

On the Radar: Guavus' Reflex platform brings big data streaming analytics to CSPs and IoT

Delivering instant intelligence to meet customer experience demands

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Summary

Catalyst

CSPs need to take advantage of insights coming from their operational data to solve challenges such as personalizing customer experience, growing revenues, and delivering efficient operations. Performing advanced analytics on these operational data sets in real time enables CSPs to identify useful insights (e.g., network failure, security attacks, etc.) and immediate actions that need to be taken. Additional benefits can be obtained from real-time analytics performed over big data streams generated from multiple disparate data sets (either held in existing systems or being collected in real time).

Guavus focuses on CSPs and industrial IoT, providing big data streaming analytics and applications for multiple business processes including network planning and operations, marketing, customer care, security, and IoT. Its streaming analytics capabilities have enabled its customers to make decisions faster, resulting in reduced costs and improved revenue growth.

Key messages

- Guavus specializes in big data streaming analytics solutions for CSPs with millions of subscribers. Its offering leverages open source big data technologies such as Spark. It also offers a suite of prepackaged analytics applications to provide customers with faster time to insight across network, device, content, and subscriber analytics.
- Guavus was recently acquired by French multinational Thales Group to support the company's digital transformation objectives. Thales extends Guavus' coverage geographically in regions such as Europe, Asia-Pacific, and the Middle East and has allowed it to move into domains such as industrial IoT and security.
- Guavus' Reflex platform has been re-architected to simplify custom application development and address some of the challenges CSPs experience with adopting AI technologies. Guavus' microservice-based architecture of Reflex platform, and the introduction of the Reflex Analytics Fabric layer will help CSPs speed up the creation of new analytics use cases.
- North America is a key market for Guavus, as it boasts of having the top three cable operators and the five largest mobile operators as customers.

Ovum view

CSPs need to take a customer-centric approach to their network operations if they are to meet customer demands for a personalized experience. A customer-first approach also allows CSPs to prioritize their network operations processes, addressing customer-impacting incidents first and leaving those with less of an impact for later. This approach also enables CSPs to manage their operational costs and profitability while satisfying customer needs.

Investing in real-time big data analytics capabilities enables CSPs to meet these requirements and more. For example, the ongoing deployment of SDN/NFV requires these capabilities to address the dynamics that these technologies bring to CSPs network operations. There are, however, challenges

such as identifying the right data sets, analytics algorithms, and analytics skills that must be addressed when putting together the analytics pipeline for the various CSP analytics use cases.

Guavus takes a customer-first approach when delivering its network analytics solutions. The vendor has developed a solution that can integrate, via open APIs, with pre-existing data lakes. In line with solving some of the challenges CSPs face with deploying analytics solutions, the vendor has introduced the concept of the Reflex Analytics Fabric (RAF) and micro apps. The RAF enables the Reflex platform to be agnostic to the underlying data processing layer, while the micro apps provide added capabilities to CSP customers to add new machine learning use cases as their needs evolve. These features aim to simplify CSPs' analytics journey.

Recommendations for CSPs

Why put Guavus on your radar?

Guavus has been in the business of real-time big data analytics for more than 10 years, with a customer base including top-tier CSP providers in both the mobile and cable space. Its Reflex platform processes up to half a trillion records from millions of CSP subscribers daily, with a view to generating insights the moment the data is captured. Reflex addresses the needs of multiple business operations such as customer care, network operations, marketing, and security.

Understanding the challenge that CSPs face with developing new analytics use cases and attracting skills for AI, Guavus has created the Reflex Analytics Fabric, which includes microservices and APIs to speed up the custom development of analytics applications. Running within the RAF are micro apps, which are prepacked analytics pipeline segments such as content categorization or commonality analysis. These micro apps leverage ML/AI algorithms and/or advanced data processing techniques to create analytics apps quickly. The micro apps are used within Guavus' pre-built applications and can be used by customers to develop new use cases, reducing their time to production. The micro apps address the AI skills shortage as they provide some of the data-science capabilities required to develop the analytics algorithms and build new use cases.

Highlights

Background

Based in San Jose, California, Guavus was established in February 2006 by Anukool Lakhina, who had previously worked at Sprint Labs on network-wide traffic-mining algorithms for his PhD thesis. The central point of Anukool's research was to identify how CSPs can obtain immediate insights from their data assets. It was this research that led to the creation of Guavus. Guavus' focus on analytics for CSPs started from the network domain. In January 2013 Guavus acquired Neuralitic Systems, a mobile-data monetization and marketing-analytics vendor for CSPs. The combination of Neuralitic's applications for mobile marketing with Guavus' network analytics applications enabled Guavus to look deeply into operational and network data with a view to helping CSPs enhance their overall customer experience management.

In September 2017 Guavus was acquired by French conglomerate Thales Group for \$215m. Following the acquisition, Guavus now forms part of Thales' Digital Business Unit, providing the company's big data analytics capabilities. This acquisition also further extends Guavus' coverage geographically into regions such as Europe, Asia-Pacific, and the Middle East and into the industrial IoT, defense, and security domains.

Guavus' solutions are deployed at more than 10 of the top-tier CSPs in the world, including six of the top mobile operators and the top three cable operators, in the US, Europe, and Asia-Pacific. The vendor also has a partner ecosystem of network equipment providers and data warehousing platform providers that play a role in the vendor's go-to-market strategy.

Current position

Delivering personalized customer experience requires being aware of what is happening with each customer throughout their journey with the CSP. Identifying critical events hours after they have occurred limits CSPs' ability to solve the personalized customer experience challenge. Therefore, CSPs need to invest in real-time streaming analytics to identify what customers need and be ready to meet these needs as quickly as possible. This trend has driven Guavus' product development for the past 11 years.

Product portfolio

Guavus provides an open big data analytics platform that delivers streaming analytics solutions to the telecoms, IoT, and media industries. Guavus' solution includes its big data analytics platform, Reflex, and prepackaged analytics applications (all of which are built on top of the Reflex analytics layer, which enables complex analytics functions to run in real time on large data sets). The Guavus Reflex platform has been deployed to several tier one CSP network environments and processes up to half a trillion records every day for over 450 million individuals. The Guavus Reflex platform enables CSPs to obtain instant insights for faster decision-making in contact centers, network operations centers (NOCs), field operations, marketing departments, and more. The Reflex platform consists of two layers:

- **Reflex base processing layer (Reflex BPL).** The big data processing layer ingests and stores real-time and historic data sets. Customers can utilize Guavus Reflex BPL (which comes pre-integrated with the Reflex platform) or use any other Hadoop-based big data infrastructure such as Hortonworks (HDP) or Cloudera (CDH) distributions.
- **Reflex Analytics Fabric (RAF).** The analytics layer sits on top of the BPL. It includes several components developed to provide CSPs with agile analytics application development capabilities, enabling them turn their analytics use cases into applications quickly without requiring the expertise of data scientists. The RAF creates a bridge between big data platforms and data-science platforms, mapping the analytical algorithms and data models created offline in data-science platforms into production big data platforms, making the integration between these easier and quicker. This ability to quickly operationalize use cases is made available to customers via micro apps and is one of the key offerings of the RAF. The main components of the RAF layer include the analytics engine, application accelerators, and the micro apps (as shown in Figure 1).
 - **Application accelerators** are reusable, discrete functions that speed up complex app development. They perform specific functions that otherwise would have to be

written from scratch. These accelerators enable self-service analytics capabilities for business users, as they can stitch these together to construct new analytics applications.

- **The analytics engine** provides the AI and analytics capabilities, some of which are based on open source components such as Spark – a streaming analytics engine.
- **Micro apps** are a series of pre-built analytics workflows (which include ML algorithms and/or advanced statistical analysis pipelines developed by Guavus) woven together to speed up app development. They are reusable across multiple business use cases and can be extended to support new analytical use cases as customers' needs evolve.

Figure 1: Guavus Reflex Analytics Platform



Source: Guavus

The Guavus Reflex platform, along with the RAF and BPL layers, form the basis for four pre-built applications:

- **Guavus Live Ops** ingests network and customer data in real time, correlating these with real-time data obtained from other sources such as customer calls, trouble tickets, and network alarms. These data streams are normalized and joined with data at rest such as device type, firmware version, and network topology to create an enriched set of events and performance data. Analytics algorithms are applied to these data sets to automatically detect events that deviate from the baseline performance. The baselines are automatically determined based on past data and are continuously adjusted as needed. Care agents can react in real time to issues impacting customer experience, saving costs such as truck rolls and equipment replacement. Live Ops comes with functionality for CSPs to track the impact of network maintenance activities on customers.
- **Guavus Marketing Insight** enables the delivery of personalized interactions and tailored content in real time to CSP customers. Using APIs, it ingests and correlates streaming Layer 7 data including http header information, deep packet inspection signatures, and mobile management entity (S1-MME) LTE events with demographic information such as ARPU and data plans. CSPs can also monetize some of these insights on an anonymized basis (having received consent from customers).

- Guavus Security Intelligence uses analytics and AI to provide advanced threat-detection capabilities and integrated threat-hunting tools to validate and prioritize immediate threats. Advanced cyber-threat hunts (proactive and iterative searches through networks to detect and isolate advanced threats that evade existing security solutions) are available in an interactive playbook for all-level SOC analysts to access and operationalize as needed. These capabilities improve the productivity of security staff and reduce the occurrence of false positives.
- Guavus Alarm IQ correlates and prioritizes network alarms, identifies the root issues of the alarms faster, and predicts which equipment failures will cause the largest impact on a CSP's customer base. As a result, preemptive, closed-loop actions can be taken and network incidents avoided.

How Guavus uses AI within the Reflex Platform

Guavus leverages AI techniques to provide advanced capabilities to its analytics portfolio. The vendor utilizes ML algorithms within its pre-built applications to extend detection capabilities to unknown scenarios, as existing rules-based approaches are limited to known scenarios. Rules fail when, for example, an unknown failure indicator occurs and engineers need to interpret what that failure is, its impact on customers, and the actions to take. Intelligent processing techniques are therefore required to identify these issues. Below are some examples of how Guavus leverages AI within its portfolio:

- **Alarm IQ.** Having identified that only a small fraction of alarms occurring in CSP NOCs actually lead to incidents, Guavus is using ML to automatically classify and predict alarms that will lead to network incidents. NOCs can prioritize their operations, focusing on these alarms first. According to Guavus, the results from current proofs of value indicate that the solution accurately classifies and predicts alarms leading to incidents. With one customer, the number of alarms that the NOC engineers need to pay attention have reduced by more than 90%.
- **Live Ops .** ML algorithms are applied to extend anomaly detection capabilities by automatically identifying anomalies that human-defined thresholds fail to detect. Time to detect and understand the root cause of unknown problems is therefore reduced. A similar approach is also taken within the Security Intelligence module.
- **Marketing Insight.** Using AI algorithms, dynamic customer segments can be created and targeted with real-time offers. Natural language processing algorithms can be used to categorize and detect content viewed, providing recommendations on suitable engagements (e.g., offers and ads) to make with customers.

Guavus big data streaming analytics capabilities are being extended to support CSPs operationalizing SDN/NFV

Delivering a personalized experience to customers is further complicated by the deployment of SDN/NFV. These technologies introduce a high level of dynamism to a CSP's network, making management of networks more complex and challenging to assure. Consequently, Guavus' Reflex platform is being developed to support CSPs' SDN/NFV deployments. Current trials include carrying out operational analytics on IP networks to assess the health of virtual network functions and trigger immediate actions to avoid service-impacting incidents. Intelligence (based on predictions made on netflow information) is provided to the SDN controller to take proactive actions (such as rerouting IP packets) ahead of a failure occurring. The vendor recently joined the Linux Foundation Networking

Fund, which facilitates collaboration and operational excellence across networking projects such as ONAP and OPNFV.

Future roadmap

Given the vendor's focus on helping CSPs run more data-driven operations (supported by analytics), Guavus' future roadmap for its product portfolio for 2018 includes the deployment of capabilities that enable self-service analytics, integrating and extending existing components to support new operations use cases. Other future development plans include the creation of secure and cloud-ready capabilities within its portfolio such as multitenancy and elastic scaling.

Guavus' research organization is also working on creating AI solutions that prescribe automated actions that technicians can adopt to prevent or fix failures. The vendor sees that through the application of these automated workflows the ROI for AI becomes even more compelling.

Data sheet

Key facts

Table 1: Data sheet: Guavus			
Product name	Reflex Analytics Platform Live Ops Alarm IQ Security Intelligence Proactive Ops Marketing Insight	Product classification	Big data streaming analytics platform. Operations intelligence Operations intelligence Advanced threat-hunting and detection Operations intelligence Subscriber intelligence (behavior and content analytics)
Version number	Reflex v 5.4 Live Ops v 5.4 Alarm IQ v 5.4 Security Intelligence v 5.5 Proactive Ops v 5.2 Marketing Insight v 5.5	Release date	May 2018 March 2018 March 2018 May 2018 May 2018 May 2018
Industries covered	Telecoms, MSO, Industrial IoT, security, defense, aerospace, space, and transportation	Geographies covered	North America, Europe and Middle East, Asia-Pacific, South & Central America
Relevant company sizes	Midsized to large enterprises	Licensing options	Perpetual and subscription-based licenses
URL	www.guavus.com	Route(s) to market	Direct and channels
Company headquarters	San Jose, CA, US	Number of employees	Approximately 250

Source: Ovum

Appendix

On the Radar

On the Radar is a series of research notes about vendors bringing innovative ideas, products, or business models to their markets. Although On the Radar vendors may not be ready for prime time, they bear watching for their potential impact on markets and could be suitable for certain enterprise and public sector IT organizations.

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