



5 Requirements driving Modern Applications

High-Performance, feature-rich NoSQL database to support modern applications

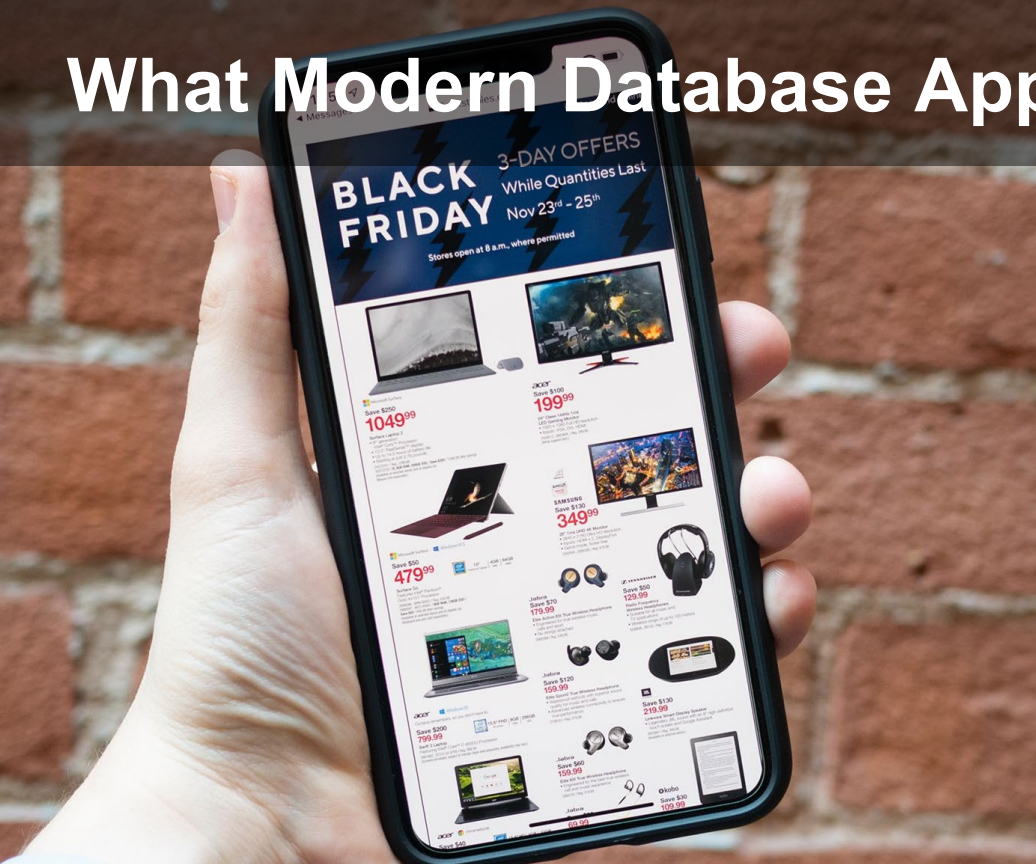
Jeff Morris, VP Product & Solutions Marketing

June 2023

Agenda

- 1 How Modern Apps are Evolving
- 2 Why Performance Matters
- 3 Why Database Flexibility is Important
- 4 Mobile & Distributed Workloads
- 5 How to Lower TCO, too

What Modern Database Applications are Starting to Look Like



Customers & The Market: Application Needs Have Changed



Deliver Great Experiences

- Personalized & responsive
- Anywhere & everywhere
- Real time info & inventory
- Ensuring dependable transactions

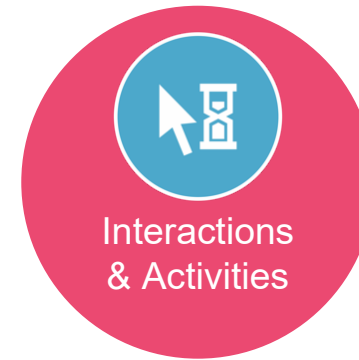
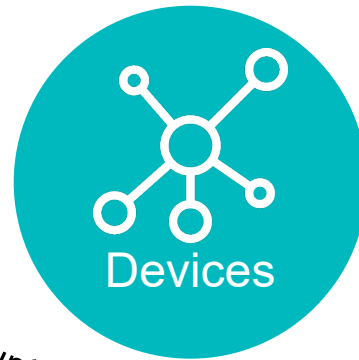
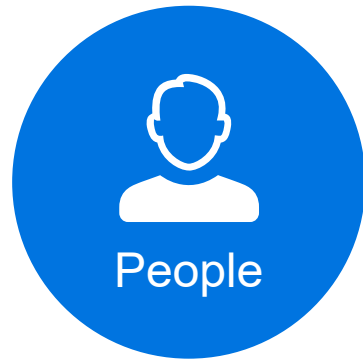
Develop Efficiently

- Simplify & accelerate development
- Tap my skills (SDKs & SQL)
- Support best practices
- Avoid data sprawl

Deploy Effectively

- Support hybrid clouds, Edge, 5G
- 100% uptime & global scale
- Flexible management options
- Cost effective

Common Application Attributes



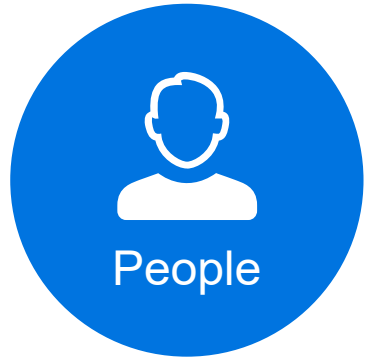
Goal: Match the account profile with the catalog



What's the **Intelligence** in the custom-made app that uses Couchbase



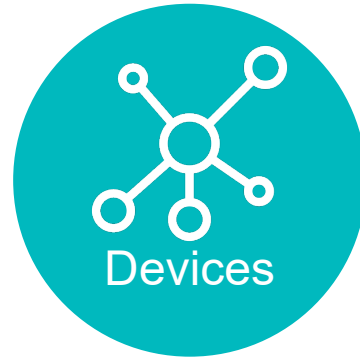
Business Issues Facing These Applications



People

Application Flexibility
so you can build personalized profiles and match them to complex catalogs

Mobility
so the experience can happen anywhere even without internet.



Devices

Application Performance
so the experience is really fast (no latency)



Interactions & Activities



Locations

Distributed Workloads
so the experience can scale anywhere on the planet



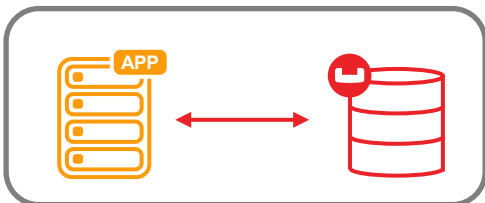
Catalogs & Offers

Developer Productivity
so the development team can build a feature-rich application without introduction complexity, and use the skills they have today.



Legacy Data & Infrastructure

High Cost of Operations
so the application can deliver on its ROI promises, shrinking cloud footprints and doing more on fewer resources than other alternatives



Modern Use Cases Are Found Across All Industries



Travel & Hospitality

- Shopping Cart
- Mainframe Offload
- Inventory/Price Management
- Recommendation Engine
- Fleet Tracking
- Crew Services
- Reservation & PNR
- Mobile Wallet



Telecom

- Content & Service Entitlement
- Rate Limiting
- Location Manager
- Program Status
- Media/Content Catalog
- Billing Center
- Identity Platform



Retail & E-Commerce

- Shopping Cart
- Product Catalog
- Personalization
- Mobile Wallet
- Loyalty Program
- Product Reviews
- Click & Collect



Financial Services

- Market Data 360
- Portfolio Mgmt
- Trade Analytics
- Fraud Detection & Scoring
- Risk Analysis
- Insurance Portal
- Application Processing



Gaming

- Messenger App
- Beaconing
- Social/Casual Gaming
- Media/Content Catalog
- Personalization
- Real-time Game Tracking



Media & Entertainment

- Messenger App
- Beaconing
- Social/Casual Gaming
- Media/Content Streaming
- Personalization
- Real-time Viewer Tracking



High Tech

- Live Chat
- Site Monitoring Platform
- Real-time Reporting
- Ad Targeting
- Account Profile



Healthcare

- Device management
- On-demand care
- Health activity logging
- Medical record management



Logistics & Manufacturing

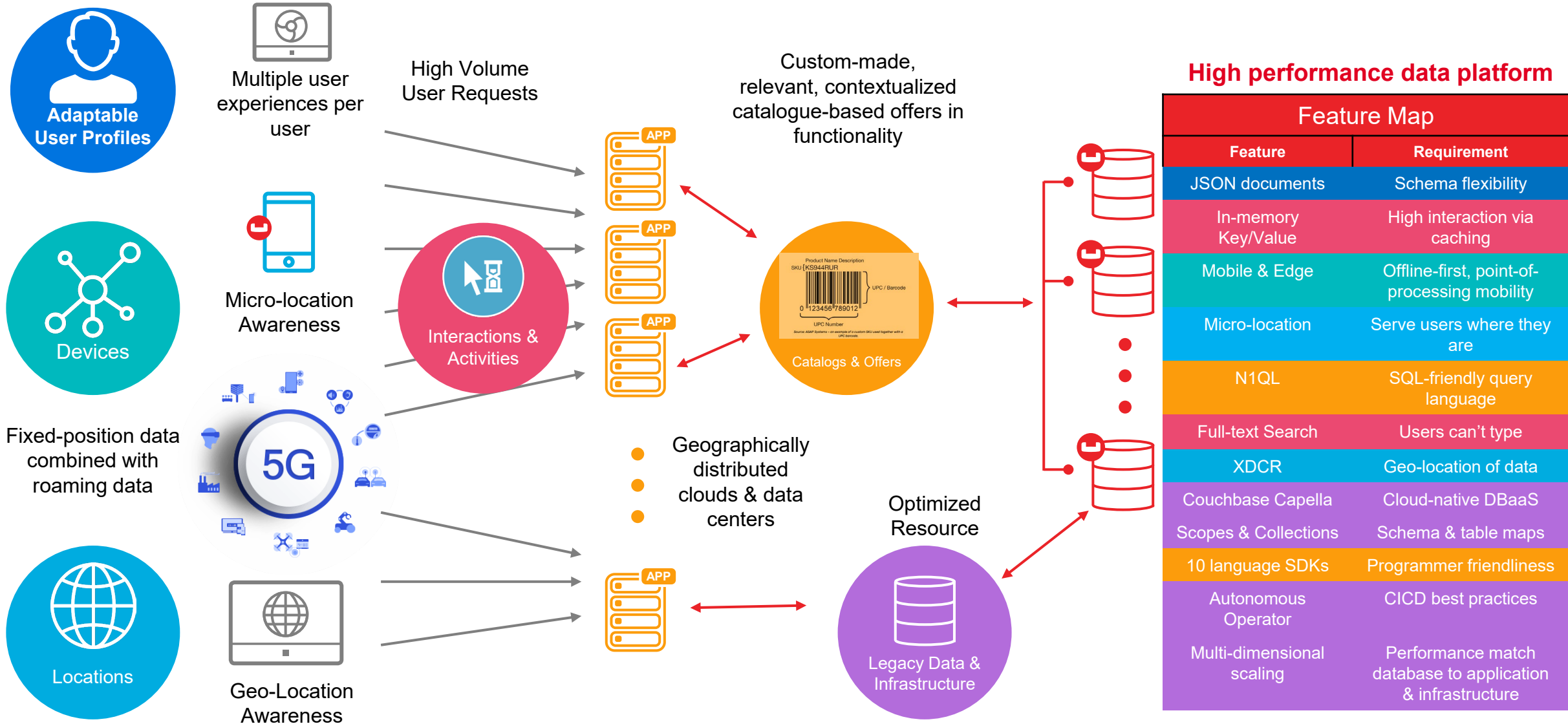
- Inventory Management
- Device Management
- Shipping Asset Tracking
- Factory Automation



Application Objects Mapped by Vertical

Object	Pain in IT that we solve		Telco/Media	Retail	Travel	Health	Financial Services
People	Flexible Profiles (JSON), forgiving searches (FTS)		Users, technicians, sales people, genius bars	Customers, employees: service reps, sales people	Passengers, crew members	Patients & doctors, care providers	Customers & accounts, policies
Devices	Smartphones, tablets, sensors, RFID tags, (5G Mobile & Edge, 5G's, embedded CB lite)		Phones, tablets, TVs, computers, set tops	Phones, computers	Phones, sensors	Phones, online, Med Devices	Phones, online, ATMs, mobile claims
Micro & Macro Locations	Cloud, Mobile & Edge, 5G near-field sensors, Geo-sensitive XDCR		Home, Roaming, Country	Home, Store, Geo location	Origin, Destinations, Country	Hospitals, clinics, homes, country,	Home, banks, office, state, country
Interactions	Cache-powered performance between the application and the database. Low latency		Content consumption, Apps on devices	Online shopping, Mobile apps, in store purchases	Online booking, in-flight consumption, in-trip purchases, etc.	Online visit, on-site visit, emergency visit.	Banking, trading, borrowing, credit transacting, insurance
Catalogs/ Offers	Catalog offers are presented in context to profile, location and search inputs		Streaming content, Mobile products, devices, apps	Products, Merchandise, sales, vehicles, software	Tickets, reservations, excursions	Symptoms, health history, Healthcare orders, prescriptions, medication	Card transactions, stock trades, Loans, Insurance options, fraud identification
Legacy Data & Infrastructure	RDBMS (SQL), Mainframes, on-prem systems that are failing, inflexible, rigid and expensive.		Mainframe, Media & Relational	Shipment records, onsite sales, merchant systems	Rewards memberships, past bookings, spend & budget	Patient history, medical research, treatment plans	Credit profiles, tax records, account holdings, transactions, etc.
Intelligence in the App	Customer 360 w/ Analytics, and AI-powered application logic from development team		Interests, buying patters, family size, members, device usage, app usage	Product suggestions, seasonality, online & mobile offers	Location (on ship, on plane, in hotel, on train), Important sites, local events	Patient outcomes, long-term care plans, drug research & trials	Insurance coverage, card purchases, savings, employment,
Deployment Destination	On prem, Raw cloud (mobile), self-managed cloud (CAO), DBaaS (Capella)		Self-managed clouds, on-prem data centers, DBaaS, worldwide coverage				

Technology Problems & Data Requirements in the Application



Problems Facing Modern Apps & What's Needed to Fix Them



Performance

Databases failing demands for millisecond response



Memory-first speeds



Innovative Active-Active clustering

Flexibility

Teams lack agility and face increasing complexity



JSON schema flexibility for personalization



Multimodel resource optimization

Mobile/IoT

Customer doesn't have on-device experiences



Mobile and IoT Application sync



Easy as SQL, with transactions, too

Shocking Cloud Costs

Excessive resource consumption from antiquated designs



Incredible price/performance

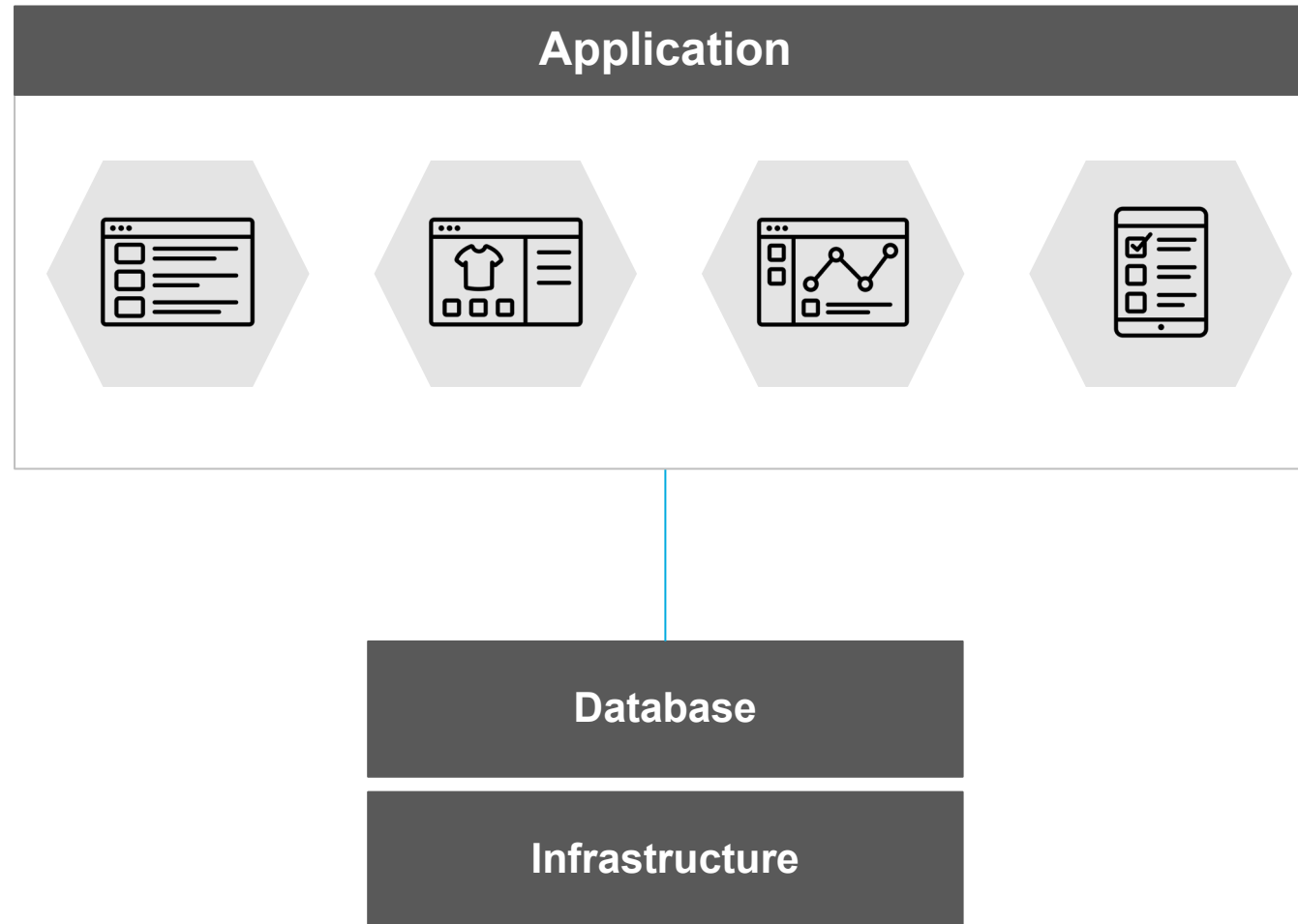


Lower cloud and operating costs



Simplistic View: Data Management For Applications

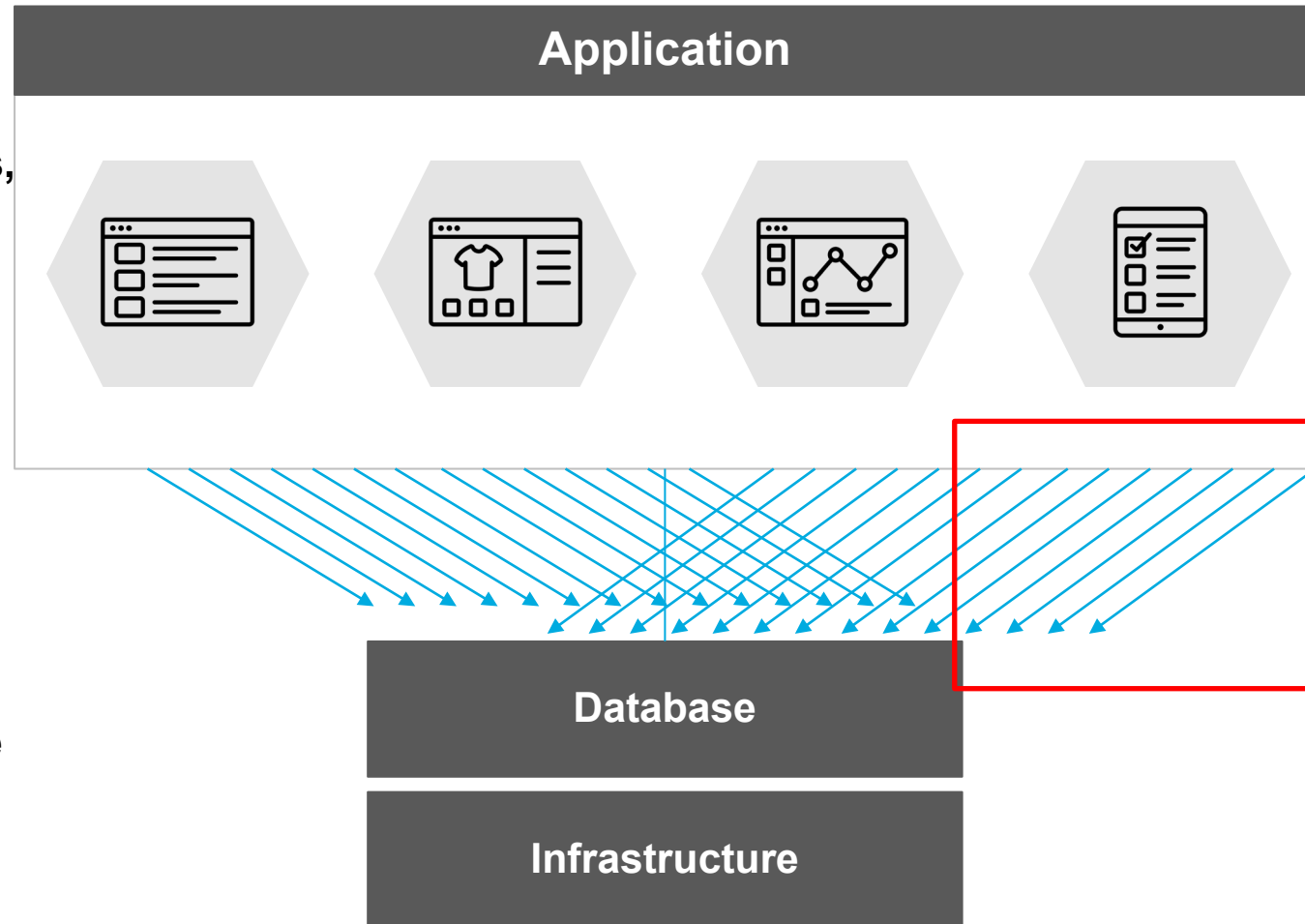
Functional Requirements



Why Application Performance issues Happen...



Not enough connection ports,
or
the queue is too long,
or
the backend doesn't answer
fast enough,
or
it wasn't built for the volume
we have now... Etc.



The problem presents
itself like a phone
call's buzzy signal.

The request can't get
through...

and that is bad.

(ask why it's bad!)
Unhappy users, crashes, lost revenue,
etc...



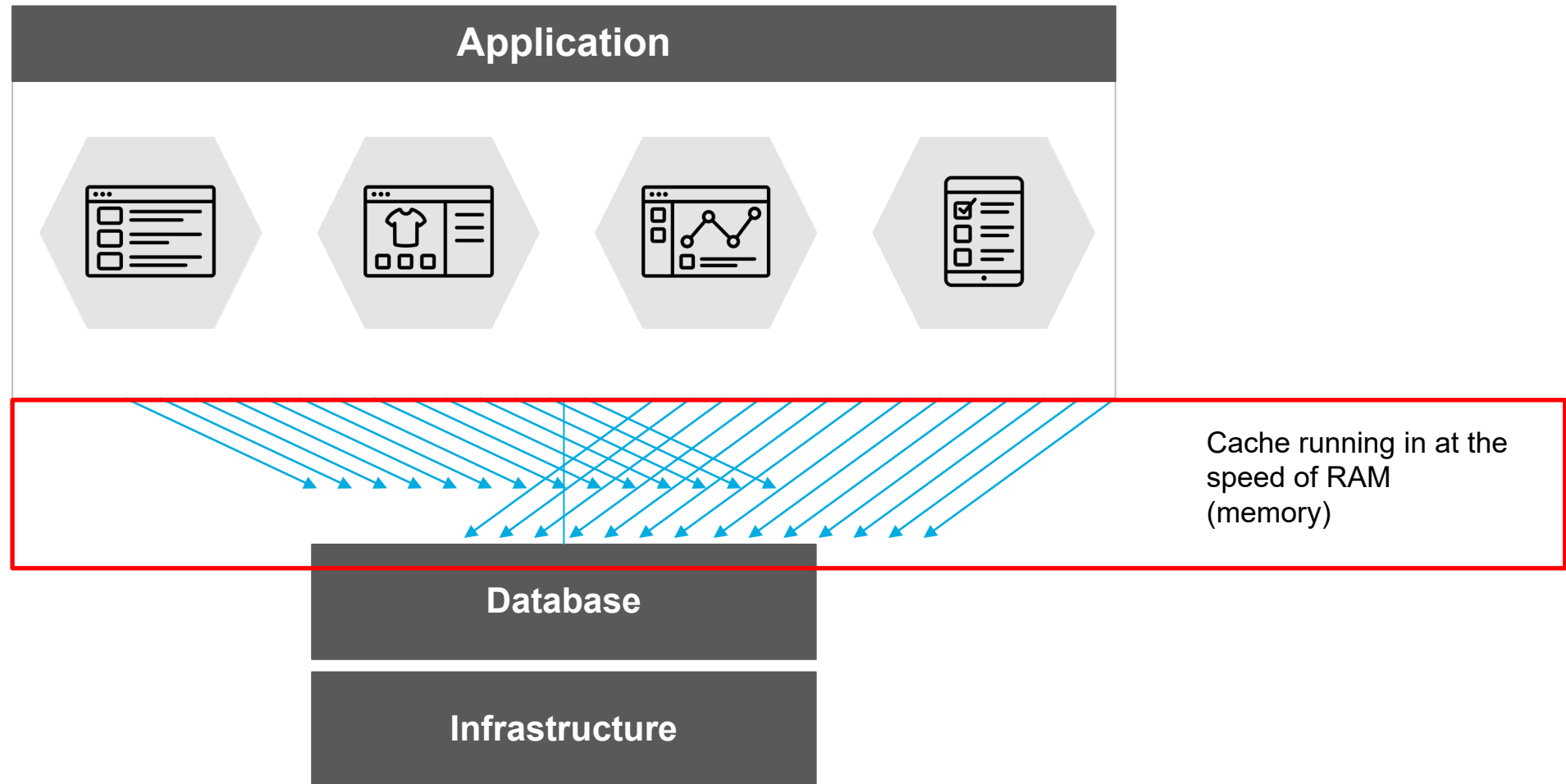
How Does Caching Help

Many Databases act as an in-memory cache,

...which means that it saves previous common requests and activity data & reuses it, instead of looking up the same value over-&-over in the back-end system.

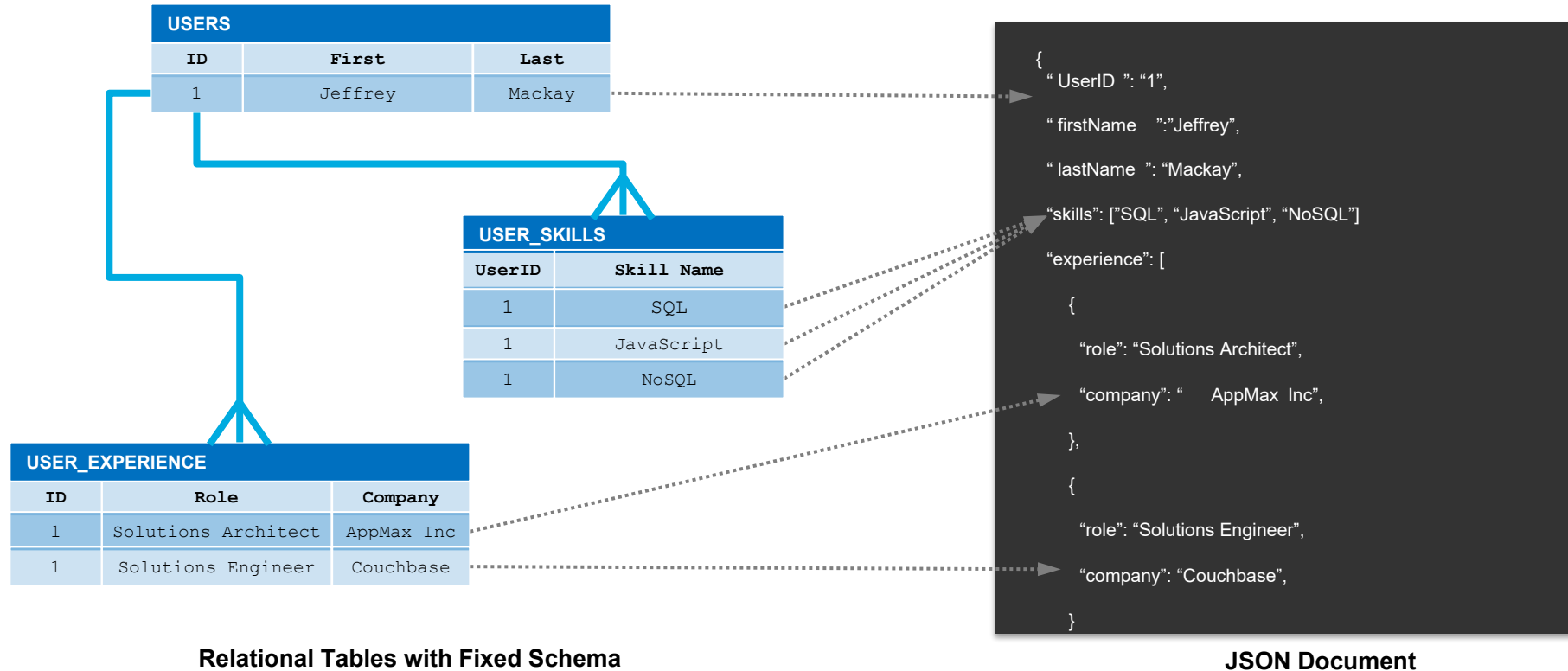
So the Cache only asks the backend for information that it doesn't have in the memory cache.

This means that fewer request need to hit the back-end system, and therefore it reduces the burden on that system



JSON's Flexibility puts the App Developer in Control of the Data

JSON makes changing dynamic user profiles and complex catalog entries very easy



Store data in logical ways:

- Denormalized single document
- Normalized with references
- Add new values when needed
- Support for binary values
- As relational schema using Scopes & Collections

Access Data in multiple ways:

- Direct Key-Value
- SQL++ querying
- Full-Text Search
- Time Series
- MPP analytics
- As Events

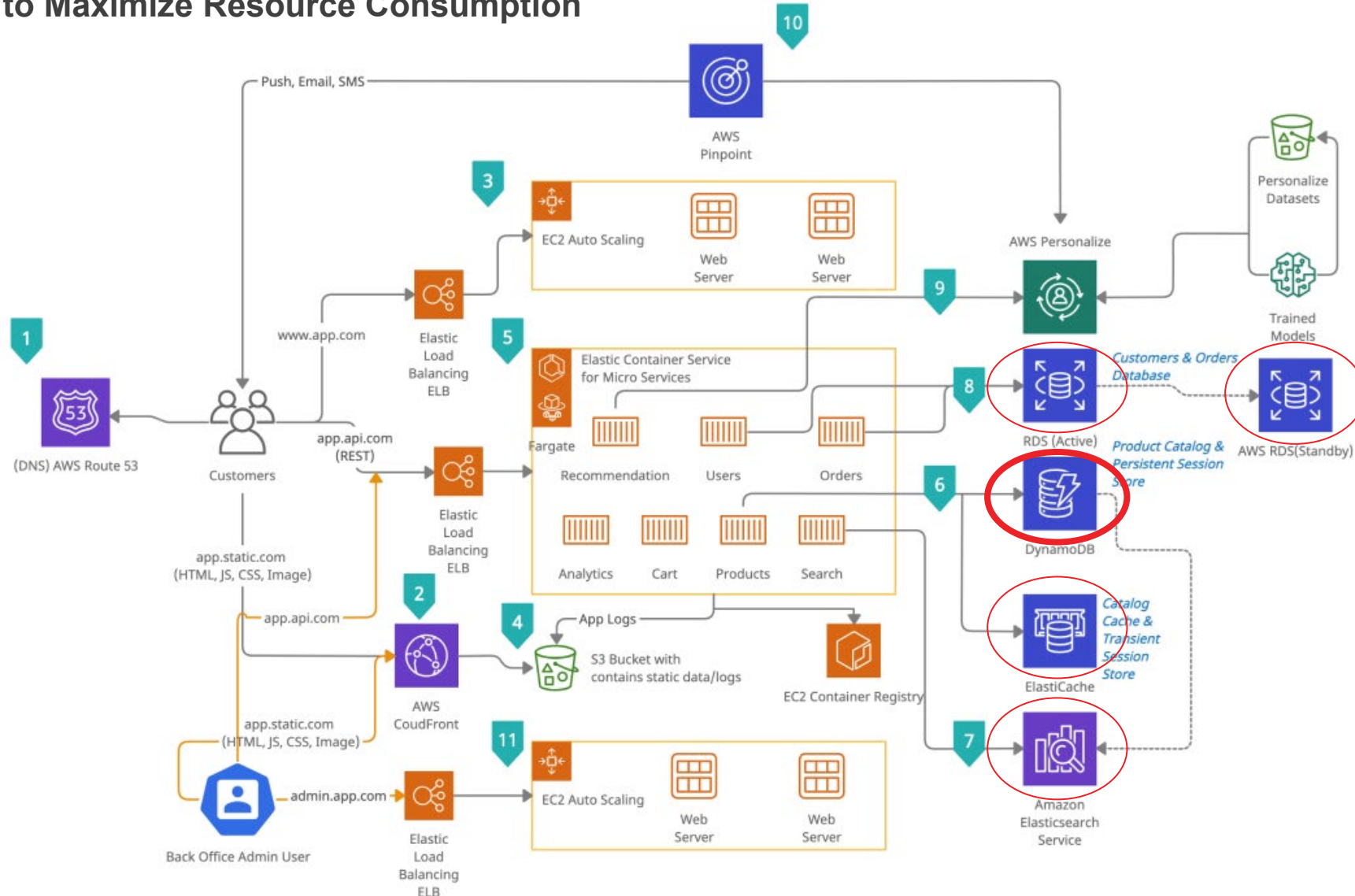
Unlike document databases, RDBMSs store JSON as a column datatype, therefore it is still attached and bound to the schema, and updating JSON values is... "a PITA," and limited to the JSON extensions added to the vendor's query language.

Unlike relational databases, the application developer controls the structure of the data, rather than the DBA who owns the relational schema, thereby dictating the application's structure.

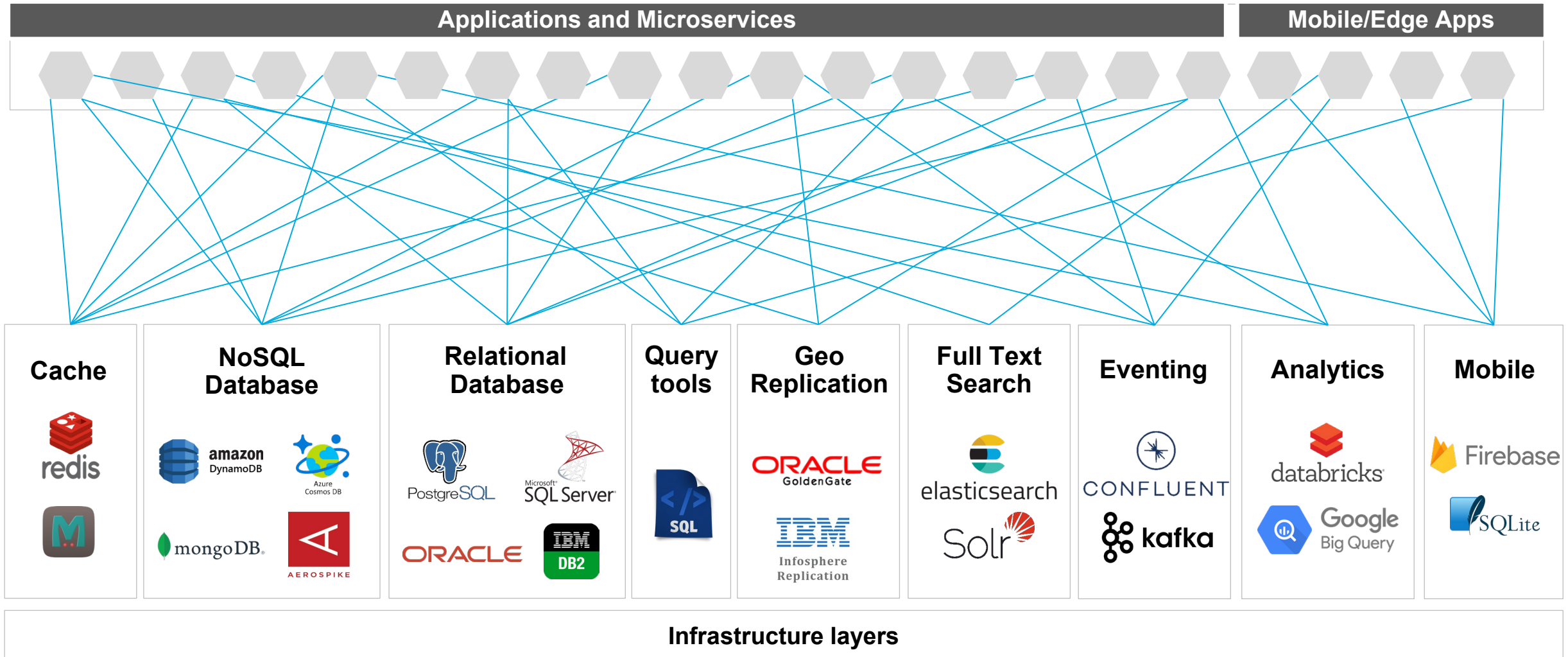
Cloud Providers Endorse Polyglot Persistence Designs



The intent is to Maximize Resource Consumption

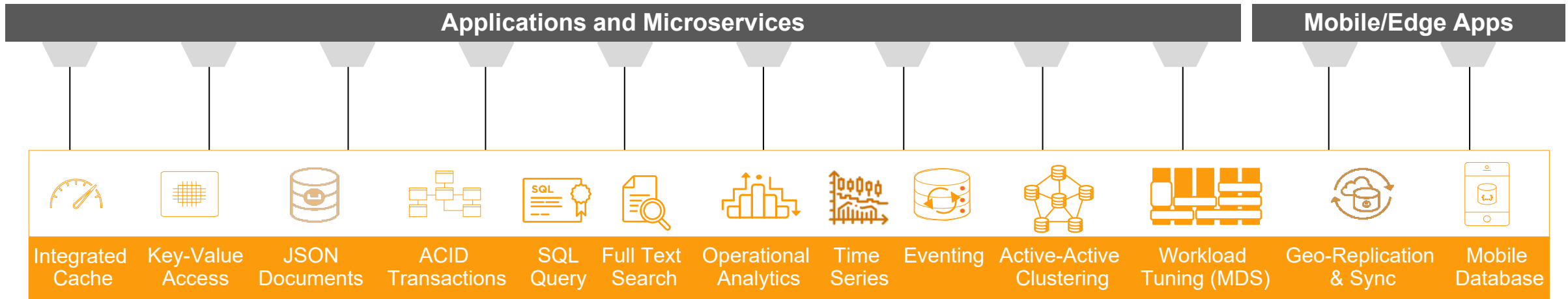


Database Sprawl Creates Complexity and Prevents Flexibility





JSON-Enabled Consolidation Offers Many Benefits



Fast

- Memory-first design
- MDS resource scaling
- Geo-replication & sync
- Ultra-low latency

Affordable

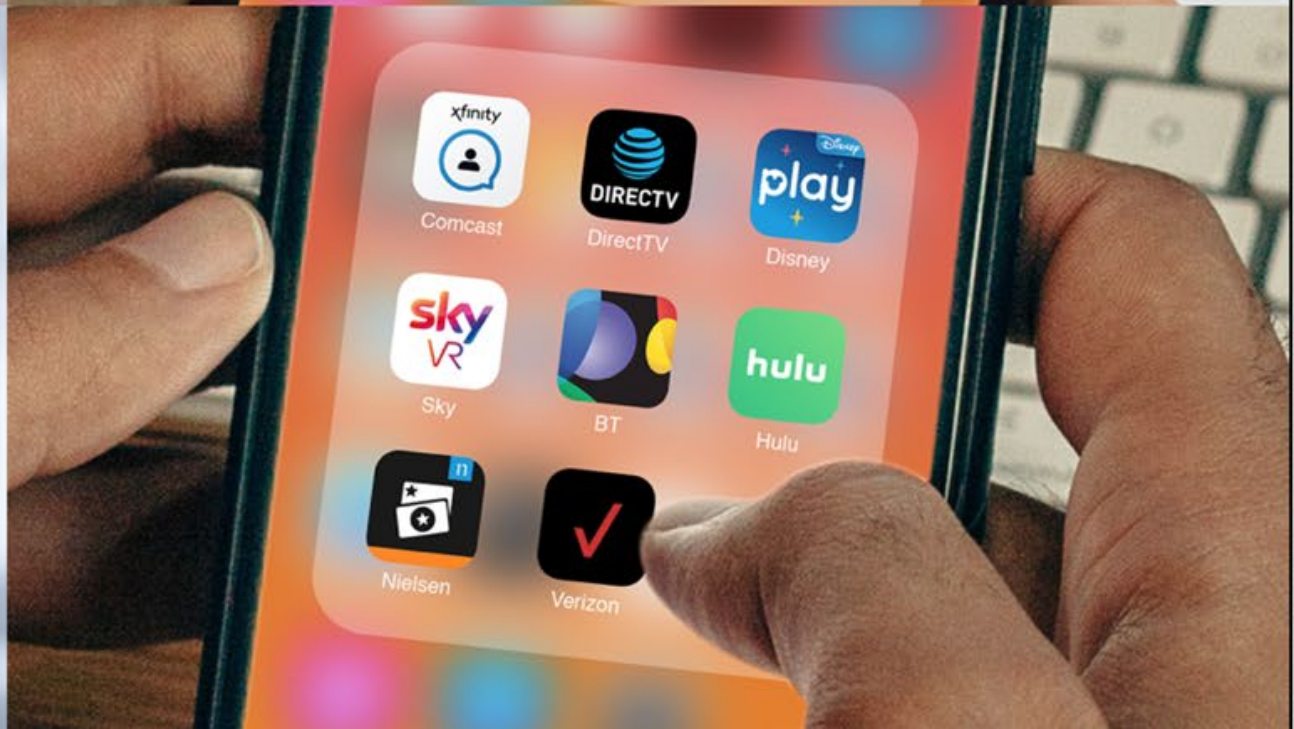
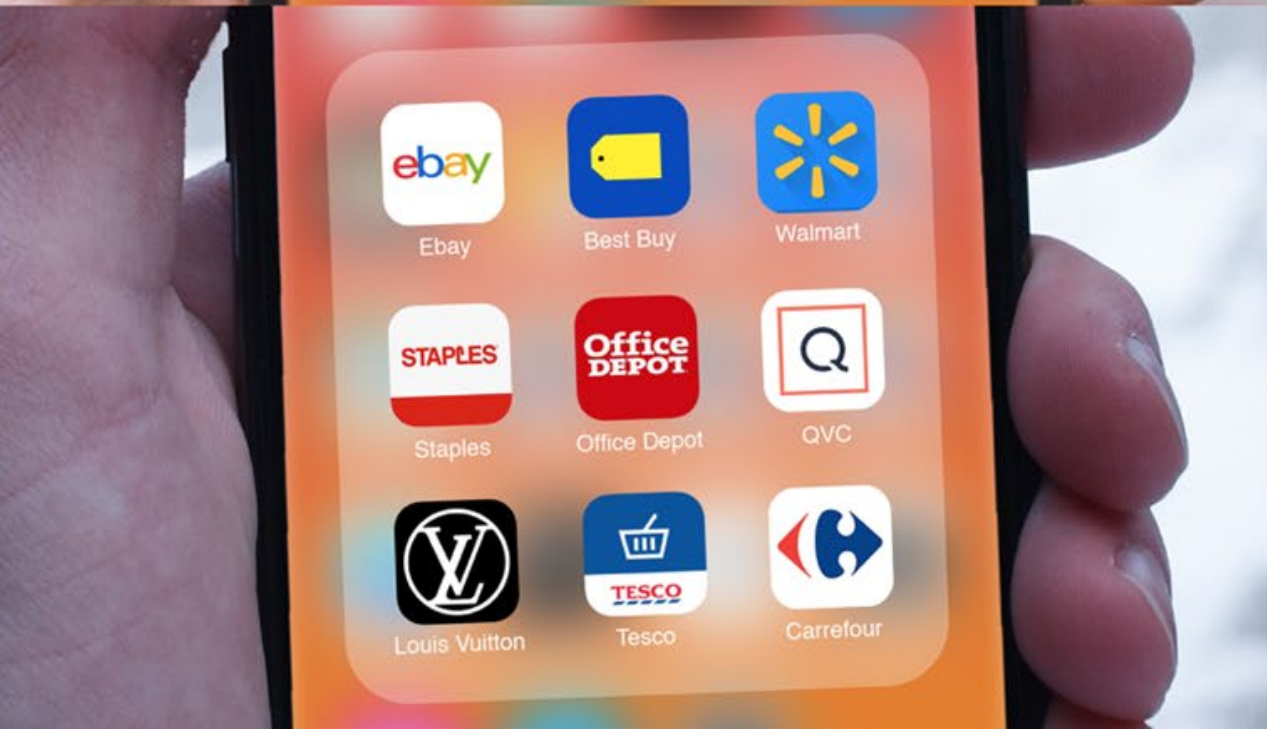
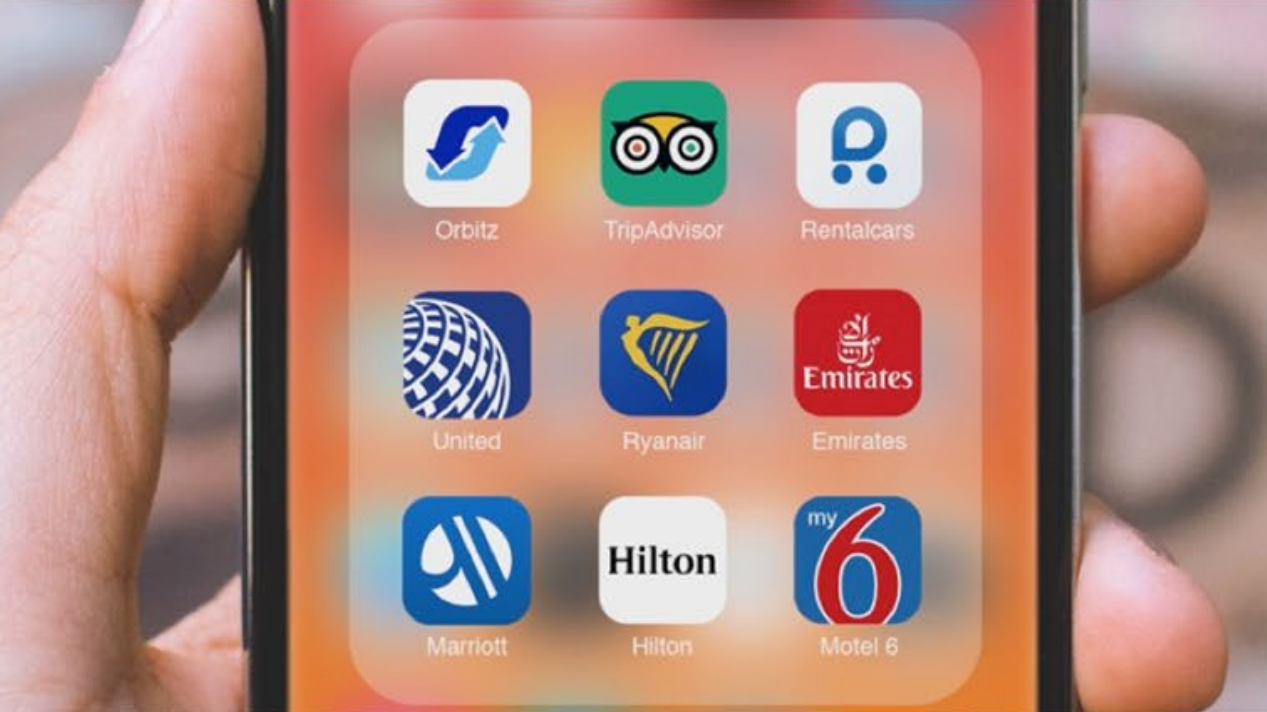
- Incredible price/performance
- Elastic scaling up & down
- High-density storage
- HA, DR & backup

Versatile

- Flexible JSON documents
- 7 Multimodel access services
- Composable features
- Mobile & Edge
- Peer to Peer Mobile Sync

Easy as SQL

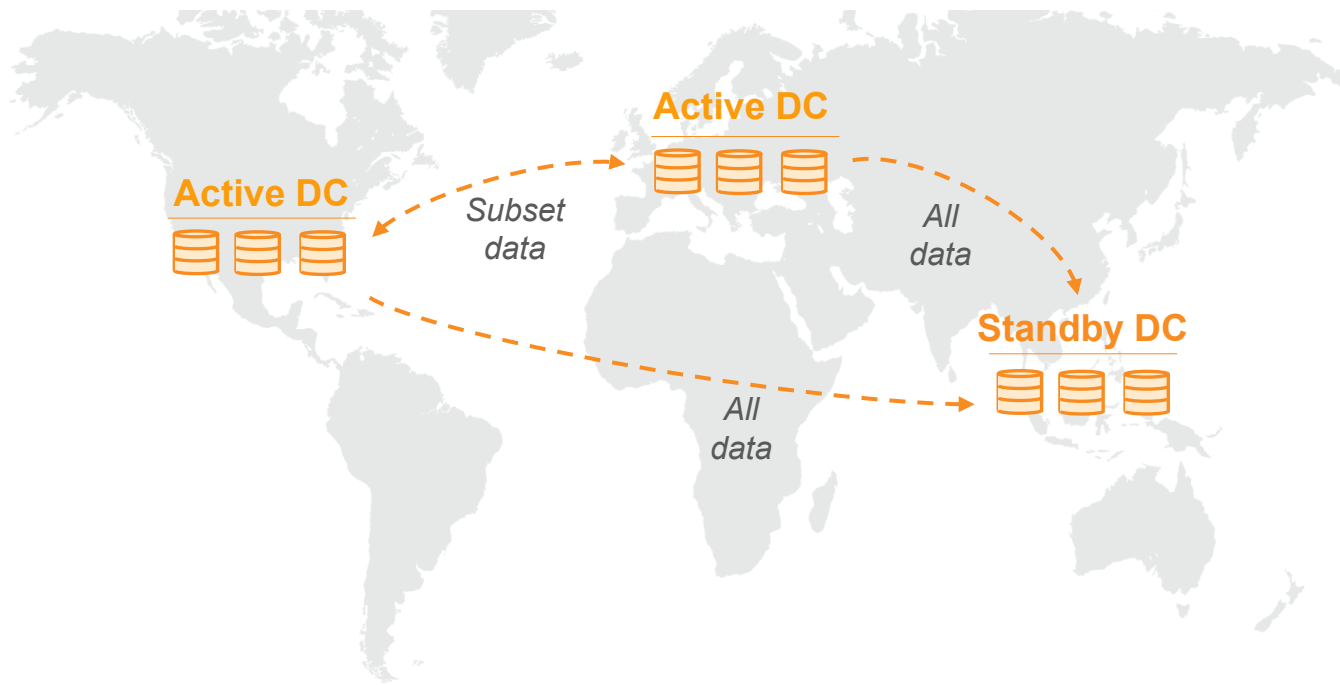
- SQL++ is SQL for JSON
- Schema on-demand
- Multi-doc ACID SQL Transactions
- SDKs for 12+ languages



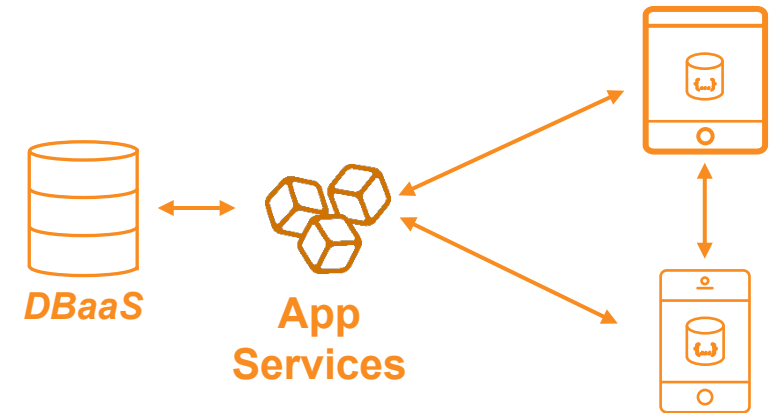
Mobility & Distributed Processing



Geo-Replication Service



Mobile Sync

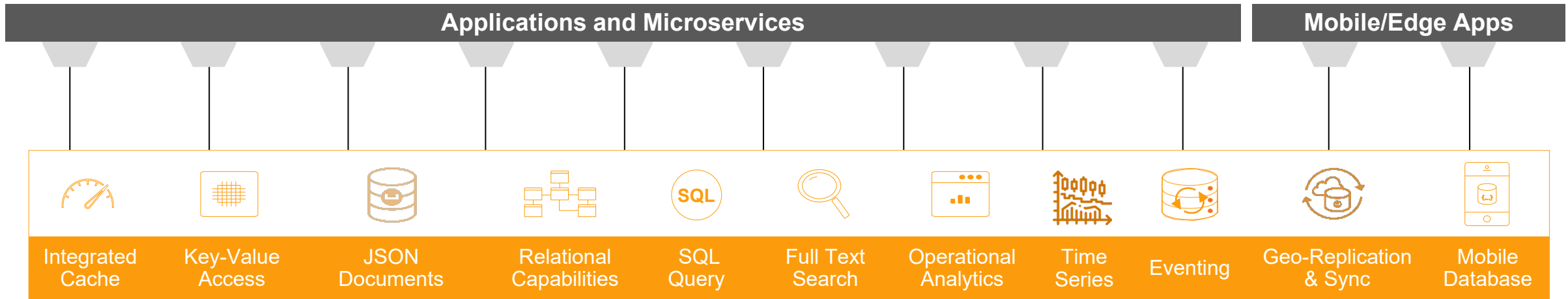


- Low latency to the Edge
- Peer-to-peer syncing

“There are many key factors for choosing Couchbase: scalability, high availability, and geo-replication to name a few.”

Krishnan Venkatasubramanian
Head of IT Architecture
Sky

Innovate Faster and Lower TCO

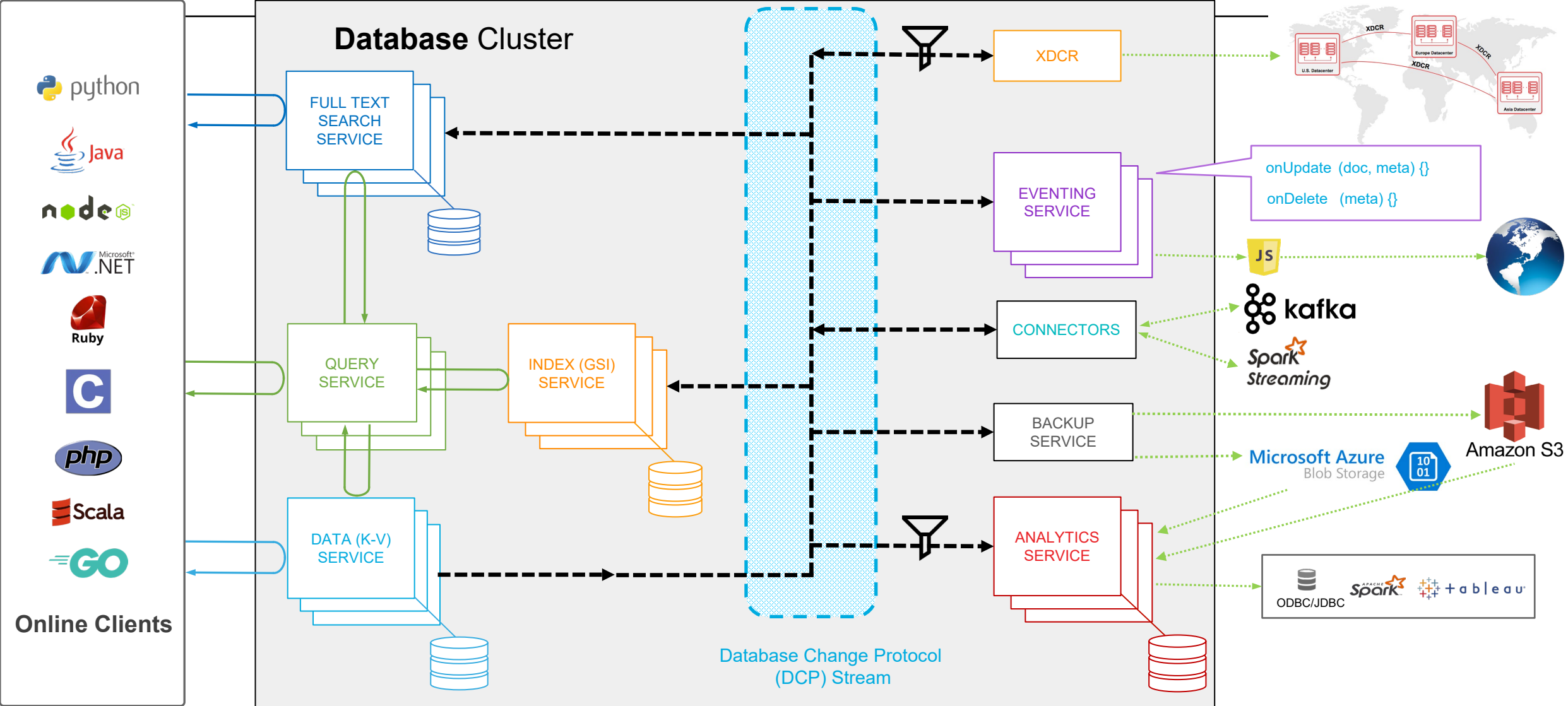


- **Faster release cycles**
- **Less duplication & data sprawl**
- **Scale more easily**
- **Less time on maintenance**
- **Lower operational costs**
- **Lower infrastructure costs**

“It’s unusual to get more features, in less time and save money,... all at once.”

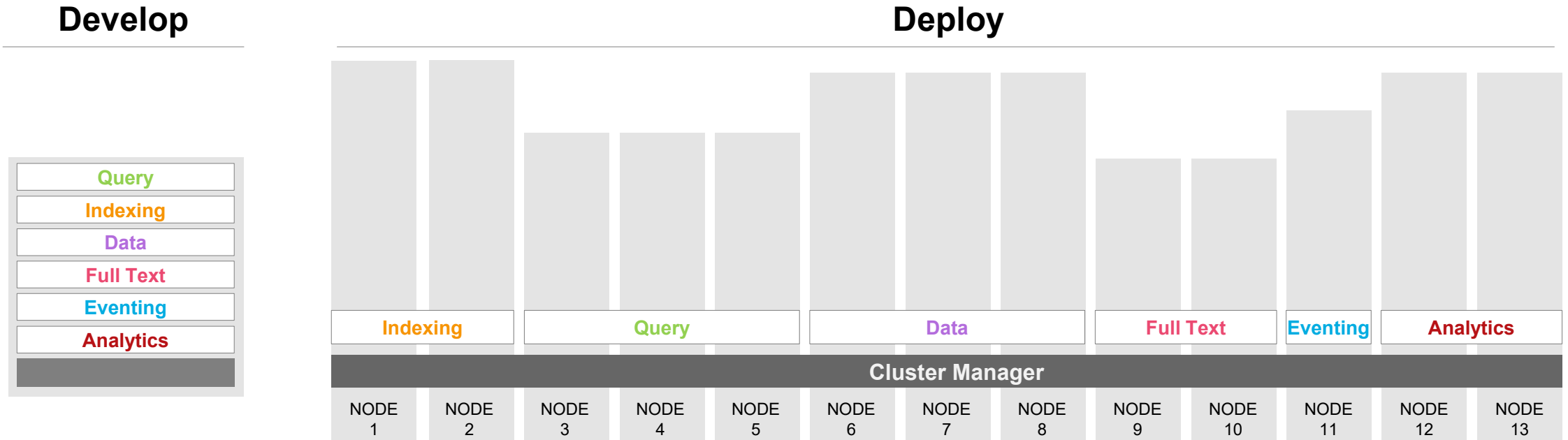
Phil Lupercio
VP of Technology
BroadJump

Scaling Each Database Services in One Architecture



Transactional / Operational Analytic / Ad hoc

Workload Isolation: Service Performance to Hardware



“The most important thing for our evaluation process was the multi-dimensional scaling. Having nodes for specific use cases is very powerful.”

Jay Duraisamy
SVP, USIS Engineering
Equifax



Look For Opportunities to Develop AI Interactions

Foundation model access

Prompt shaping

Generative AI Coding in Java or other SDK languages

AI Model Execution & Communication

Applications and Microservices

Mobile/Edge Apps

Low-latency proximity to active application data in JSON



Caching common connection activity to AI services

JSON sub-structures for storing AI-based data & metadata

Generative AI coding in SQL++

Vector-like search stored in JSON arrays

State change data from logs

Streaming to AI models and Services

AI needs Performance tuning & workload isolation

Active geo-location data for models

User interface & voice activity

Generative AI index construction

Multi-doc failure safety net

Inverted indexes for FTS-like searches

Computation of Vector Search Nearest Neighbor Algorithms

AI forces Global Execution because AI consumers are global

Drive Down TCO



53%

Customers who had 50% or more TCO reduction

Customers' Reduced TCO

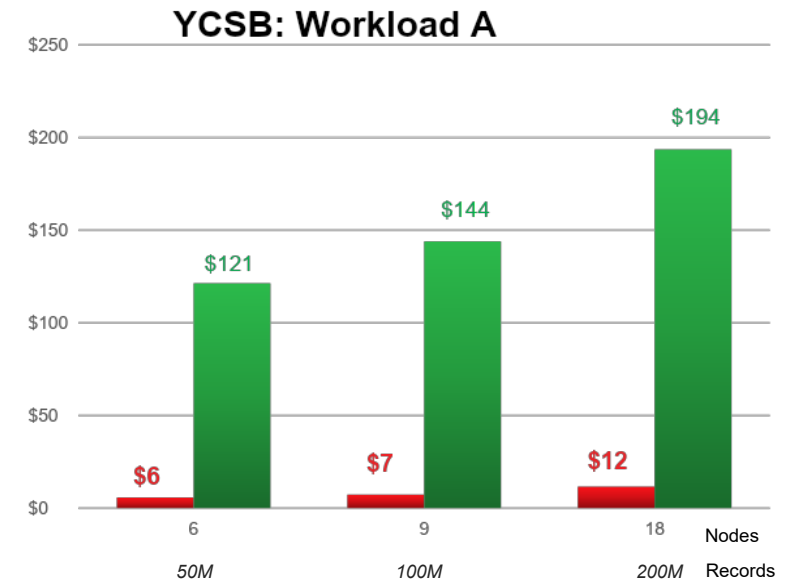


TechValidate Survey Data

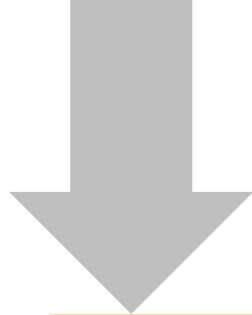
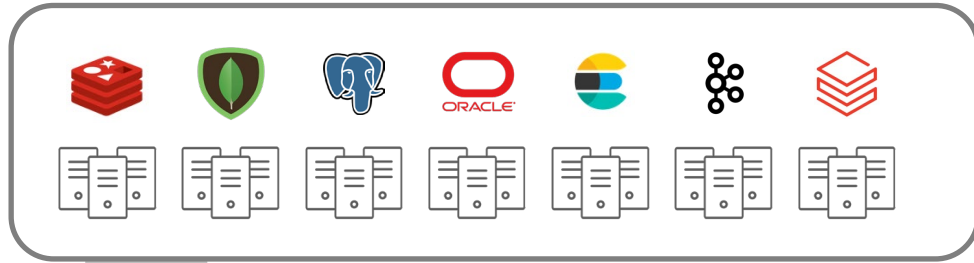
DBaaS Reduces Running Costs

Hardware Costs
+
Operational Costs
+
Team Costs

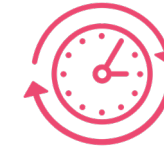
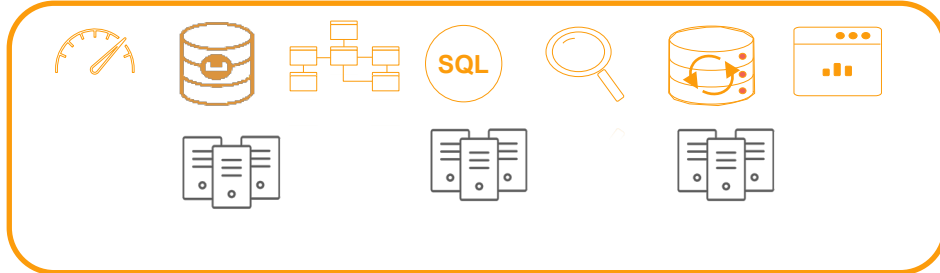
Cost of 1 Billion Operations
Capella vs. Atlas



Reduce the High Cost of Operations & Lower Complexit



Replace multiple databases and eliminate more than half their infrastructure to enjoy better performance from a less complex, all-in-one architecture



Developers code faster and write less complex applications



Save Money



Save Time



Improve Quality

- Save on Infrastructure and Software Costs
- Save on Administration and Integration labor costs
- Code better features, with less training expense, in less time
- Test and deploy efficiently in less time

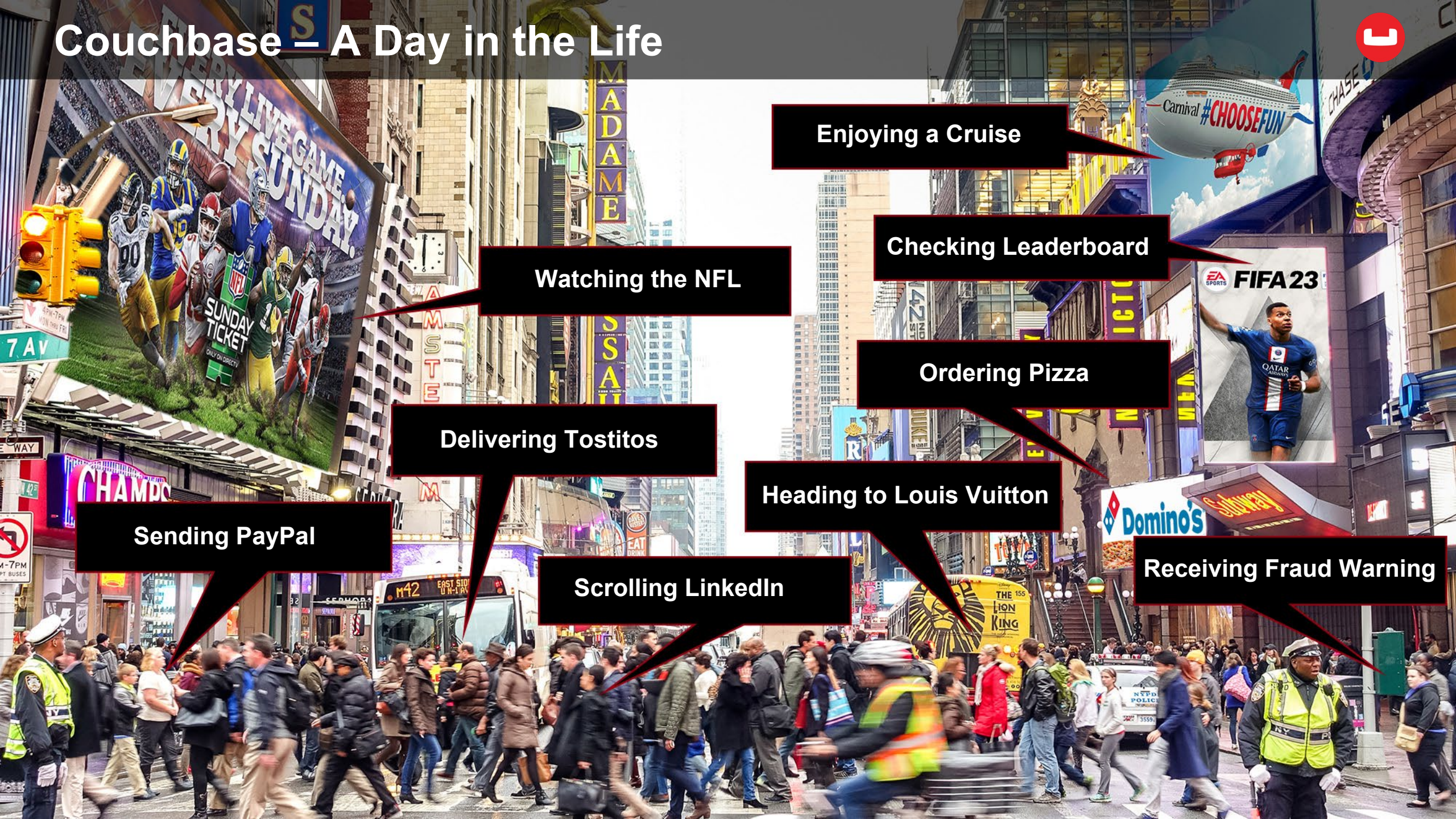


5 Database Requirements For Modern Applications

Incredible price/performance, availability, versatility, and ease of use

1. **Performance, scale, and tunable architecture** for millisecond response
2. **Multimodel access to JSON** to reduce complexity & shrink customer's cloud footprint
3. **App Services for Mobile & IoT, with peer-to-peer sync** for great experiences anywhere, all the time
4. **Easy as SQL, robust SDKs**, and AI automation
5. **Demonstrably Lower TCO**
 - 55% of surveyed customers cut their infrastructure spend in half (Source: TechValidate. TVID:[64F-44D-56B](#))

Couchbase – A Day in the Life



Enjoying a Cruise



Checking Leaderboard



Ordering Pizza



Heading to Louis Vuitton



Watching the NFL



Delivering Tostitos

Scrolling LinkedIn

Sending PayPal

Receiving Fraud Warning



THANK YOU

