

Couchbase for 5G-Powered Edge Computing



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5G—WHAT IS IT?



5G is the next generation of wireless broadband cellular networks that promise ultra low latency and high capacity. 5G is propelled by the massive growth of mobile phone usage as well as the new wave of data-intensive applications that require real-time responses in the IoT, AR/ VR, and AI spaces.

HOW IS 5G BETTER?

ON A 4G NETWORK, DATA TRAVEL TIME FROM A DEVICE TO A CELL TOWER AND BACK AGAIN AVERAGES 12 TO 15 MILLISECONDS. WITH 5G, THOSE LATENCY LEVELS ARE REDUCED TO JUST 2 TO 3 MILLISECONDS.

On a 4G network, data travel time from a device to a cell tower and back again averages 12 to 15 milliseconds. With 5G, those latency levels are reduced to just 2 to 3 milliseconds. 5G is expected to support up to 1 million connected devices per .38 square miles, which is several orders of magnitude more than what's possible with 4G. Finally, 5G supports multi-Gbps data transfer speeds. This means faster downloads and support for more connected devices than ever before. With its inherent low latency, 5G brings the potential to power innovations such as smart factories, autonomous vehicles, and robots, but it can also vastly improve existing applications in retail, finance, and healthcare when uptime and real-time responsiveness are critical requirements. 5G is poised to have an immediate impact on everyday life.

IS 5G A PANACEA?

While 5G provides substantial benefits, they apply only to the “last hop,” or the edge of your network from the cell tower to your device. However, the round trip from the tower to a cloud data center and back can still take up to 500 milliseconds or more depending on where you are. This severely limits the benefits of 5G for cloud computing applications because they rely on internet connectivity for data processing and storage. A speedier final hop can't make up for overall internet latency or outages. In a *Computerworld* article, Dave McCarthy, Research Director for Edge Strategies at IDC said, “By itself, 5G reduces the network latency between the endpoint and the mobile tower, but it does not address the distance to a data center, which can be problematic for latency-sensitive applications. By deploying edge computing into the 5G network, it minimizes this physical distance, greatly improving response times.”



EDGE COMPUTING AND 5G



Edge computing is a distributed computing paradigm that brings data processing closer to the clients that generate data and use it. This is enabled with a distributed cloud architecture made up of local micro-data centers, and can include edge devices themselves. The key value proposition of edge computing is high availability, low latency, data privacy, and reduced network load/bandwidth usage. Mobile carriers are investing in multi-access edge computing by deploying micro-data centers at the edge of the network where they can leverage 5G. This, in essence, brings data and computing to within the final hop where applications can take full advantage of the speed and reliability offered by 5G.

TAKE FULL ADVANTAGE OF 5G WITH COUCHBASE

Couchbase Server and Couchbase Sync Gateway can be deployed as micro-data centers within a 5G wireless network to store and process data at the edge. While applications within the 5G edge radius enjoy high performance and uptime, processed data is synced to the backend central cloud data centers for ultimate storage behind the scenes as connectivity permits, thus removing internet latency and unreliability from the equation. Couchbase can be deployed within mobile carrier edge networks with or without 5G network coverage, allowing for a staggered upgrade of the infrastructure as 5G coverage expands and evolves.

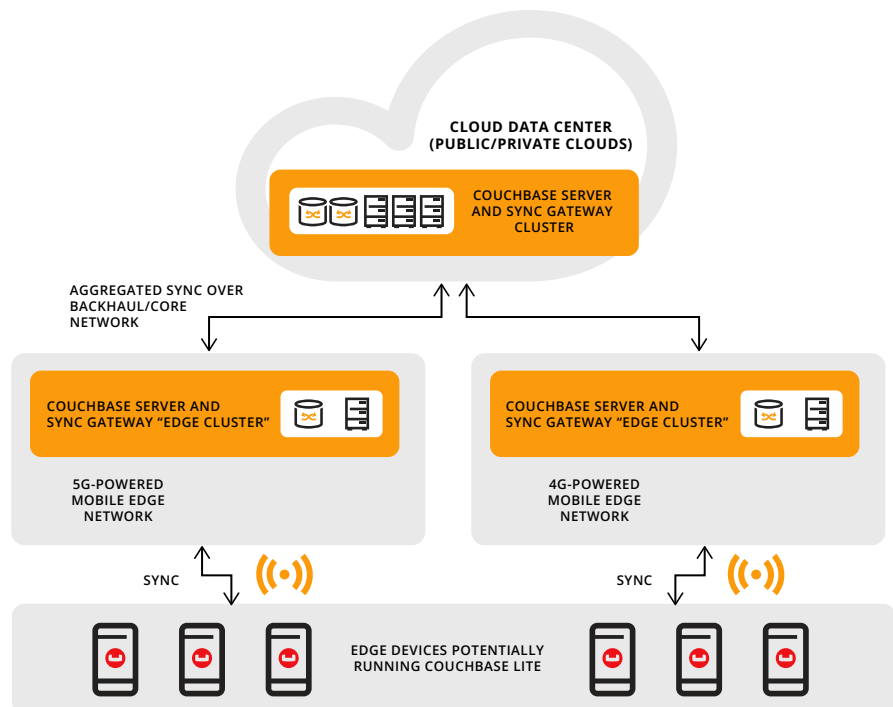


Fig. 1: Couchbase's powerful sync technology facilitates movement of data between the edge and backend data centers.



POWERFUL EDGE DEVICES

To take advantage of the new capabilities, mobile and IoT devices are now rolling out with 5G support that provides ample storage and processing capacity to run data- and CPU intensive apps, such as apps that leverage machine learning models locally on devices. App developers can create offline-first applications by embedding Couchbase Lite, a local NoSQL database for on-device data storage and processing, and by taking advantage of built-in machine learning. Couchbase Lite syncs data to the edge data center via Sync Gateway, leveraging 5G where available. After processing, ephemeral data can be deleted from the local Couchbase Lite store to alleviate network load and data privacy concerns.

With the advent of 5G, the edge computing architecture becomes more than a competitive advantage—it represents a best-practice approach to modern computing that enables a new class of applications with unparalleled resilience, speed, security, and efficiency.

Only Couchbase supports the distributed model at every tier, from the cloud to the edge, ensuring that critical information never stops flowing to the applications and users that need it.





Modern customer experiences need a flexible database platform that can power applications spanning from cloud to edge and everything in between. Couchbase's mission is to simplify how developers and architects develop, deploy and consume modern applications wherever they are. We have reimagined the database with our fast, flexible and affordable cloud database platform Capella, allowing organizations to quickly build applications that deliver premium experiences to their customers—all with best-in-class price performance. More than 30% of the Fortune 100 trust Couchbase to power their modern applications.

For more information, visit www.couchbase.com and follow us on Twitter.

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