On the Radar: SWIM EDX 1.2, real-time intelligence at the edge

Providing real-time learning for fast edge data and Internet of Things applications

Summary

Catalyst

The proliferation of embedded software in IoT and smart devices has led to a corresponding explosion in the generation of sensor and metrics data. Traditional approaches to business intelligence and analytics take the data from the edge devices, reduce it down, decide which elements are most important, send those across the network, and drop them into a data lake, database, or cloud storage. Typically, cloud processing (such as machine learning, digital twins, traditional analytics, complex analytics, and visualization) is run against it, but for applications that need real-time responses the latency involved is too slow for effective decision-making. In many edge applications, the processing has to be done locally, in real time, in order for actions to have an impact. SWIM EDX is a novel solution that performs all the processing needed for analytics and machine learning applications locally on edge devices, with its software right next to the source of data production.

Key messages

- SWIM EDX is a self-training and self-managing software solution for edge intelligence.
- SWIM EDX analyzes, models, and predicts from the entire data set as it is created using incremental machine learning to offer predictive insights.
- EDX instances interconnect to create a distributed edge compute/data fabric, which is lightweight, highly secure, autonomous, self-managing, and resilient and runs on existing edge devices with no connection to the cloud required.
- SWIM EDX is currently designed to process time series data from sensors and equipment. It is not well suited for image recognition, or textual analysis such as Twitter stream processing, or historical data and regulatory requirements storage functions.

Ovum view

There is a lot of idle computing power available at the edge that is completely unused, considered not powerful enough for traditional machine learning or analytics processing. SWIM software enables that hardware to be used to produce valuable streaming edge data insights, localized learning, and advanced real-time services. It is highly efficient, running on edge devices with small processing units, including CPUs, GPUs, and even small microprocessors embedded in routers, switches, and access points, as long as it has access to at least 2MB of memory. But obviously the stronger the hardware the faster it can process and produce results. SWIM software delivers insights by effectively ingesting, reducing, analyzing, and then running its proprietary analytics and machine learning algorithms on that data in real time, and where connectivity to other local devices is available, it will use a distributed computing and data fabric running across all local edge devices. In the SWIM world you end up solving a deep neural network "digital twin" model for each data source or end device.

Ovum is particularly impressed by some innovative aspects of SWIM, such as the incremental learning capability (continuous learning) that lets it continually enhance what it has already learned. In many cases where intelligent decisions need to be performed in real time locally, SWIM's product offers the only solution Ovum is aware of at the time of writing that does not require changing the

hardware landscape but instead uses the existing infrastructure. SWIM's solution is more efficient and effective for real-time edge data than existing big data or cloud-based analytics options for real-time data.

Recommendations for enterprises

Why put SWIM EDX on your radar?

SWIM is a general solution that can be taken and applied to different industry sectors and is appropriate for manufacturers, service providers, enterprises, and IoT suppliers that have large numbers of edge devices with embedded software. SWIM doesn't need specialist data-scientist skill sets, custom application development, or expensive data lakes or cloud storage to operate, making it easy to install and quick to deliver results. It has been deployed on traffic management equipment in multiple US cities to deliver real-time traffic information (density, traffic lights, pedestrian, routing, navigation, etc.) providing results to an Azure-hosted API (for use by third-party applications and users). SWIM is also being used in manufacturing plants by a major vendor of manufacturing equipment and controls. SWIM provides analytics on machine and plant performance, delivering predictions of future behavior. Making use of these insights requires a small degree of basic programming to focus the data inputs and select outputs for the API or GUI. But generally the solution is extremely easy to set up and use and could offer valuable predictive analytics without imposing a massive burden in cost to a wide variety of organizations.

Highlights

Figure 1: SWIM overview
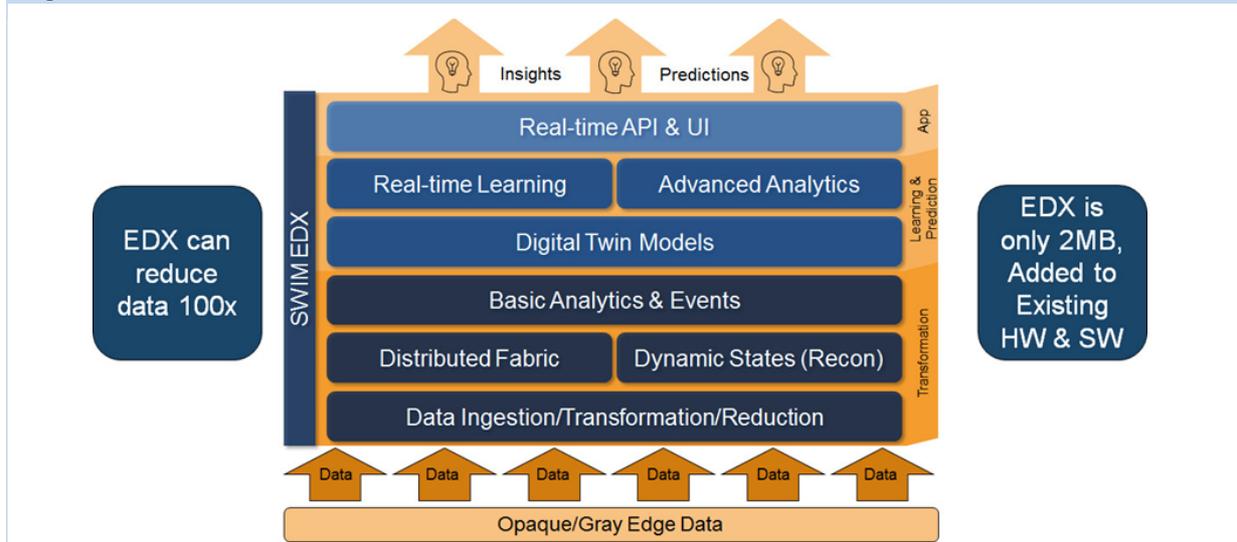
Source: SWIM

Main features of SWIM EDX

- **Stateful edge data-processing fabric:** SWIM EDX creates an autonomous, resilient mesh for edge analytics and learning on any underutilized edge hardware. It builds a stateful distributed actor model similar to Orleans or Erlang, but fast and small and optimized for processing massive amounts of dark data and undertaking reduction and entity inference. It instantiates a "digital twin" actor to represent each real-world object in the data.

- **Actors that learn:** Each actor analyzes, learns, and predicts from the real-world data from the system it represents. Actors efficiently "gossip" their data to other actors via a pub-sub API for input to their learning and prediction capabilities. Their outputs can be easily "joined" to create apps or yield deeper insights. SWIM EDX runs self-training machine learning to deliver real-time insights to UI/API to optimize performance (delivering insights into states, correlations, anomalies, and predictions).

- **Real-time API:** Each twin offers a real-time API that makes it easy to visualize its state and the results of its analysis and its predictions. EDX offers real-time UI "widgets" to enable rapid delivery of custom UIs. Application developers use per-actor APIs to create custom logic for multi-actor joins to combine/correlate/analyze or learn and predict from multiple twins.

- **A secure environment:** SWIM is highly secure, autonomous, and self-managing, operating as a secure, resilient distributed set of microservices running at the edge to reduce connectivity, latency, privacy, and regulation concerns.

Background

SWIM was founded in January 2015 and is based in San Jose, California. Funding to date has been $7m from Silver Creek Ventures, DCVC, and Angel investors. Key executives are Rusty Cumpston (founder, CEO), Simon Crosby (CTO), Chris Sachs (founder, Chief Architect), Ramana Jonnala (Chief Product Officer), and Simon Aspinall (CSO/CMO).

Current position

SWIM currently consists of 20 plus staff, with the majority based in San Jose, CA, and other US locations. Its EMEA HQ is based in Geneva, Switzerland. Its R&D center is under development in Cambridge, UK. The current regional focus is on the US and EMEA.

The financial figures are not released, but SWIM says its growth has been 500% over the last year. Partnerships are under development in manufacturing, enterprise, service provider, and cloud. No public announcements of partners have been made yet. SWIM is also looking for partnerships with traditional hardware and software vendors or existing analytics vendors.

On its roadmap, SWIM intends to offer increasing levels of auto-training and schema inferencing, and to enhance partner integration with existing cloud and analytics solutions. It also plans to roll out to new market verticals including retail, education, healthcare, banking, insurance, and government.

Data sheet

Key facts

Table 1: Data sheet: SWIM EDX

Product name	SWIM EDX	Product classification	Edge Intelligence – Analytics and Prediction
Version number	1.2	Release date	April 2018
Industries covered	Manufacturing/OEM: process and discrete Service provider: (telco, network, traffic, smart cities, IoT) Enterprise: IT, healthcare, financial, retail, government	Geographies covered	US, EMEA
Relevant company sizes	All	Licensing options	Perpetual (per device/data stream) Term (per device/data stream) SaaS (per device/data stream) Insights as a service (revenue share)
URL	www.swim.ai	Routes to market	Indirect channels to key segments
Company headquarters	San Jose, CA, US	Number of employees	20

Source: SWIM

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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We hope that this analysis will help you make informed and imaginative business decisions. If you have further requirements, Ovum's consulting team may be able to help you. For more information about Ovum's consulting capabilities, please contact us directly at consulting@ovum.com.

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