



AN INFLUXDATA CASE STUDY

Space Made Simple: How Loft Orbital Delivers Unparalleled Speed-to-Space and Reliability Using Telegraf, InfluxDB Cloud and Google Cloud



Loft Orbital Improves Performance of Microsatellites with Better Insights into Infrastructure and Sensor Data

Company in brief

Loft Orbital is the leading provider of space infrastructure as a service. It is a Series A startup having raised \$20 million+ and has 60+ employees in the USA and France. Its mission is to take some of the complexity out of space; technological advances are making space and satellite missions easier and more affordable. Loft Orbital flies and operates customer payloads on its microsatellites as a service. Companies turn to Loft Orbital when they want to focus on their area of expertise and trust Loft Orbital to operate their satellites using its mission-agnostic, flexible operating system and interfacing technology.

Case overview

Loft Orbital uses Telegraf, InfluxDB and Google Cloud to collect and store all telemetry data from its equipment — which includes spacecraft on orbit. Additionally, they are monitoring the infrastructure supporting their missions, including servers and containers. They are using InfluxDB to help QA their code which improves their performance monitoring and to monitor their mission automation solution. By using a time series database, Loft has been able to discover long-term trends within their data.

The business challenge

Loft Orbital combines satellite buses with their Payload Hub which can be used to house any type of sensor and for any type of mission, from IoT to imagery. Their Payload Hub capacity ranges from 1 g to 70 kg, or even just software loaded onto the onboard edge computer.

Loft Orbital simplifies everything for their clients by integrating the payload into the Payload Hub, contract for the launch provider, and actually operate the spacecraft. Loft Orbital has developed a platform called Cockpit which makes operating payloads easy for their customers. They are providing space infrastructure as a service — including everything from mission design, instrument development, satellite integration and testing and launches. Loft Orbital aims to remove the complexity of satellite development and operations.

| The technical challenge

Loft Orbital created Cockpit Mission Control System (MCS), a cloud-based automation tool that simplifies mission tasking, monitoring and data routing. Loft needed a way to handle time series data collected by the MCS in order to safely fly the spacecraft. MacLachlan points out that satellites are like fancy flying servers, so the monitoring requirements are similar to a data center — but keep in mind that the satellites are moving eight times faster than a bullet and collecting millions of metrics absolutely essential to their health.

Their spacecraft are collecting and streaming telemetry data. Loft needed a solution that could handle several hundred million measurements per day and scale as their fleet grows. Loft needed to be able to zoom out, analyze the data and find long-term trends. Before using a purpose-built time series database and prior to launch, Loft Orbital was using a relational database.

| The solution

Gaining observability into their infrastructure as well as collecting sensor and telemetry data is important to Loft Orbital's success. Loft Orbital's first mission is called YAM2 — YAM stands for “yet another mission”.

They want to crank out these missions at a very rapid pace. Loft's first two satellites have already been launched into space aboard SpaceX's Transporter-2 mission in June 2021. Loft has a spacecraft operations team that relies heavily on automation; they don't have the bandwidth to manually interact with every aspect of their satellites and customers' payloads at all times. Customers directly control their payloads, including maneuvering the spacecrafts within certain situations, when it's safe to do so while Loft maintains and monitors the spacecraft's health and underlying operations.

Caleb MacLachlan and others on the team had used InfluxDB at previous jobs, so picking InfluxDB as Loft's time series database of choice was easy. They knew they needed to collect millions of highly critical spacecraft metrics; Loft predicts they will have to scale to collect 500 million metrics per day. The team and their clients need near real-time visualizations while also providing easy access for their engineers. Long-term trend analysis, limit checking and alerting are also crucial for them.

Loft's unique multi-customer model requires careful data segmentation. MacLachlan appreciates InfluxDB's subscription feature because as the data comes in they can use measurements to determine the actions required as well as which customer the data belongs to. They are able to segregate the data based on individual customers as well as bus suppliers. Loft is cloud-agnostic as they can use any of the major three cloud service providers depending on their client's preference. For internal storage, they use Google Cloud.

Results

Loft Orbital appreciates the large user base and community behind InfluxDB. They are ingesting 10 million measurements every 10 minutes. They are using InfluxDB Cloud for customer data and they use InfluxDB OSS for Cockpit metrics. Loft values the low barrier to entry, subscription functionality of the time series database, and filtering capabilities of Kapacitor and Telegraf. Data from the local server supporting Cockpit is pushed to Kapacitor to be filtered into customer/provider specific buckets, then pushed into InfluxDB Cloud.

Their team uses Grafana for alerting and visualizations; it was already built into their operations workflows. MacLachlan continues by pointing out they love the flexibility in designing alerts. The team appreciates that they can generate dashboards based on all of their time-stamped data, regardless of which InfluxDB instance it is in.

Loft Orbital still uses a Postgres database for non-time-series-data — for example: identifying each satellite, calibration factors and other metadata. MacLachlan and his team are able to query their data regardless of which database it resides in. From the user's perspective, it's seamless. Since migrating to InfluxDB, data queries run 10x faster.

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“It took less than a day to have a proof of concept of InfluxDB and Kapacitor running in containers. We were able to put data in it and show it in Grafana — it was a really quick process!”

Caleb MacLachlan, Senior Spacecraft Operations Software Engineer,
Loft Orbital

| What's next

Loft Orbital is continuing to grow fast and will need to scale out. They hope to upgrade all InfluxDB usage to InfluxDB Cloud. They are looking forward to using Flux, the scripting and query language from InfluxData. Loft hopes to utilize Telegraf and create advanced filters for their customers.

About InfluxData

InfluxData is the creator of InfluxDB, the leading time series platform. We empower developers and organizations, such as Cisco, IBM, Lego, Siemens, and Tesla, to build transformative IoT, analytics and monitoring applications. Our technology is purpose-built to handle the massive volumes of time-stamped data produced by sensors, applications and computer infrastructure. Easy to start and scale, InfluxDB gives developers time to focus on the features and functionalities that give their apps a competitive edge. InfluxData is headquartered in San Francisco, with a workforce distributed throughout the U.S. and across Europe. For more information, visit influxdata.com and follow us [@InfluxDB](https://twitter.com/InfluxDB).



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