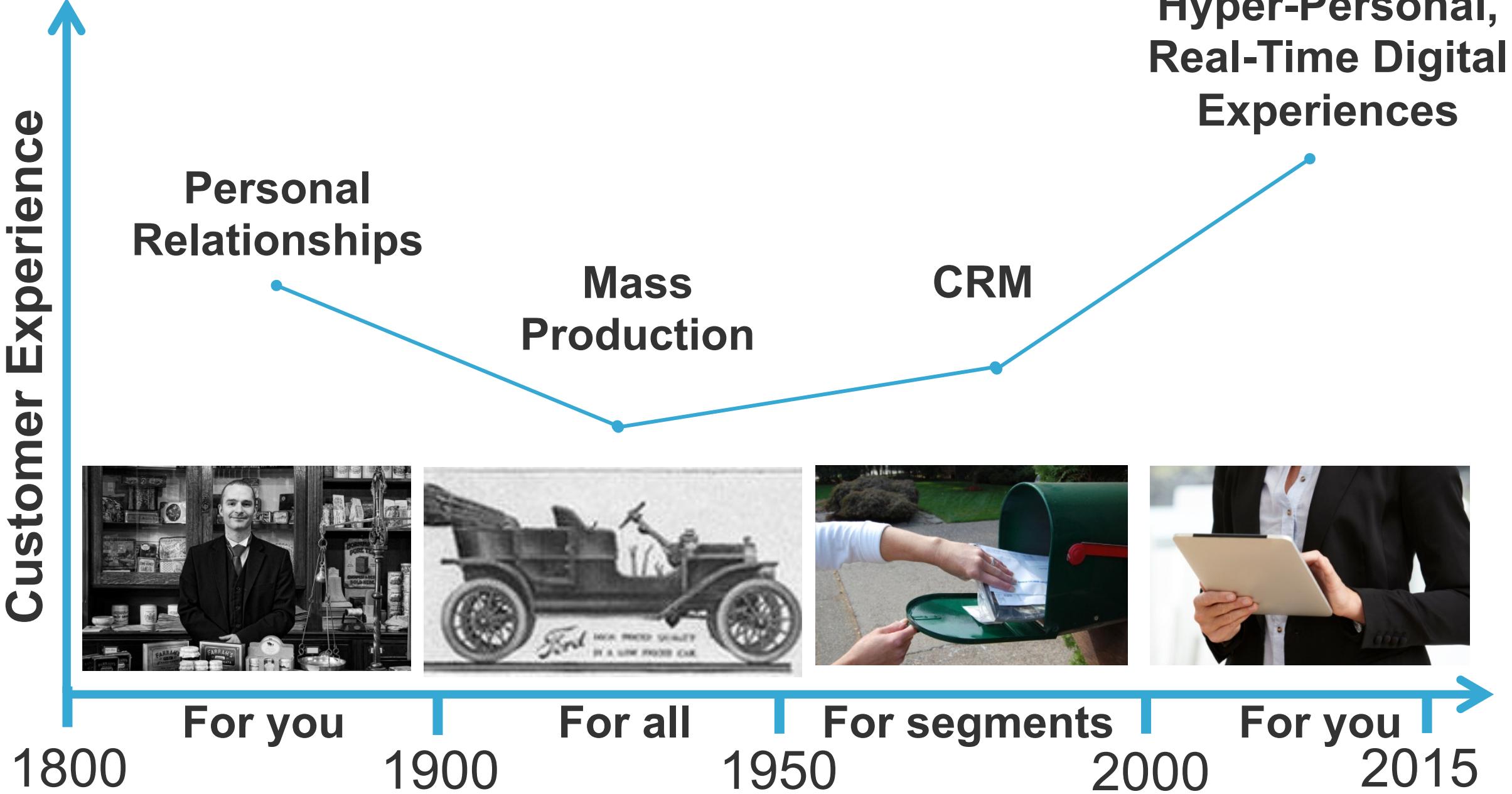
Source: Forrester Global Business Technographics Data And Analytics Online Survey, 2015

#Priority

Customer experience is a top business priority over the next 12 months



- › Base: 3,005 global data and analytics decision-makers
- › Source: Global Business Technographics Data And Analytics Online Survey, 2015



#Celebrity

A photograph of George Clooney and Amal Clooney. They are both wearing dark sunglasses and smiling. George is on the left, wearing a grey blazer over a light blue shirt. Amal is on the right, wearing a dark top and large, ornate gold earrings. They appear to be outdoors near a body of water, with boats visible in the background.

**Customers want and increasingly expect
to be treated like celebrities.**



Celebrity experiences must:

- Use analytics to learn customer characteristics and behavior
- Detect real-time context
- Adapt applications to serve an individual customer



Led Zeppelin II 1969

[+ Save as Playlist](#)[Share...](#)[Start Radio](#)

By Led Zeppelin

★	»	1	Whole Lotta Love	5:34	
★	»	2	What Is And What Should Never Be	4:44	
★	»	3	The Lemon Song	6:20	
★	»	4	Thank You	4:49	
★	»	5	Heartbreaker	4:14	
★	»	6	Living Loving Maid [She's Just A Woman]	2:39	
»	»	7	Ramble On	4:23	
★	»	8	Moby Dick	4:21	
★	»	9	Bring It On Home	4:20	

How can Spotify use location and accelerometer data generated by customers' while they listen?

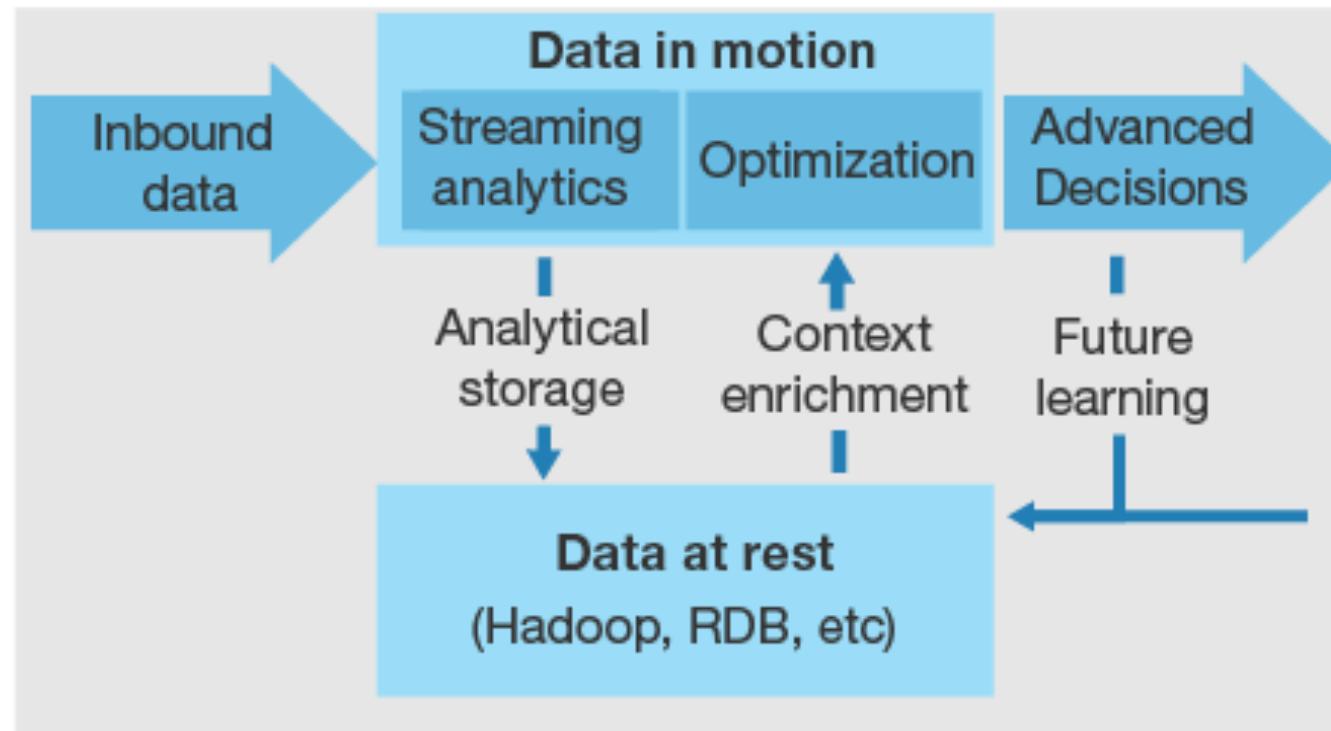
More by Led Zeppelin

1969 Swan Song Inc.

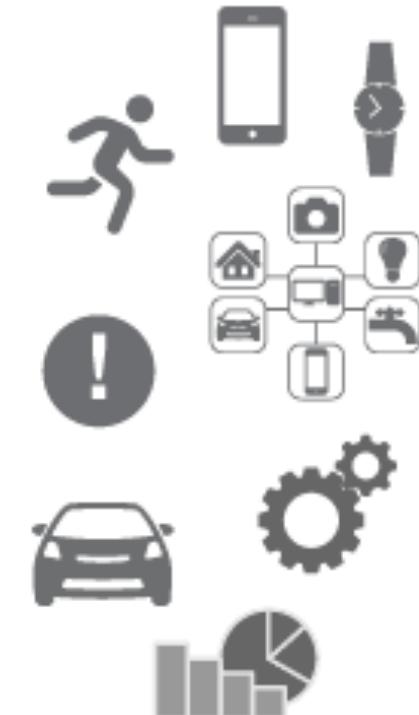
1969 Atlantic Recording Corp., a Warner Music Group company

Building celebrity experiences requires a real-time architecture.

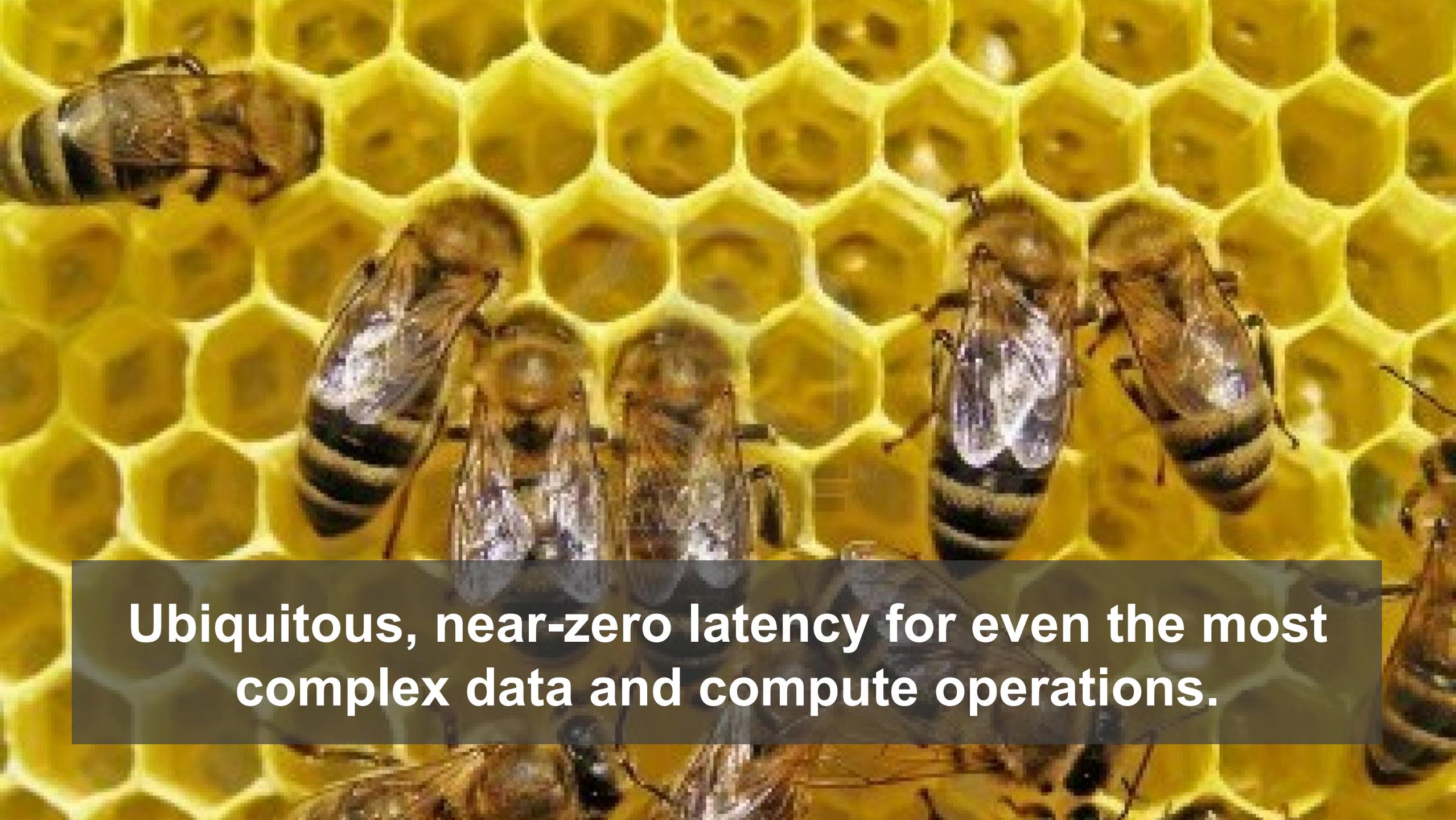
The Connected World



Applications



#In-Memory



Ubiquitous, near-zero latency for even the most complex data and compute operations.

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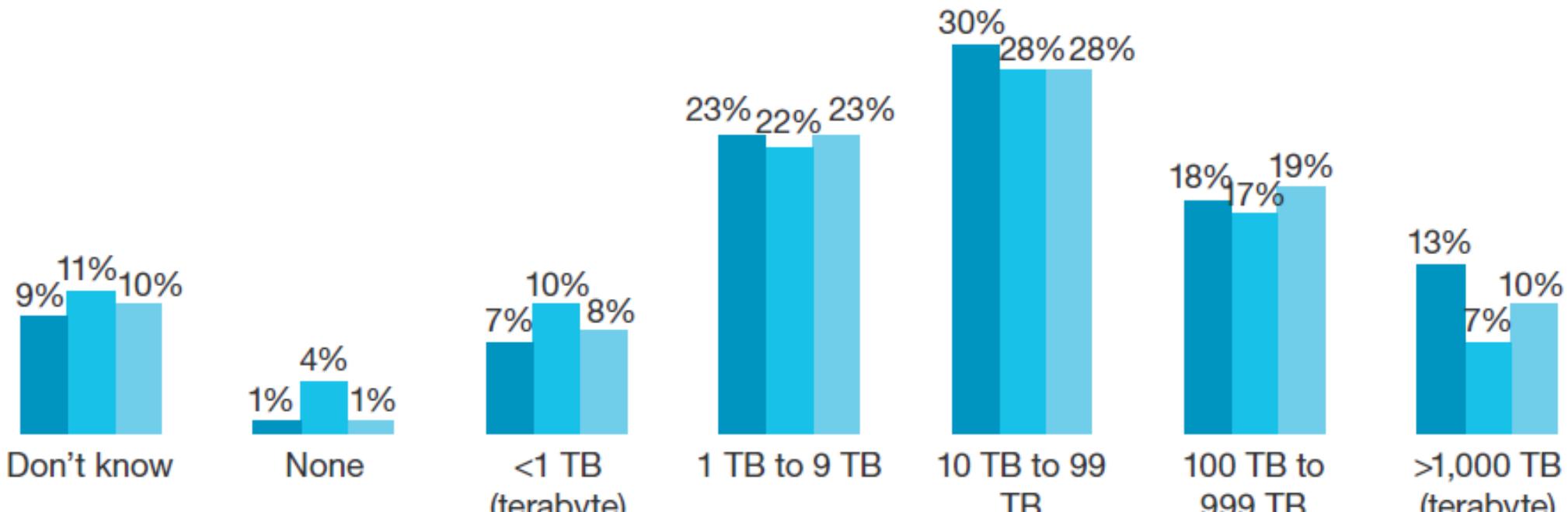
Technologies that are principally architected to use chip-based memory to accelerate the performance of data access and applications; and reduce the complexity of app development.

DEFINITION

Why not just pop your data in-memory?

“Using your best estimate, about how much data is currently stored in your company?”

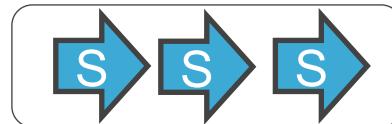
■ Structured data from transactional system ■ Semi-structured data ■ Unstructured data



Base: 1,805 global data and analytics decision makers

Source: Global Business Technographics Data And Analytics Online Survey, 2015

Streaming Analytics



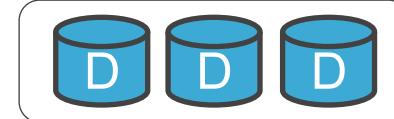
**Scale-up
Database**



**Data And
Compute Grid**



**Clustered
Database**



**General-purpose data
processing cluster**



#FastData

All data starts out fast, but is often only used after it becomes big data at-rest

- › Rich transactional data from portfolio of dozens or hundreds of business applications
- › Usage and behavior data from web and mobile apps
- › Social media data
- › Sensor and event data from IoT devices
- › Data economy – firms buying and selling data



Performance should not limit design decisions.



Scale should not limit design decisions.

A photograph of five large, cylindrical metal silos standing in a row. They have dark, conical roofs and are set against a clear, light blue sky. The silos are made of corrugated metal and show some vertical siding. The lighting suggests it's either early morning or late afternoon, casting long shadows to the right.

Security
110010011011001

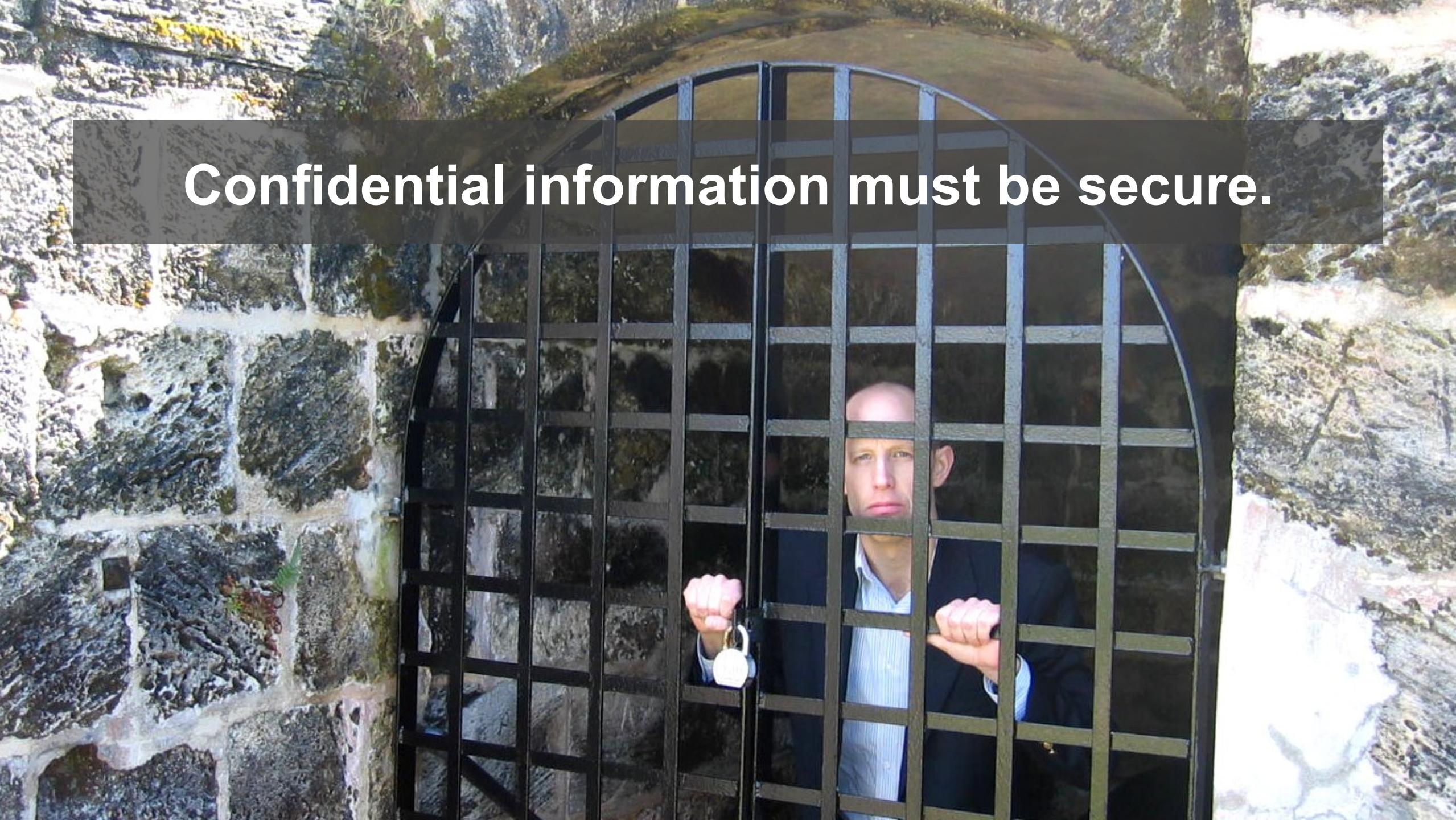
Transactions
0100110011011

Historical
0100100110

Customer data
0100

A white commercial airplane is shown from a front-three-quarter perspective, flying against a bright blue sky with wispy white clouds. The aircraft features a standard T-tail and two large engines mounted under its wings. A dark rectangular overlay at the bottom contains the text.

Fault-tolerance is non-negotiable.



Confidential information must be secure.



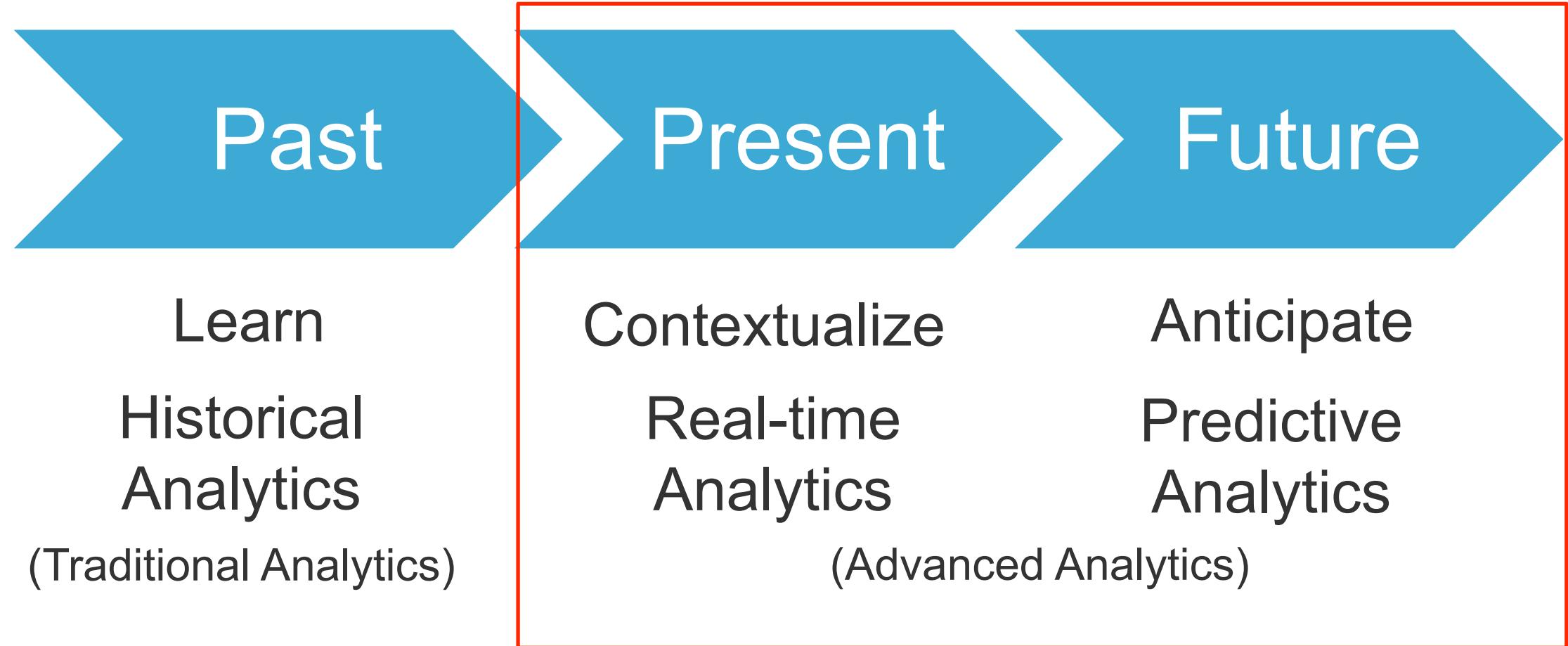
In-memory must fit and work seamlessly with existing architectures.

The background of the image shows a series of classical stone columns, likely made of marble or a similar material, arranged in a row. The columns have a fluted or grooved design and are set on a raised platform. The lighting creates strong shadows and highlights on the curved bases and the vertical ridges of the columns.

**In-Memory technology speeds application
development by reducing architectural concerns.**

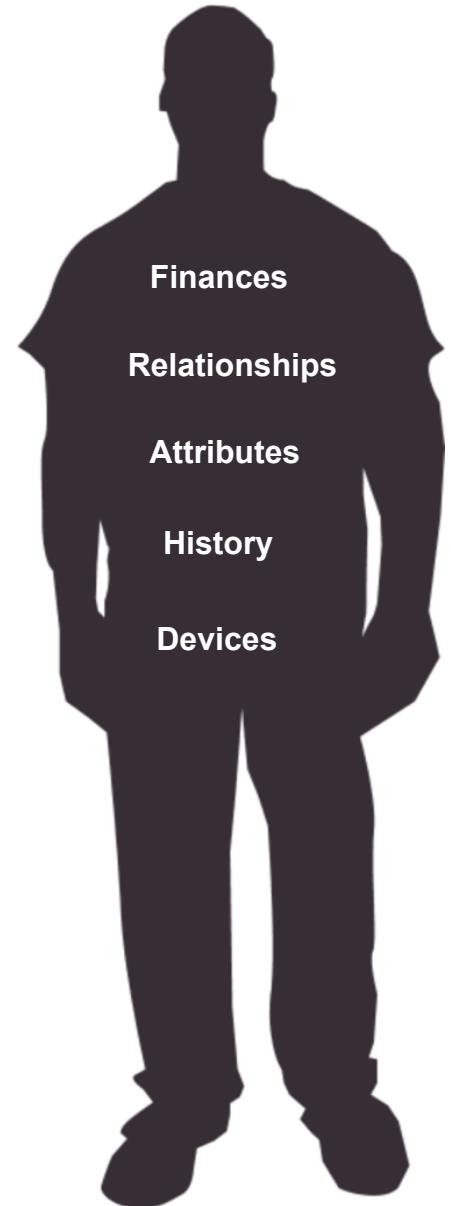
#FastAnalytics

Three kinds of analytics are essential to create predictive apps



#FastPrediction

Customer

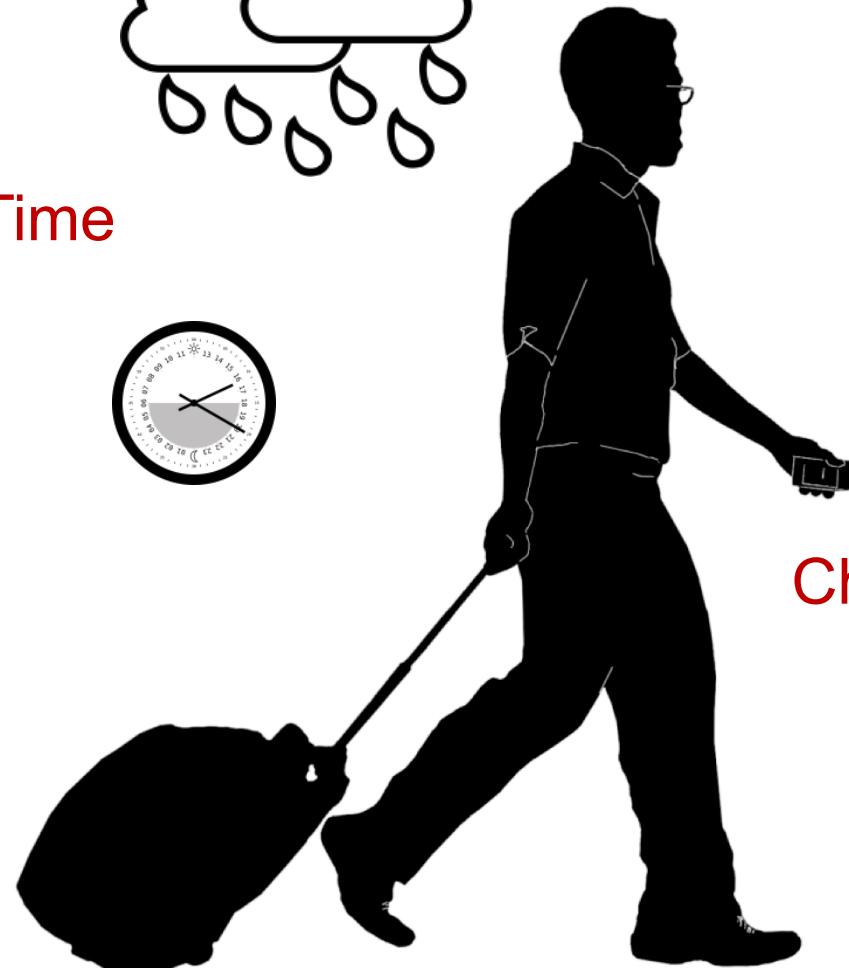


**Predict
characteristics,
behaviors, likes,
and needs.**

Weather



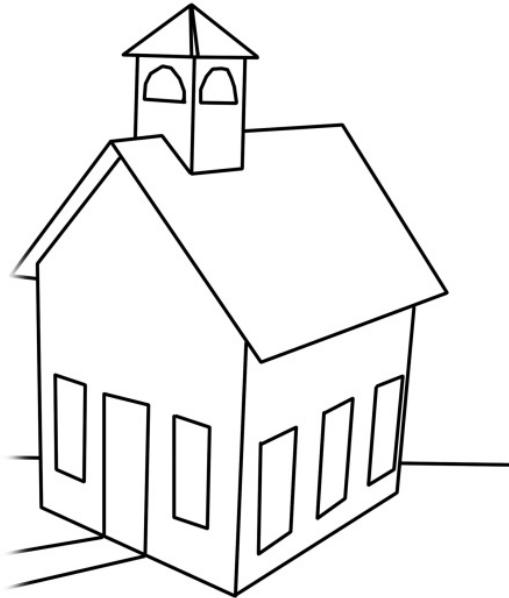
Customer



Time



Location



Channel

Behavior

Use in-the-moment context to predict next-best-action.

#Sensors

Your senses will never be the same.

Tommy

He will tear your
soul apart



Apps are blind – use sensors to make them
see.

Original Soundtrack Album Available On Polydor Records Screenplay By Ken Russell Directed By Ken Russell Produced By Robert Dickerson And Ken Russell
Executive Producers Beryl Vertue And Christopher Stamp Associate Producer Harry Bonn Distributed By

If you can measure it, then you can use it.

Distance	Speed	Heart Rate	Temperature	Time	Food Energy	Electric Resistance	Angular Acceleration	Force	Heat Transfer	Magnetic Field Strength	Magnetic Flux Density
Body Mass	Electric Current	Atmospheric Pressure	Heading	Blood Oxygen Saturation	Blood Glucose	Irradiance	Volume Flow	Impact	Power	Bicycle Cadence	Pace
Blood Pressure	Relative Humidity	Elevation	Frequency	Acceleration	Voltage	Run Cadence	Volume	Fuel Economy	Radioactivity	Electric Potential	Radiation Dose
Number of Steps	Body Fat	Depth	Weight	Blood Alcohol Content	Altitude	Step Rate	Mass	Sound Level	Radiation Dose Rate	Stride Length	Muscle Mass
Illuminance	Pressure	Wavelength	Wind Speed	Angular Velocity	Body Temperature	Geomagnetic Field Strength	Birefringence	Gamma Radiation	Beta Radiation	Dewpoint	Skin Temperature

Sensor taxonomy

	Definition	Examples
Biological	Biological sensors measure the states of living organisms, including body temperature, skin conductivity, brain activity, and blood pressure.	Nike's Fitbit, Scanadu's Scout, Mimo onesie, and NTT DOCOMO's Gyuonkei
Machine	Machine sensors measure the workings and conditions of human-made objects, including oil temperatures, engine vibrations, and component integrity.	GE's ANSI smart meters, the train and track contact sensor in the Hong Kong-China railway, and Progressive Casualty Insurance's Snapshot
Environmental	Environmental sensors measure the state of the world around us: temperature, air pressure, humidity, soil quality, water toxicity, and more.	Salinometers, mass spectrometers, and seismometers

Local or remote

Access modes Definition

Local access

- Sensors which are contained within the same device as the application making use of them, where the data does not need to be transmitted over an external server or network
- Example: A smartphone's accelerometer, GPS receiver, camera, and microphone are all direct access sensors

Remote access

- Freestanding or bundled groups of sensors where the data must be transmitted over a network to the software that will make use of it
- Example: A Nest Labs thermostat or a Dropcam digital camera which are interfaced with through cloud services



Fantasy becomes reality at Universal's Wizarding World with RFID sensor packed wands.

#Location



Location means latitude, longitude, and altitude.



Velocity represents speed and direction.

Orientation is the position relative to normal.



Location can have more value when augmented with both real-time and referential contextual information.

Referential Context (examples)

- › Address
- › Business name
- › Event
- › Road
- › Sale
- › Weather forecast

Real-time Context (examples)

- › Time
- › Relative humidity
- › Heart rate
- › Pressure
- › Sound level
- › Brightness

A close-up photograph of two young women with blonde hair, smiling broadly at the camera. They are holding shopping bags in front of them. The woman on the left is wearing a teal shirt and has a brown shopping bag. The woman on the right is wearing a dark blue shirt and has a yellow shopping bag. They appear to be in a store or mall setting.

What if you knew your customers were “show-rooming” when they walked through your store?

#FastApps

Design apps that are always aware.

Define events gleaned from monitoring sensors, patterns, and individual profile to trigger intents.



Smartphone GPS detects that you are at a golf course.

Define intents to know when the app may be useful to the user.



Possible intents:
play golf, play tennis,
lunch at the clubhouse,
or pick up spouse.

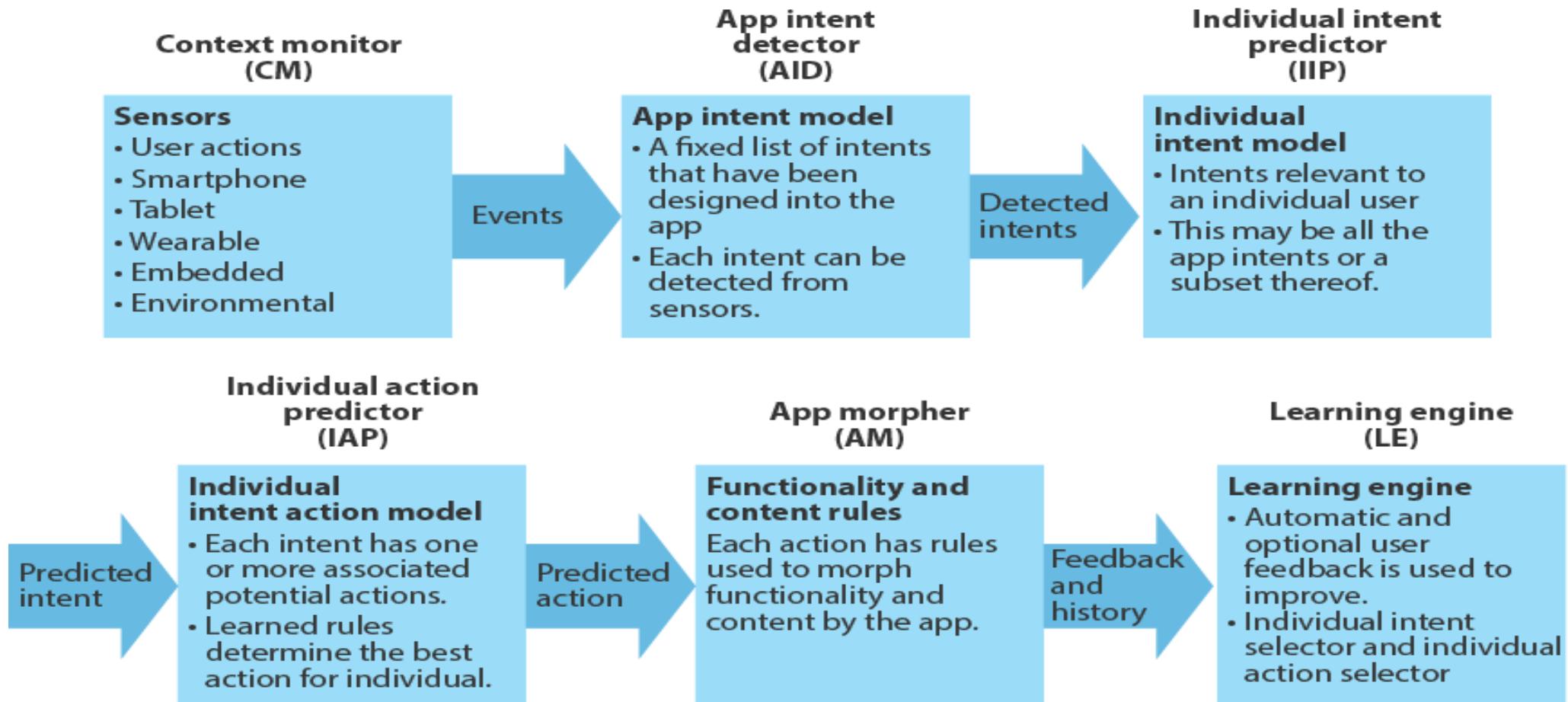
Define the actions that the app can take for the individual user.



Possible actions:
confirm tee time, reserve court,
reserve table, text spouse.

Source: Forrester report “Predictive Apps Are The Next Big Thing In Customer Engagement”

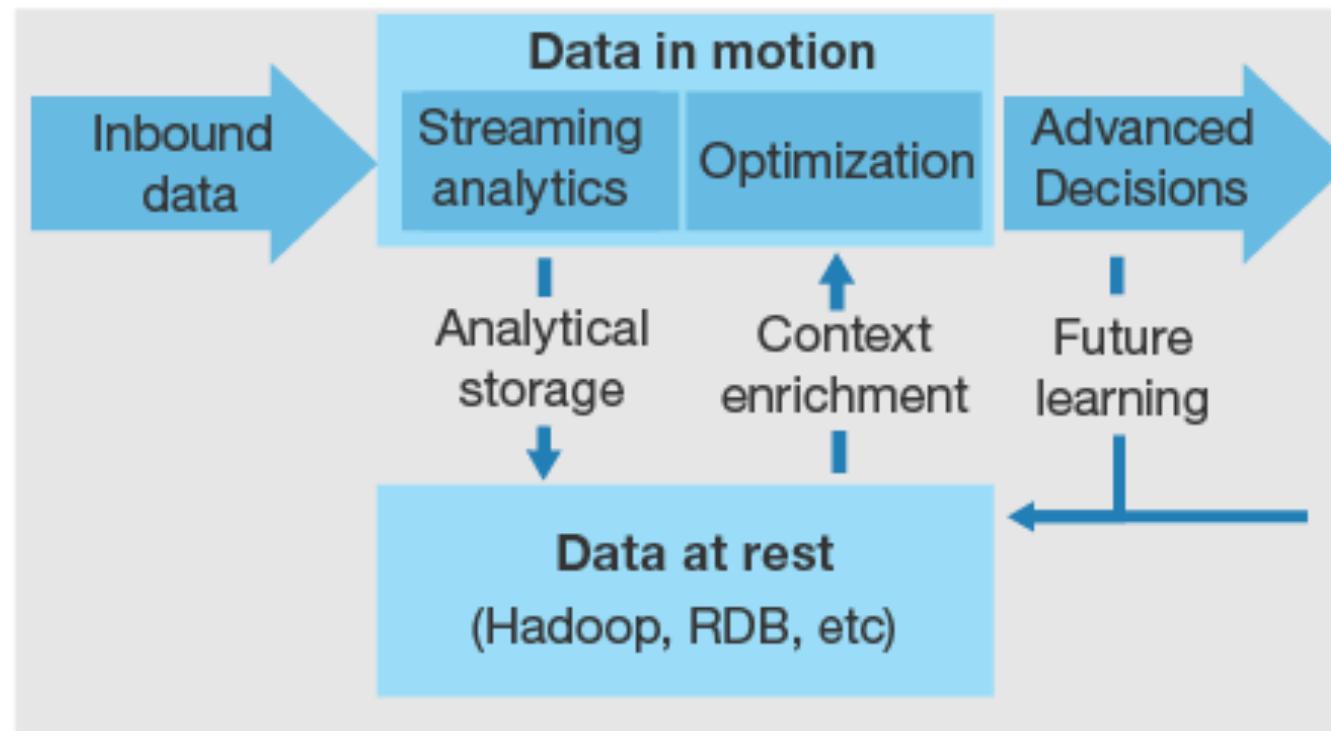
You must use in-memory platforms to detect, predict, and act in real-time.



Source: Forrester report “Predictive Apps Are The Next Big Thing In Customer Engagement”

In-memory technology is the industrial-strength, real-time glue that makes it all work together.

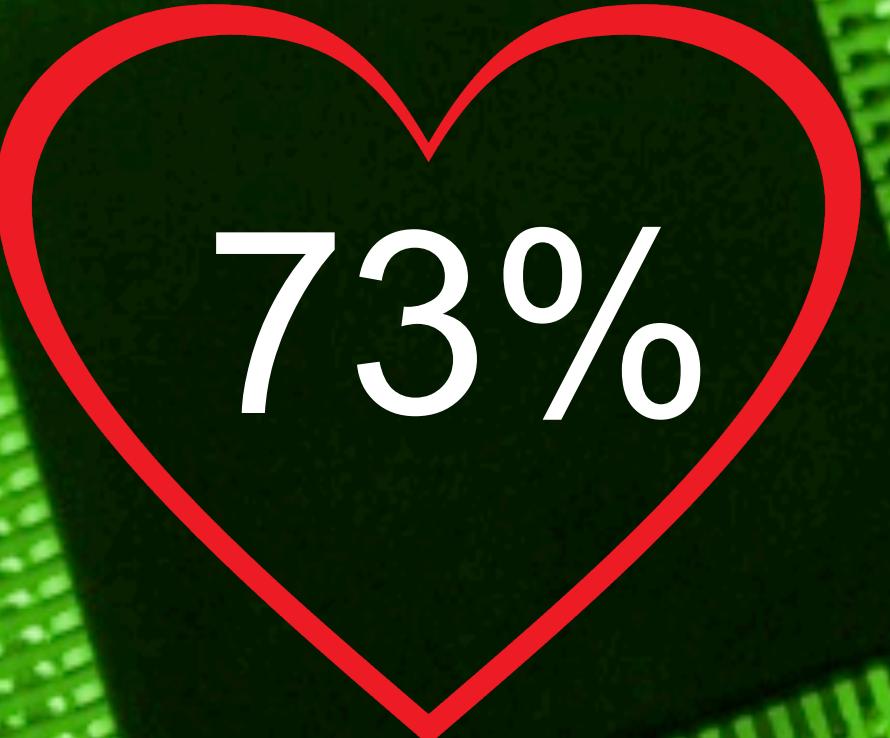
The Connected World



Applications

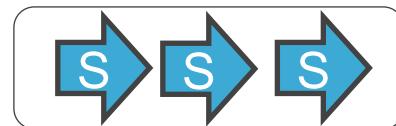


#Priority

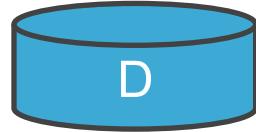


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Streaming Analytics



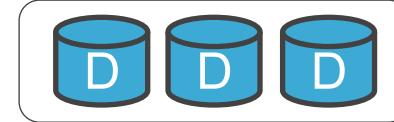
**Scale-up
Database**



**Data And
Compute Grid**



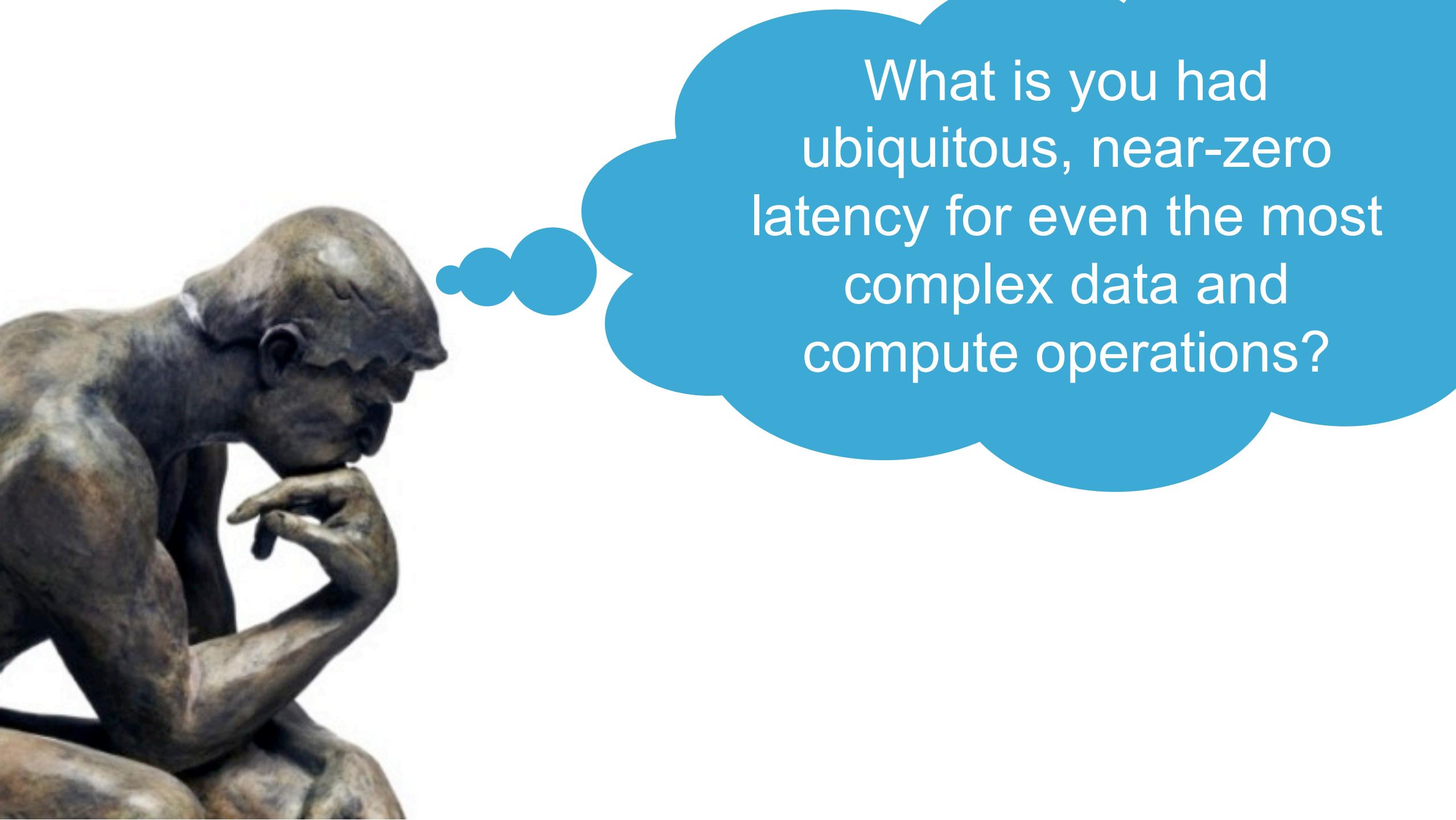
**Clustered
Database**



**General-purpose data
processing cluster**



#Opportunity



What is you had
ubiquitous, near-zero
latency for even the most
complex data and
compute operations?

What if you had ubiquitous, near-zero latency for even the most complex data and compute operations?

1. Walk through critical or challenging business processes
 - At each step of the business process ask how in-memory could improve the process

2. Walk through customer journey to improve digital experience design
 - At each step of the customer journey, ask how in-memory could help create a dazzling, new customer experience.

Thank you

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