Vendor Profile

Vendor Profile: Rajant

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IDC OPINION

Organizations worldwide are increasingly looking to advanced connectivity solutions to help solve challenging business problems by enabling new use cases and applications, including those requiring "on the go" enablement. Indeed, mobile applications, particularly those connected through IoT sensors deployed at the industrial or enterprise edge, continue to spur innovation across wireless networks. However, to connect moving endpoints, particularly those requiring high reliability and redundancy, the industry still struggles to develop best practices about how to design and deploy advanced networks that support applications at a reasonable cost. For example, the industrial sector has long wrestled with proprietary protocols and IT stacks, which has made it sometimes challenging to scale applications across the organizational footprint. Further, many industrial and mission-critical organizations have found it challenging to work with a wireless service provider as the network approach may not align with desired use cases, policy design, security concerns, and even geographic coverage. As such, IDC observes many organizations today are focused on building in-house, private networks for a more custom approach. Enter Rajant's innovative approach to networking:

- Leveraging a bottoms-up or "build to application" approach, Rajant deploys network solutions only where needed, often deployed on the moving assets (e.g., vehicles, equipment, people) both indoors and outdoors. Further, leveraging mesh networking principles, which diverge from the overarching grid or fixed network models often deployed today at potentially higher costs, Rajant has carved out an established position within several industrial verticals, such as mining, energy, and transportation as well as military.
- With a clear market position based around delivering "highly reliable" networking that provides continuous connectivity that is not reliant on infrastructure and purpose built for mobility, Rajant has the potential to expand into other industries fast – such as manufacturing, warehousing, and other net-new industrial segments in which ultrareliable connectivity remains a "must have." Further, Rajant differentiates itself by being one of a few vendors that enable M2M endpoints to "see" around obstructions while reliably delivering high-capacity connectivity.

IN THIS VENDOR PROFILE

This IDC Vendor Profile focuses on Rajant, a network solutions vendor focused on providing connectivity solutions across the industrial IoT and M2M connectivity marketplaces.

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SITUATION OVERVIEW

Company Overview

Rajant is a United States-headquartered network solutions provider specializing in wireless connectivity for industrial and mission-critical organizations. Rajant was founded following the 9/11 attacks in New York City in 2001, where the recognition that wireless networks, particularly those deployed within the public safety vertical, required more resiliency.

Officially cofounded in October 2001 by Robert Schena, CEO, and Paul Hellhake, CTO, Rajant has grown to service customers in over 80 countries.

As of 2023, the company has around 200 employees working primarily from offices in Pennsylvania, Arizona, and Kentucky, although the company is represented by personnel in 14 countries and by partners in 80+ countries worldwide.

Rajant has had success in key industries, including mining, energy, military, and transportation, which includes rail and ports. The company is leveraging its successes in these markets to expand its presence in adjacent verticals, particularly challenging indoor environments, which include manufacturing and warehousing facilities.

Solution Overview

Rajant's flagship solution is Kinetic Mesh, a mesh-based network solution made up of radios, which Rajant calls BreadCrumbs (BC). Kinetic Mesh can run across and be compatible with all other networks — wired or wireless — because it is Layer 2. Kinetic Mesh leverages Rajant's InstaMesh network software that dynamically reroutes to overcome frequency interference and physical obstructions.

InstaMesh does not have requirements to calculate, store, or communicate source-to-destination routes. All InstaMesh path selection decisions are made locally at each node for each packet. This results in low administrative overhead, the ability to utilize any available connection, and adaptation to change and interference even while packets are en route to their destination. While InstaMesh software utilizes a proprietary routing algorithm, it is fully compatible with 802.11 and 802.3 standards and is a standard that can be licensed to third-party devices, protecting network investment while increasing network capacity, mobility, and connectivity.

In totality, the solution addresses key network pain points, including:

- **Advanced security.** Rajant's latest innovation, RiSM, is an inline network encryption appliance capable of very high-data bandwidth and low-latency throughput over gigabit Ethernet. RiSM is based on Rajant's Wolverine crypto module, which has been designed and proven to pass the most stringent U.S. government certification requirements. RiSM is a low-power device with POE pass-through capabilities, making it simple to add to and upgrade an existing Rajant Kinetic Mesh wireless network to meet NIST FIPS 140-3 requirements.
- **Mobility.** With onboard routing capabilities, BreadCrumb nodes can act independently, enabling a multi-radio, peer-to-peer architecture across mobile devices, overcoming any obstacles, dynamic typography changes, and any gaps in connectivity. Multi-radio enables make before break to ensure seamless mobility to maintain application persistence.

- **Reliability and resiliency.** Leveraging a peer-to-peer approach, Rajant's network creates a self-healing, self-sustaining network topology, driving a high level of reliability within challenging environments.
- **Redundancy.** Many competing wireless solutions depend on controller nodes, which introduce a potential point of failure and can result in service interruptions. In contrast, Rajant's network does not use a controller node and has no single point of failure. Rajant's network has built-in redundancy because multi-radio, multi-frequency BreadCrumbs automatically connect with numerous neighboring nodes. In an extensive network, a single node could have hundreds and even thousands of node connections, providing many potential data pathways and routing options.
- **Reliable data transfer.** InstaMesh routing technology leverages Rajant's patented data routing algorithm to discover and maintain accountability at each BreadCrumb node. In what is probably Rajant's most powerful tool, InstaMesh determines the best path and regularity to send the data back to an edge or a central site. As both external and internal network conditions can change within dynamic environments, Rajant's solution is designed to maintain high reliability and support application needs, regardless of changes to the network. The protocol sends packages over Layer 2 and integrates within a Layer 3 network. In addition, InstaMesh is interoperable with third-party equipment as requested, supporting instances in which third-party network equipment may be used to as part of a project.
- **Dynamic frequency utilization.** As many organizations today leverage multiple access technologies, including wireless, Rajant's approach aligns with multiple spectrum bands, including 900MHz, 2.4GHz, 4.9GHz, and 5GHz, as well as other spectrum, including military-licensed frequencies (LTE/5G). If a data pathway is disrupted on one spectrum band, Rajant can redirect the packet to one of the other available frequencies to ensure delivery.
- **Integration within hybrid network models.** Rajant BreadCrumbs can be deployed rapidly to self-configure and route communications through peer-to-peer mesh and point-to-point wireless, wired, or even satellite links. This includes network access topologies such as Wi-Fi, 4G/LTE, and eventually 5G.
- **Scalability.** BreadCrumbs self-configure when added to the network, easing rollout costs and saving time. In scenarios in which network rollouts can grow from a few dozen to potentially hundreds or thousands of network nodes, Kinetic Mesh is easily scalable with no manual configuration or extra design work needed.
- **Pricing.** Rajant networks all in are generally priced less than nonmesh-based alternatives, including private LTE/5G, which may require dedicated towers, spectrum, or site leasing agreements to deploy infrastructure over wide areas outdoors. Even so, due to its design principles, Rajant can deploy as a hybrid solution, in which it augments existing private LTE/5G topologies if requested.
- **Backward compatibility.** Every Rajant BreadCrumb node is backward compatible with previous BreadCrumbs to simplify new network upgrades. Overall, Rajant has demonstrated its dedication to understanding and helping organizations excel in the most challenging environments present today by delivering ultrareliable network solutions that help organizations cost effectively scale applications for any number of gained benefits.

Case Studies

Fremantle Port Authority

A strong example of Rajant in practice comes from the Fremantle Port Authority (FPA), considered one of the busiest ports in Australia. The FPA represents a challenging radio frequency (RF) environment, whereby the area is inundated with ships, moving containers, and even a rail terminal. In addition, existing LTE coverage in surrounding communities potentially adds to the challenge of connecting industrial endpoints.

The FPA was interested in deploying real-time monitoring via a live-feed CCTV system deployed on mobile trailers throughout the port. The CCTV system fed data and statistics tied to vehicle recognition and license plate recognition (LPR) software. As such, the FPA was able to improve tracking, monitoring, and worker safety. Rajant deployed its Kinetic Mesh solution for mobile connectivity, enabling the trailers to be moved throughout the FPA property without loss of data within the challenging RF environment as operations evolve over time. As such, the mobile trailers themselves become a part of the network topology.

Stanwell Corporation

Within the utilities and mining sectors, Rajant's newer BreadCrumbs, Peregrine and Hawk, were deployed to support energy production. Rajant leveraged its partner, Acubis Technologies, to deliver a communications network that connected endpoints across an open-pit mine, which is used to create electricity in Queensland, Australia. The network was deployed to help overcome challenging RF environments in and around the mine, as well as the power station itself.

The network was called upon to support CCTV, access control, in-vehicle fleet management, fatigue management, digital fire alarms, manufacturing executing systems (MESs), mining operational data warehousing, and industrial IoT edge devices.

Peregrine BreadCrumbs were installed on both fixed and mobile endpoints, including communication towers and mobile wireless communication trailers, which are constantly moved due to shifting operations within the mine. Hawk BreadCrumbs were installed on mobile machines for real-time data related to safety and security. Rajant's BC|Enterprise and BC|Commander provided monitoring and management solutions.

Beyond the initial applications, Stanwell plans to deploy ML/AI and business process improvement applications, which will be added to Rajant's network in the future.

Company Strategy

Rajant's ruggedized, mission-critical heritage continues to drive the company's evolving strategy, particularly as the company looks to leverage its innovative approach to grow in adjacent industrial verticals.

First, Rajant continues to develop new BreadCrumb solutions, which include its most recent Cardinal launch. Cardinal is the company's lightest and smallest dual-radio BreadCrumb module to date, aimed at not only warehouse automation but also use cases in manufacturing, mining, agriculture, utilities, oil and gas, and military applications.

Within RF-challenged industrial environments, particularly within warehouses and manufacturing plants, Rajant sees a significant opportunity to apply its Kinetic Mesh and InstaMesh solutions for optimal outcomes.

Second, Rajant has been at the forefront of ML/AI and analytics in networking, tailoring its solutions to meet the needs of the emerging autonomous ICT framework. From a high level, IDC expects networking to gravitate toward autonomous enablement over the next decade as industries underpin operations with digital infrastructure that can then be infused with automation for operational gains. Rajant InstaMesh software is already heading down that path by creating network connectivity and optimized data flows that automatically adapt to inputs from the network.

Last, Rajant security solutions are designed to help secure industrial IoT and M2M applications in data-sensitive operational technology (OT) environments, a day 1 requirement from industrial and mission-critical customers. As such, Rajant employs dedicated staff who are focused on next-generation cryptographic technologies. Indeed, according to IDC's ongoing research into IoT and M2M connectivity, proven security measures remain the number 1 requirement for any technology vendor engaging with a customer.

FUTURE OUTLOOK

Rajant is already entrenched in a number of mission-critical verticals in which it has name-brand value, including mining, defense, and transportation. While it continues to accrue wins in those verticals, it is highly driven to expand into warehouse automation, manufacturing, and other verticals, in which its latest product launches position it to capture new market share.

As part of this, we expect Rajant to continue highlighting innovation in autonomous networking via ML/AI and edge compute and expanding its LTE- and 5G-enabled solutions.

ESSENTIAL GUIDANCE

Advice for Rajant

Rajant is largely a product-based company revolving around its Kinetic Mesh and InstaMesh solutions. Implementing a solution marketing function that combines all of its value-adds related to hardware, software, and technical support services which can then be delivered through partners via a service-based model would potentially endear it to more stakeholders within its target organizations.

In addition, as IT and network procurement decisions are increasingly encompassed as part of digital transformation, Rajant should target outreach more at the C-suite, including the CIO, CTO, and COO levels. Further, developers who build applications on top of Rajant's network could be critical partners to unlocking brand awareness. Partnering with existing edge IoT platform enablers could be a valuable pathway to expanding Rajant's branding into key target verticals.

Considering APIs, Rajant equipment does support API integration through its BC API. As such, Rajant should highlight how its connectivity solutions are configurable and can interwork with leading ISVs as a means to grow mindshare with industrial and enterprise app developers. For example, showcasing how Rajant's connectivity solutions drive real-time insights to a platform such as Litmus Edge can help Rajant improve brand awareness while demonstrating how its connectivity solutions underpin real-time, critical data-based decisions.

Competitively, Rajant is likely to see more competition from private LTE and 5G vendors that are also looking to grow their share in the industrial and mission-critical space. Rajant's solution can be deployed as a standalone or as an augment to such solutions. Positioning as both a standalone and as complementary could help it win share, whereas otherwise, as a standalone solution, it may not.

Sustainability is top of mind for almost all large organizations these days, driven by regulatory guidance related to reducing energy consumption and carbon emissions. Rajant's bottoms-up approach limits the need for network technology to what is required as opposed to building grid-based coverage over long distances. Leveraging that model, Rajant is uniquely positioned to help organizations meet the needs of ever-tightening regulatory considerations.

LEARN MORE

Related Research

- *Worldwide Internet of Things Infrastructure Forecast, 2023-2027* (IDC #US51050323, July 2023)
- *IDC's Worldwide Internet of Things and Intelligent Edge Infrastructure Taxonomy, 2023* (IDC #US50931823, July 2023)
- *Worldwide Private LTE/5G Wireless Infrastructure Forecast, 2023-2027* (IDC #US50863623, June 2023)
- *Evaluating the Impact of Cloud Delivery on IoT Network, Server, and Storage Infrastructure* (IDC #US50942023, June 2023)
- *Organizational Investments in IoT Will Continue to Increase in the Next Five Years; "Market Makers" Poised to Drive Deeper Integration Between IoT and Blockchain* (IDC #US50727523, June 2023)
- *Worldwide 5G and 4G/LTE Enterprise Wireless WAN Forecast, 2023-2027: 5G Shipments Begin to Ramp* (IDC #US50622523, May 2023)
- *IDC's Worldwide Enterprise Network Infrastructure Taxonomy, 2023* (IDC #US50490923, March 2023)
- *IDC's Worldwide Enterprise Infrastructure Workloads Taxonomy, 2023* (IDC #US49306023, March 2023)

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