
# NETWORK PERFORMANCE MANAGEMENT

*for 5G Manufacturing Networks*

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## OVERVIEW

### *5G Technology Brings a Revolution to Manufacturing*

5G offers manufacturers and network operators the opportunity to evolve factories and take advantage of remote-controlled robotics, sensors, IoT and ubiquitous factory-wide interconnection. Manufacturing is one industry identified as having the greatest benefit from the deployment of 5G second only to Energy and Utilities as shown below:

5G improves machine and process efficiency, system availability, reduces defects, and enhances productivity. It enables intelligent, connected, and digitized manufacturing processes. These technologies will reduce time-to-action through real-time insights, better analytics, and enhanced performance. The ultra-low latency provided by 5G and network slicing, for example, increases the use of robotics or other mobile tools.

Technologies like IoT, Robotics, Augmented Reality/Virtual Reality and Artificial Intelligence enables end-to-end visibility of operations where production takes place. Frost & Sullivan predicts 90% of industrial enterprises will be utilizing edge computing by 2022.

Manufacturers can more easily keep tabs on factory equipment performance via smart sensors using predictive maintenance software to find and fix problems before they develop.

5G benefits may include as much as 10% reduction in maintenance costs, a 15% improvement in production efficiency, and a 25% reduction in error rates.

Many manufacturers will choose to deploy their own 5G private network whether maintained by a network team or a network provider. This 5G network is now much more critical to your manufacturing success since it controls all aspects of your operation and therefore must always run at peak efficiency.

To monitor 5G, the visibility solution must include Artificial Intelligence/Machine Learning and workflows to manage the millions of applications, processes, and network data points of your network. The data must be filtered, dissected, and humanized to be useful. It must collect and monitor the key performance indicators for all device types, identify applications, and generate reports for your complete infrastructure.


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## DART Built for 5G Manufacturing Networks

Cirries DART provides a holistic visibility suite that combines the best attributes of Network Performance Management (NPM), Application Performance Management (APM), and Digital Experience Monitoring (DEM). DART ingests streaming network data augmented with Machine Learning to improve the manufacturing network experience, application performance, and device performance;  providing the optimal communication environment required for 5G monitoring.

It captures packets and metadata from the network for all sessions and then humanizes the data delivered as visual actionable metrics. The primary objective is always to efficiently deliver manufacturing services, solve performance and threat issues faster, and mitigate risk more effectively than ever; maximizing the digital experience. These features include:

- Continuous calculation of KPIs to ensure latency tolerances and performance demands are met
- Instant alerts and auto-reaction to networking anomalies to avoid damaging expensive components
- Live monitoring of video streams from assembly lines to detect production issues


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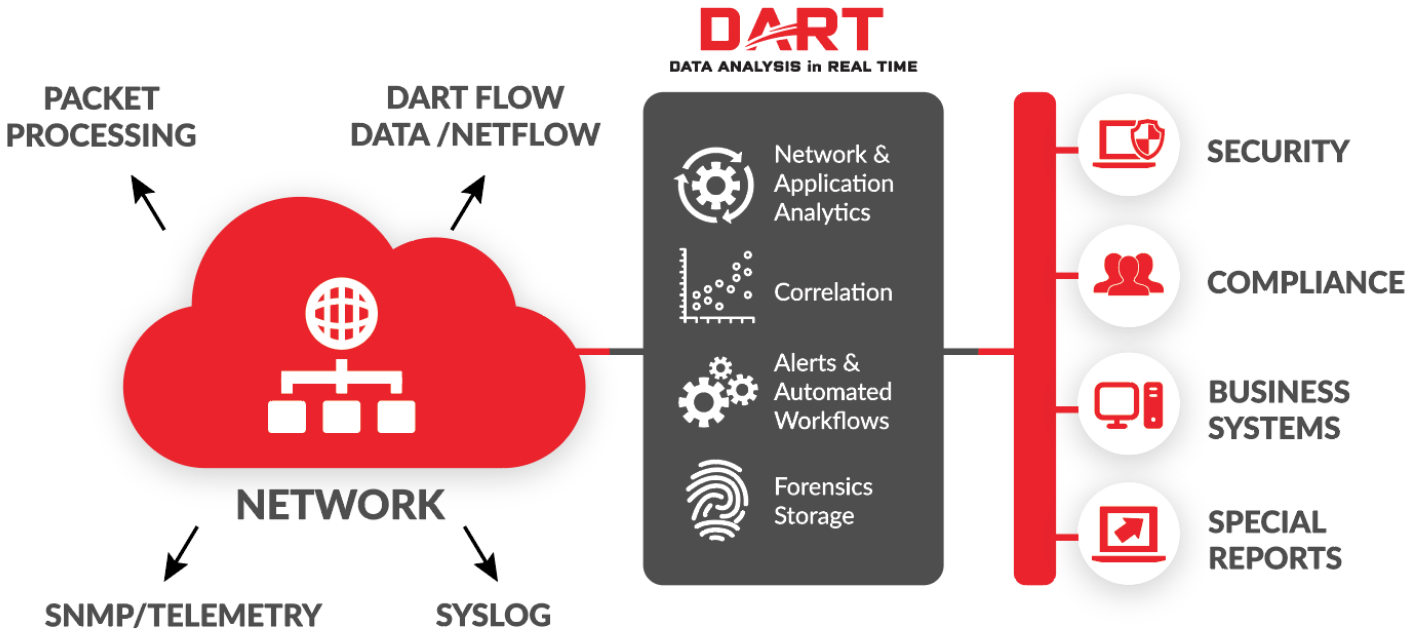
## The 4 Cornerstones of Data Analytics

Capturing all the network data is the only way to efficiently manage and protect your manufacturing networks. The four cornerstones are illustrated below:




## Packet Processing

Cirries Packet Sensor provides on-demand packet recording, DART flow data generation, and light packet brokering capabilities, including filtering, shunting, and load balancing to forward packets to other tool sets, i.e. security.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## DART Flow Data

Network flow or traffic is the amount of data being transmitted across a network over a specific period. Monitoring network flows is key to understanding the typical behavior and performance of your network. DART provides flow generation to represent the traffic on the network for each session. Cirries Enriched Netflow capability exceeds traditional Netflow Generation and Analysis by first evaluating each and every packet in a flow, not sampled 1024:1 or higher by other Netflow Generators. This allows the ability to provide detailed metrics for each flow including latency and error conditions met along the flow path.

## SNMP/Network Telemetry

SNMP is used to collect information about managed devices on networks. Devices that send SNMP data include cable modems, routers, switches, servers, workstations, printers, and more. Correlating this data with the other data from your network is key to finding erratic behavior or failures in network elements. Network Telemetry works on the push model and can provide a more real-time view of key metrics in the network including critical traffic and other performance measurements.

## SYSLOG Data

Syslog is used by applications to send data about events, statuses, diagnostics, and the severity level of an event. Syslog allows you to historically investigate incidents to determine and eliminate the root cause. As a result, it can eliminate the damage caused by similar future events thereby saving minutes or even hours of downtime.


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## The Best NPM Solution for Manufacturing Networks

DART network performance solution meets the following criteria needed for manufacturing:

- **Scalability** – can grow as your manufacturing network grows without limitations or replacement
- **Capturability** – can capture all your existing network protocols and data and all future protocols as you transform and evolve the manufacturing environment.
- **Virtual Sensors** - support nodes to join and leave virtual sensor networks, broadcasting and merging of networks
- **Network Baseline** – captures network activity, establishes a baseline and alerts on anomalies
- **Offline storage** – able to download data to an external device for long-term analysis or regulatory requirements
- **Auto-Discovery** – identifies and discovers network elements automatically and alerts when abnormal changes occur
- **Auto-Mapping** – geolocate your network locations on a map displayed on your start up screen using Lat and Long coordinates
- **Auto-Drill Down** – allows a location with an issue identified by a red icon on the map to be clickable to drill down to the root cause
- **Workflows** – eliminates manual investigation of anomalies by automatically investigating alarms and providing the most likely cause
- **Machine Learning** – uses machine learning to discover data trends not otherwise detectable
- **Application Performance** – measures and reports performance metrics
- **Segment Breakout**- discrete calculations for access latency, overall network latency, and application response


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## Sensor Deployment

- Deploy sensors to monitor links to servers, server farms, and other critical network infrastructure
- Gather data from infrastructure devices including packet brokers, load balancers, SD-WAN forwarders, and next generation firewalls
- Leverage traffic mirroring from cloud service providers such as AWS, Google Cloud Platform, and Microsoft Azure to get visibility into cloud-hosted applications
- Use Virtual sensors to gather data from cloud service providers such as AWS, Google Cloud Platform, and Microsoft Azure to get visibility into cloud-hosted applications
- Deploy a Network Performance Management software platform such as Cirries DART to provide actionable insight into the data by providing dashboards that give you at-a-glance visibility into your network's underlying health and performance
- Since you now have full visibility, quickly fix anomalies, eliminate congestion, and proactively manage usage to optimize and grow your network
- Use Cirries Professional Services team to deploy and implement your NPM/APM/DEM platform and assist on site or remotely to create implementation plans, build your network specific dashboards and reports, review your network configuration and growth plans then suggest improvements to improve efficiency

## Summary

DART provides a unique collection of next generation network tools for monitoring, securing, and traffic engineering your manufacturing network to guarantee the best possible Digital Experience by maximizing network uptime and overall network performance.

Cirries' DART is a holistic network, digital experience, and application performance monitoring software that provides complete visibility across physical, virtual, software-defined, and cloud network infrastructures. With a comprehensive set of network monitoring tools, DART tracks all network flows and application transactions across data centers and virtual environments, north-south and east-west. The result? All user experiences and all applications and server performances become known and visible to ensure quality of experience (QoE) across the organization.


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