



PRODUCT REVIEW

PROPHECY IOT®: UNCOVERING THE MYSTERIES
OF SHOP FLOOR OPERATIONS

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Prophecy IoT®: Uncovering the Mysteries of Shop Floor Operations

About This Report

With increasing consumer demand for more high-quality products and services, manufacturing and distribution companies around the world are desperately seeking ways to gain a competitive advantage. At the same time, with increasing presence on the shop floor, software technologies are being incorporated into nearly every new production device and piece of machinery.

The ever-increasing presence of software and computing systems within manufacturing—an industry that basically consumes and produces lots of data—enables machines and devices to produce data about their operations and to be interconnected. This in turn enables the manufacturing industry to usher in the new era of the Internet of Things (IoT).

On the consumer side, as IoT gains momentum, products both simple and complex can now be connected and operated intelligently. On the industrial side, a new form of IoT is being shaped into the next industrial revolution.

In this scenario, there is a new offering that aims to provide analytics and intelligence to address the new challenges faced by the manufacturing industry. Godlan's Prophecy IoT® allows manufacturing companies to collect data from manufacturing and operations processes easily and to provide insights via advanced analytics capabilities—all with minimal technical requirements.

This report provides a review of an IoT analytics provider Godlan and their Prophecy IoT® solution specifically developed for the provision of productivity and process data and analytics for manufacturers.

The report is structured into the following sections:

- An analyst perspective that offers a general discussion of the technical and business impact of IoT on the world of manufacturing and the increasing importance of leveraging analytics capabilities to improve business performance.
- A dive into the new release of Prophecy IoT® and its ecosystem for IoT analytics, describing the solution's technology and business value:
 - Functional, architectural, and business perspectives

- Key capabilities for big data management and analysis
- Role in tactical and strategic decision-making within the manufacturing and IoT spaces
- A real-world success story of a company using Prophecy IoT®
- Analyst observations and commentary

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"The ultimate function of prophecy is not to tell the future, but to make it."

- Joel A. Barker, Futurist

IoT Analytics and Manufacturing: A Marriage Made in Heaven?

Until recently, device connectivity was aimed mainly at enabling and enhancing human interactions either directly and indirectly (voice, data, transactions, etc.). Nowadays, as data is increasingly being generated independently or unwittingly from human interactions, connectivity is more about communication between devices and the production of more and more data from an ever-growing number of transactions and interactions.

The generation of enormous amounts of data and the incessant communication between devices have given way to the next technological phenomenon, the Internet of Things (IoT).

According to the International Telecommunication Union (ITU):

The IoT can be viewed as a global infrastructure for the information society, enabling advanced services by interconnecting (physical and virtual) things based on existing and evolving interoperable information and communication technologies (ICT).

Through the exploitation of identification, data capture, processing and communication capabilities, the IoT makes full use of "things" to offer services to all kinds of applications, whilst ensuring that security and privacy requirements are fulfilled.

The IoT phenomenon has made it possible for organizations to connect extensively all types of devices. This interconnection of devices has led to not only an increase in service efficiency but also the collection of larger amounts of data that can be processed and analyzed to increase a company's intelligence capabilities.

Organizations have discovered that as with consumer products, industrial assets can produce massive amounts of data. The data can be collected from any asset—whether a new or existing one, ranging from railroad cars and grid sensors to small and large machines.

A specific type of IoT has recently emerged within the manufacturing industry, called the Industrial IoT. The **Industrial Internet of Things (IIoT)** has already had an impact on the digital technologies of nearly all industries, and it has become

the main source of data. Therefore, IIoT is paving the way to a radical transformation in how companies produce and deliver both products and services (see figure 1).

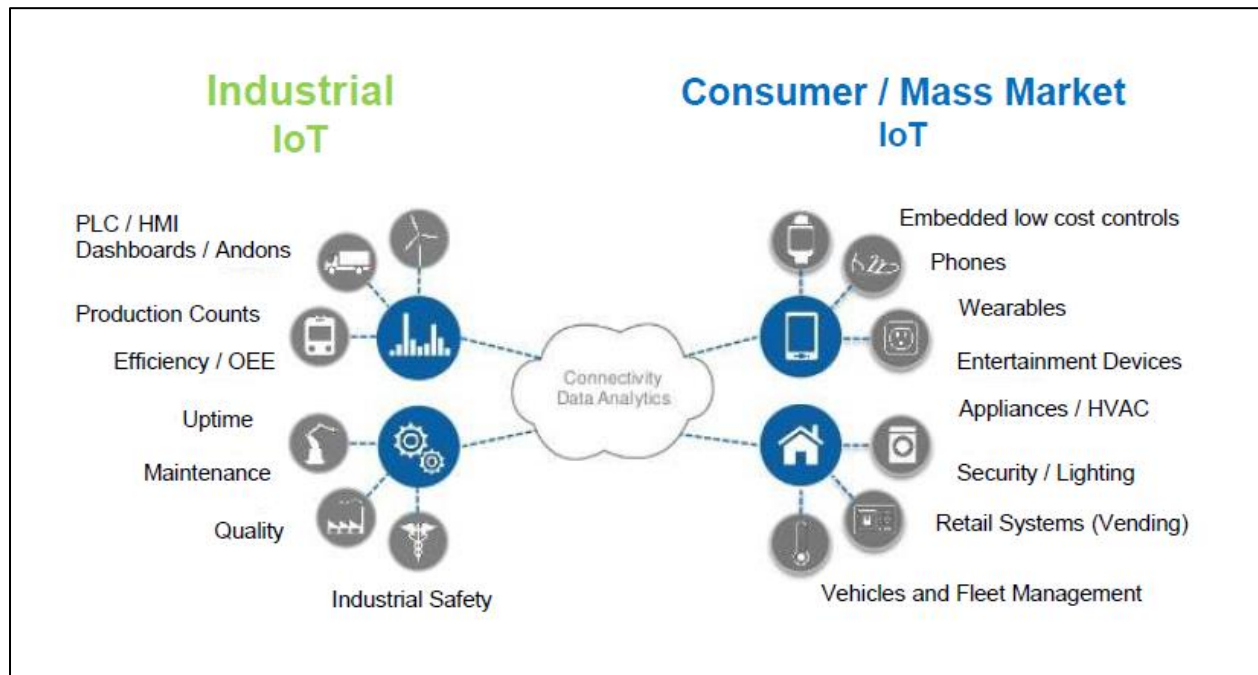


Figure 1. Industrial IoT vs. consumer IoT (image courtesy of Godlan)

The large volumes of data produced by the industrial IoT can, if properly processed and analyzed, yield valuable insights for an organization. Such data analysis can trigger improvements in not only the quality of products and services being delivered but also the quality and efficiency of the entire production and distribution chain.

The incorporation of IIoT within the factory floor environment is a radical development in the manufacturing industry. It enables manufacturers to gain a deeper understanding of their production processes and, consequently, enhance the productivity and efficiency of their shop floors and plants.

According to Accenture's report [Winning with the Industrial Internet of Things](#), IIoT alone could add \$14.2 trillion (USD) to the global economy by 2030. That figure is a testament to the overarching importance of IIoT for the connection of devices for manufacturing companies across the entire industry spectrum. But manufacturing businesses will first need to innovate their processes and technologies to be able to leverage the data they produce—and stay ahead of the curve.

(I)IoT Analytics: Giving Real Power to the Shop Floor

Simply having a connected plant is not enough. Intelligent strategies and solutions are necessary to ensure that the data gathered from many potential data points is being stored, treated, and processed, and seamlessly embedded with the rest of the data arising from various sources. This will ensure that comprehensive, accurate, efficient, and timely insights are provided to all key stakeholders, thereby producing substantial improvements in operations and significance increases in enterprise performance.

IIoT, like IoT, continues to evolve and gain presence and popularity in the manufacturing industry. And as analytics usurps a prominent role in manufacturing operations, a new type of analytics solutions is born—IoT Analytics.

Both well-established software providers and newcomers alike are directing their analytics development efforts toward the configuration of new solutions and platforms that are designed to collect, store, and analyze the data arising from all plant floor equipment. The development and use of IoT Analytics offerings will enable manufacturers to realize the enormous potential of analyzing data from manufacturing equipment, thereby generating valuable insights.

Though much of this data has been present within shop floors for decades, it has not analyzed to its fullest. IoT Analytics offerings can perform extensive analyses of this data and other emerging data from various sources, enabling manufacturing companies to fulfill many of their analytics requirements. Manufacturers can thus apply analytics for many activities such as for performing predictive maintenance and optimizing plant floor energy usage, or for alerting and guiding responses to critical failures and events such as water leaks or pump and equipment failures. IoT Analytics can thus bring power to the shop floor and generate value.

The Needs and Deeds of (I)IoT Analytics

Organizations in the manufacturing and distribution industries can choose from a multitude of industrial IoT (IIoT) offerings currently available on the market. While many providers offer IIoT solutions with similar sets of capabilities, each manufacturing company needs to do its due diligence and select the solution that most closely aligns with its business needs (figure 2).

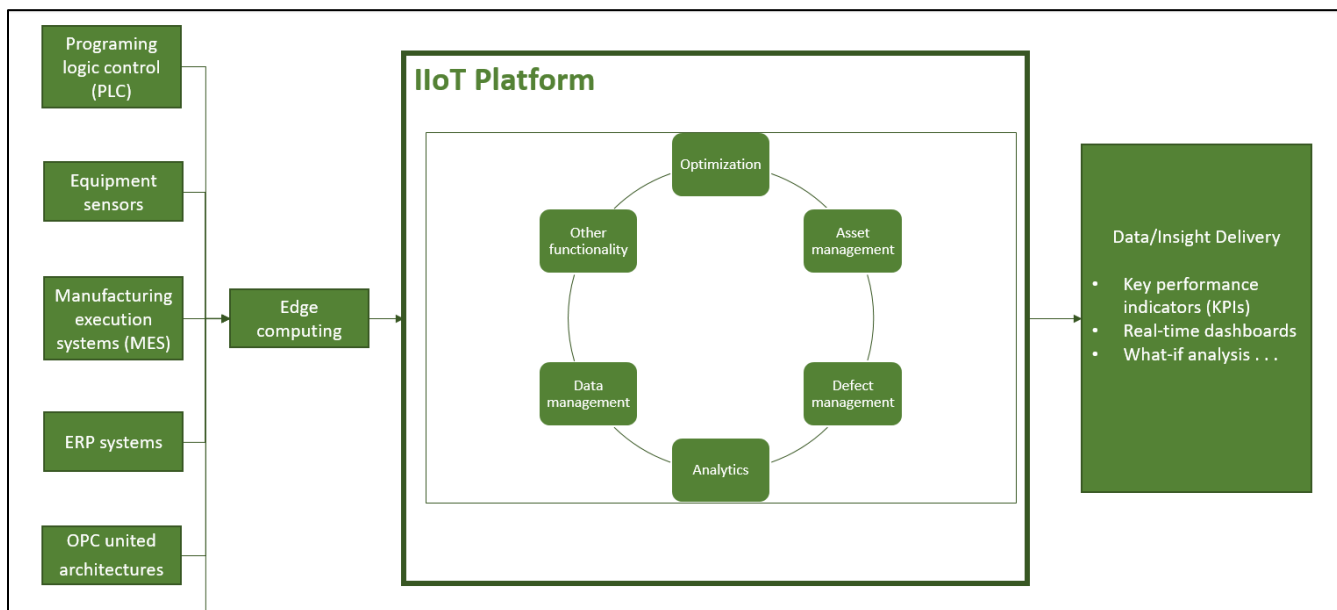


Figure 2. Basic IIoT infrastructure for manufacturing

Many of these vendors offer similar subsets of IIoT functionality through their software and service products, such as data collection, reporting, and dashboarding, among others. The key difference for manufacturers will reside in how well an IoT Analytics solution will be able to not only connect various devices and systems but also serve as the central system for the entire IoT infrastructure to effectively provide timely and accurate insights.

For IIoT strategies, and especially IIoT analytics strategies, to succeed, organizations must ensure that they have the right goals in mind. Below are some recommendations to increase the likelihood for IIoT analytics strategy success. Specifically, organizations must ensure the following:

1. The stakeholders and users as well as the solution and service providers understand and can leverage their expertise within manufacturing deployment scenarios.
2. All processing, analysis, and decision-making aspects are clearly identified at all stages of the IoT infrastructure.
3. A full system integration is feasible—especially with core enterprise software systems such as enterprise resource planning (ERP) and customer relationship management (CRM), and others—in order to gain full visibility into every aspect of manufacturing, production, distribution and maximal insights.
4. The software solution portfolio contains the necessary value and capabilities to fit the organization’s analytics needs.
5. The organization will be able to make data, information, and insights a vital part of all internal and external systems and processes.

6. Based on insights and correct use of advanced analytics, the organization configures its decision-making process and logic to ensure continued improvement of the data-to-insight cycle that can lead directly to production and distribution performance improvement and quality.

Putting all these measures in place will better equip organizations to collect, prepare, process, and analyze data effectively in order to gain significant business value.

Having the right IoT Analytics solution in place enables manufacturers to incorporate manufacturing data into the data value chain, making manufacturing data a key integrated element for the provision of insights. This will lead to improvements in all areas of manufacturing—from quality of production, to product improvement, to effective predictive maintenance of equipment.

An effective IoT infrastructure strategy speaks to a new manufacturing era that reflects the interconnection of devices and digital technologies and plays a central role in an organization's ability to remain competitive in the market.

Prophecy IoT® Solution Architecture and Capabilities

ERP for manufacturing consultant Godlan has been well aware of the needs of manufacturing companies for successfully deploying, maintaining, and growing their IIoT initiatives. Over the years, Godlan has seen companies struggle with their ERP systems due to the lack of data, as there was no accurate and timely method of producing data. Prophecy IoT® was created to solve the visibility issues in manufacturing, which have also resulted in more effective use of ERP systems.

Via its newly formed business group, Godlan developed an approach for designing a new solution that enables organizations to effectively deploy an IoT strategy. The software system, Prophecy IoT®, incorporates the company's expertise in the manufacturing industry to speed the deployment and efficiency of an IoT strategy.

Prophecy IoT® allows manufacturing companies to collect data from production-related machines, equipment, and sensors easily and with minimal technical requirements. What follows is an overview of the company and a comprehensive review of the most important features, capabilities, and strategies that Prophecy IoT® offers to both old and new generations of manufacturing companies.

About Godlan

Founded in 1984, Godlan adds up to more than 30 years of experience in the implementation of ERP software for manufacturers. Hundreds of customers across the United States have given Godlan the drive to become a leading professional manufacturing services company.

As an Infor Gold Channel Partner for more than 20 years, Godlan has amassed a lot of experience with the manufacturing industry. As such, Godlan is an ideal

provider of both technical and business expertise in the industry and an ideal partner for supporting the implementation of world-class processes and practices throughout a manufacturing organization.

Godlan has relied on an experienced and highly skilled group of professionals to provide successful consultancy and support to its now large clientele and represent the core values and philosophy of the company.

The principles of Godlan's philosophy involve being:

- **Customer centric.** Committed to providing each customer with excellent ERP services and superior products by understanding the customer's ERP expectations and by strengthening its business relations with customers.
- **Objectives based.** Able to work collaboratively with customers to create a project charter document that accurately describes each customer's current business problems and desired benefits and the project team's roles and responsibilities.
- **Metrics driven.** Able to assure customers that the project team will work with them closely to determine an acceptable ERP implementation budget and detailed project plan with defined timelines.
- **Success focused.** Able to lay the foundation for a customer's project with proven tools, processes, and personnel to ensure success.

Following these same principles, Godlan has now developed a new business unit and software offering called Prophecy IoT[®], aiming to provide manufacturing organizations with an innovative, effective, and a key technology partner for their new or ongoing IIoT initiatives.

About Prophecy IoT[®]

Prophecy IoT[®] was born from Godlan's strategy to provide manufacturers with a next-generation software solution for their IIoT initiatives, filling the need for bringing clarity and accuracy of manufacturing operational data.

Prophecy IoT[®] is a complete IoT connection and analytics solution platform built to help manufacturing companies collect and analyze data from the manufacturing and operations realm and to easily process that data with minimal technical requirements.

The IIoT analytics solution platform allows organizations to collect vast amounts of relevant and contextual machine and operational data—by the second, minute, hour, or day. This data, when combined with manufacturing ERP data, can be analyzed to gain insights that can effectively support decision-making.

The fundamental goal of Prophecy IoT® is to provide users—even those with no technical training—with a system that allows them to interactively process and analyze production and operational information.

According the Prophecy IoT® team, the platform provides an easy and intuitive interface that speaks the language of manufacturing: to provide accuracy, efficiency, and straightforward information about the status of operations.

The team notes that Prophecy IoT® allows manufacturers to access and analyze general business and operation data as well as specific data on the shop floor (equipment, sensors, etc.) , so that they can solve daily yet crucial questions in their manufacturing and operations (figure 3).

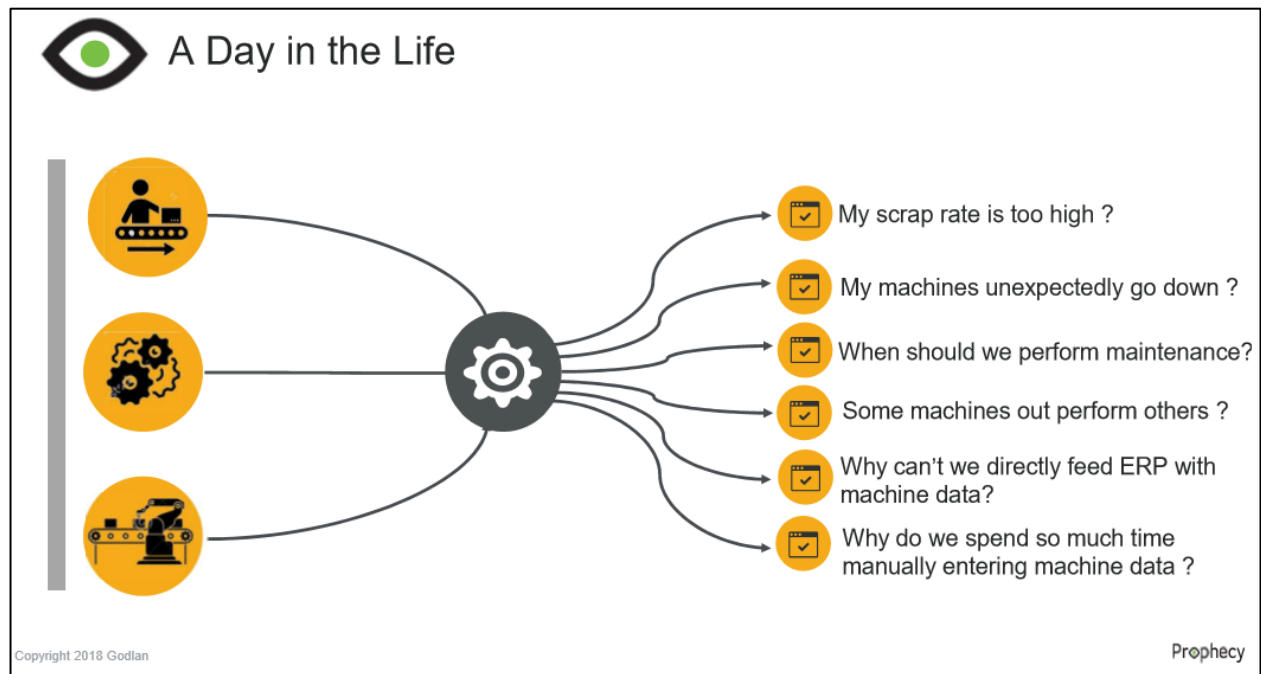


Figure 3. A day in the life of a manufacturing manager (image courtesy of Godlan)

Prophecy IoT® Solution General Architecture

Godlan's Prophecy IoT® allows manufacturers to deploy a full IoT Analytics solution using a simple two-way mechanism:

- **First**, by offering a solution that enables companies to collect relevant and contextual manufacturing and operations data and perform relevant manufacturing and operations data analysis, and then blend that solution with third-party enterprise software systems.
- **Second**, by offering a productivity pack that allows for gathering defined data from machines and focused charting for producing manufacturing-centric key performance indicators (KPIs). The productivity pack is ready

to run right out of the box, with the ability to be personalized and expanded to meet customer-specific needs.

Prophecy IoT® sits at the center of Godlan's strategy. It connects the dots—meaning it integrates data from a variety of sources—to permit vast amounts of data to be converted into actionable information within the manufacturing context (figure 4).



Figure 4. Prophecy IoT® and the future of manufacturing (image courtesy of Godlan)

By being at the center of the IoT initiative, Prophecy IoT® allows organizations to collect vast amounts of relevant and contextual machine and operational data. Prophecy IoT® then takes this data and combines it with existing operational data from manufacturing ERP systems to enable users to analyze it via an interactive system and gain insights that can effectively support decision-making (see figure 5).

Prophecy IoT® allows users with no technical training to easily process and analyze information via an intuitive and easy-to-use interface that is specifically designed to *speak* the language of manufacturing—providing a seamless and straightforward way for users to effectively use the information about the status of operations.

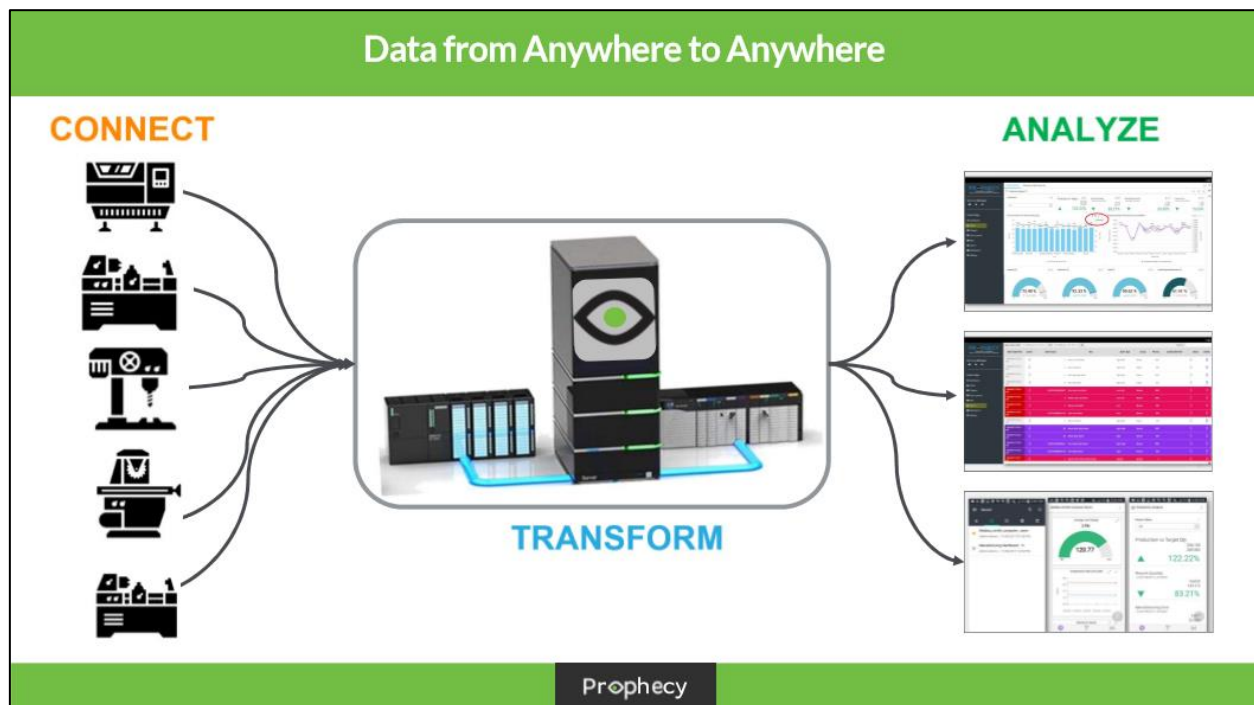


Figure 5. Prophecy IoT® at the center of the IoT framework (image courtesy of Godlan)

While simple, Prophecy IoT®'s approach relies on securing reliable services for all IIoT processes. These services range from providing robust ways for data collection to offering the necessary technology for final presentation of the results and insights in a timely fashion. For this, Prophecy IoT® combines a series of key functional features to ensure that it provides manufacturers with truly useful information.

Prophecy IoT® Solution Ecosystem

According to the company, Prophecy IoT® was built with a specific ecosystem in mind. The ecosystem provides the necessary elements for ensuring effective operations and efficient progression of the IoT cycle (figure 6). Each element of the ecosystem provides the necessary functions for completing the cycle. These elements include:

- **In-Context data.** This represents the solution's ability to gather information from many different sources (machines, ERP, QC, engineering systems, etc.) and to combine all that data so that it can be evaluated against process and operational control data. This process enables the user to create, discover, and manage flexible relationships between data sources in order to make the data relevant for most, if not all, manufacturing procedures (products, jobs, operations, customers, etc.).
- **Human machine interfaces (HMIs).** These are also called machine control panels, a key feature that enables real interaction with both the

equipment via command execution and the display production data. According to the Prophecy IoT® team, the platform can create HMI displays and control panel graphics with direct connection to tags configured in the Data Acquisition Engine (DAE). The platform can be designed to display tag data directly or in a wide variety of graphical formats such as radial gauges, numeric or percentage readouts, radio buttons, and real-time data charts.

- **Data analytics.** There is a full mechanism for pulling together and organizing tag data from the DAE for analysis and further transformation into actionable insights. Prophecy IoT®'s analytics and data visualization application enables users to capture and configure a wide variety of types of data sources (i.e., machine PLC output) and create dashboards to configure and display data related to the user's required key performance indicators (KPIs).
- **Data aggregation.** Prophecy IoT® includes a full set of data aggregation functionality to allow users to log selected tag data or groups according to specific conditions, such as defined time intervals, aggregation rules, and events.
- **Prophecy IoT® alarms and alerts.** A core feature of top analytics applications and a key functionality feature of Prophecy IoT® is the ability of the system to set process and operational alarms, an important component for achieving safe and productive operations. In Prophecy IoT®, alarms are set to monitor the status and control all aspects of manufacturing and production operations, machines, and devices. Users gain the ability to set up, log and view status, as well as send notifications and alarms when needed.

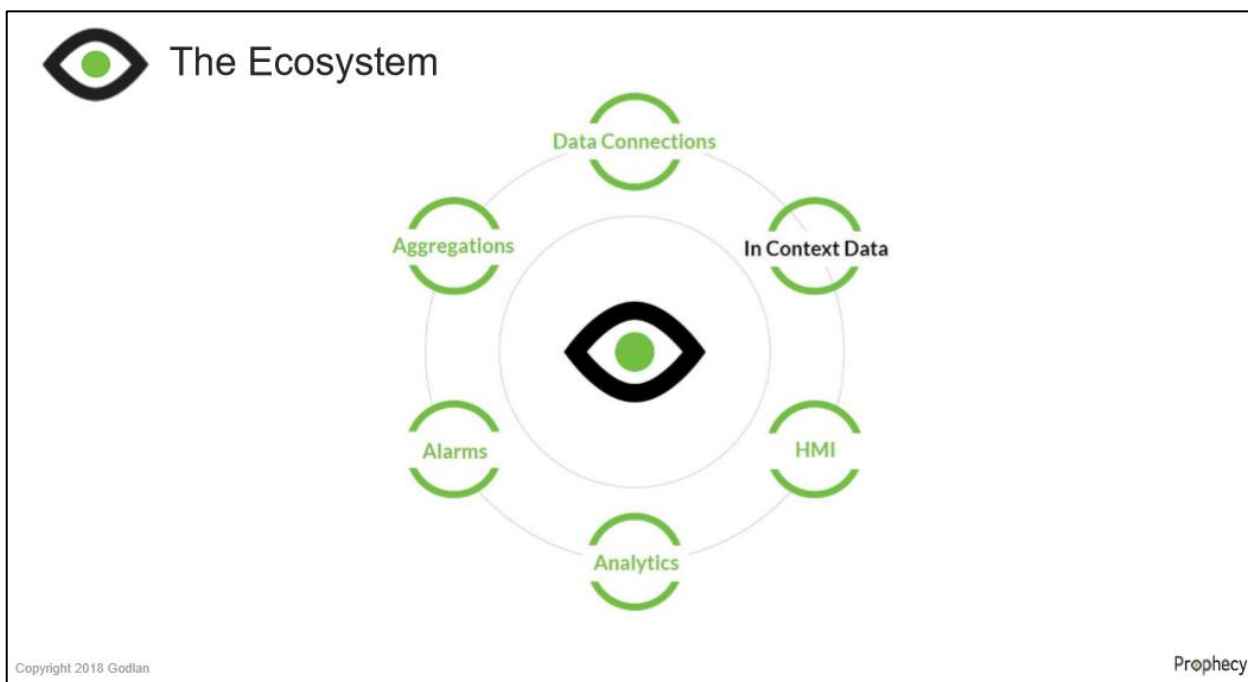


Figure 6. Prophecy IoT®'s five main functional components (image courtesy of Godlan)

Based on all the above, the Prophecy IoT® offering has three main key differentiators (which we will touch upon in the next sections):

1. Robust data collection and integration features
2. A full IIoT processing and production analysis cycle
3. A prebuilt and extendable productivity pack quick-to-value solution

With this structure, Prophecy IoT® aims to provide a complete data management and analytics cycle for manufacturers' IoT initiatives, resulting in specific benefits, including:

- Increased operational efficiency
- Reduced risks, lowered operational costs, and minimal downtimes
- Optimal use of resources

Robust Data Collection and Integration Features

A key capability of Prophecy IoT® is that it allows organizations to collect vast amounts of relevant and contextual machine, device, and operational data at any predefined time interval. More importantly, it allows them to collect this data easily and with minimal technical effort.

The platform counts on a vast number of connectors, both specific to manufacturing and for other external sources, for easily collecting information directly from the source. It comprises connection tools for machine and devices sources as well as connectors for common enterprise and external sources.

Having these capabilities enables Prophecy IoT® to ensure manufacturers will be able to confidently initiate their IIoT frameworks. These companies know that their platform will have enormous potential for collecting data: from Programmable logic controllers (PLC) to simple MS Excel spreadsheets. Below is a list of some of these sources.

PLC Connections out of the box	<ul style="list-style-type: none"> • Modbus, Siemens, Allen Bradley, Rockwell GE, Kepware, OPTO, OPC UA, OPC Classic, MQTT, CANbus, Opto 22, OAS SDK, Kepware, MTConnect, . . . • Industry Specific—Euromap, DNP3, IEC
OPC Clients	Kepware, Wonderware, FactoryTalk
Web Services	REST, HTTP, JSON, Jquery, JavaScript
API Connectors	Infor CSI, ION, Birst
.NET—Interface to any .NET application	
Industry standard databases	SQL, Oracle, MySQL, Access, SQL Azure, CSV files
Other formats	Binary, text, XML files, Excel spreadsheets

Table 1. Prophecy IoT® machine sources (courtesy of Godlan)

Siemens Connector	Siemens Driver Interfaces that support communications over Ethernet to S7-200, S7-300, S7-400, S7-1200, and S7-1500
Modbus Connector	Connect to Modbus slave devices over Ethernet and Serial interfaces with Modbus TCP, RTU, and ASCII protocols
OPTO Connector	Driver with communications to OPTO 22 SNAP PAC controllers
OPC Server Connector	Provides connectivity to OPC Classic and OPC UA Servers, Data Access and Alarms and Conditions
OPC Client Connector	Enables unlimited OPC Clients to communicate with an OAS Service, allowing unlimited OPC Client connections while maintaining only one OPC connection to the local OPC servers
Data Route	Allows an OAS Service to write values from any Tag Parameter to any local or remote OAS Tag data source, simplifying remote networking by installing the OAS Data Engine at the source
Excel Connector	Provides connectivity to MS Excel Workbooks for both read and write functionality with Excel 2003, 2007, 2010, and above
Device Connectors	Web Services REST, HTTP, JSON, Jquery, JavaScript API Connectors for CSI, Factory Track, and ION

Table 2. Prophecy IoT® device connectors (courtesy of Godlan)

Still, the process does not end with data collection. Once Prophecy IoT® receives this data, it combines it with manufacturing ERP data and analyzes it to enable users to perform analytics over a full homogeneous set of data—and gain actionable insights.

A Full IIoT Processing and Production Analysis Cycle

Once collected and integrated, the data needs to be used and analyzed effectively and efficiently by users. According to the company, Prophecy IoT®'s analytics component is designed to provide full charting, visualization, and dashboarding capabilities so that users can capture, configure, analyze, and provide insights from most types of data sources.

Once prepared, the data can easily be used to create dashboards composed from a wide range of chart types, including comparisons, relationships, proportions, distributions, and other types of visualizations.

One key aspect of the features provided by Prophecy IoT® is the capability—due to the ability to work with data in real time—to provide near real-time status and, if necessary, alarm into many aspects of daily operations (figure 7).

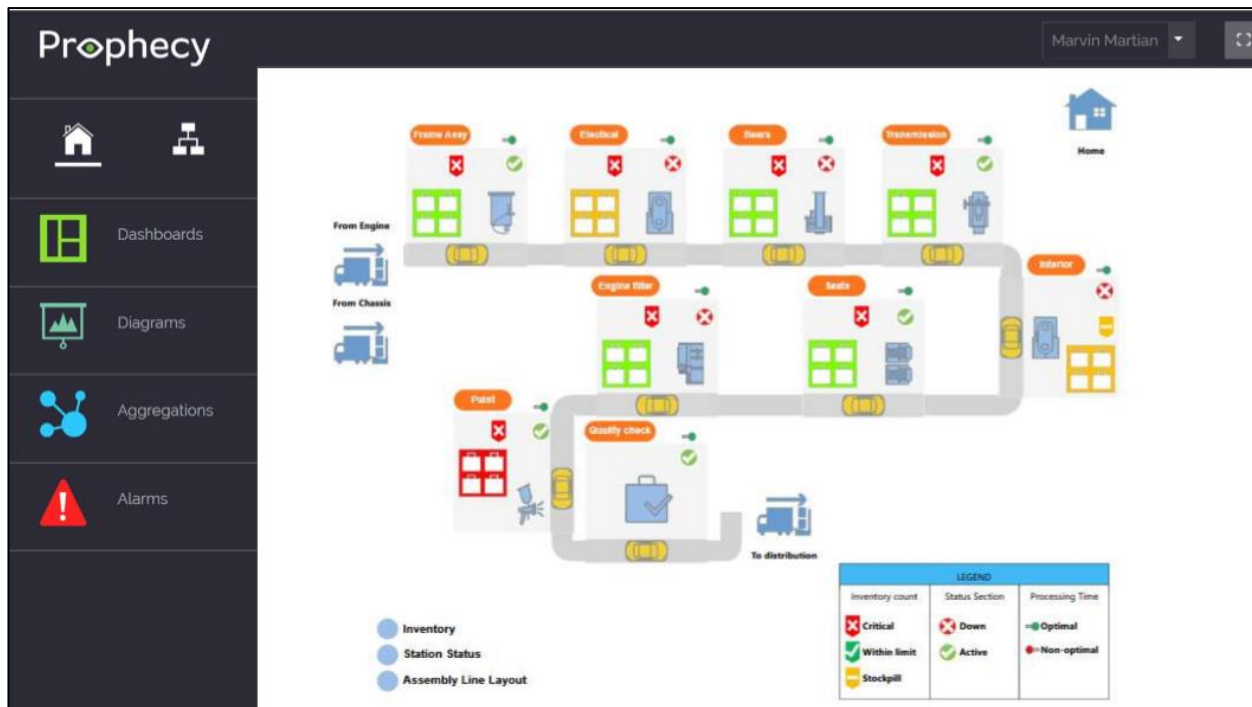


Figure 7. Prophecy IoT® screencap from Prophecy IoT®’s Analytics component (image courtesy of Godlan)

Another key functional piece from Prophecy IoT® includes process and operational alarms—an important component to help ensure safe and productive operations.

Within the platform, these alarms monitor the status of and help control production operations, machines, and other manufacturing-related processes by promptly detecting issues with production machines and processes, so they can be accurately identified and corrected.

Set specifically for helping manufacturers, these alarms can be easily configured to achieve specific tasks, including:

- Less unplanned machine downtime
- Improved process performance/yields
- Better operator effectiveness
- Increased safety

Interestingly, as part of Prophecy IoT®'s Data Acquisition Engine (DAE) and Tag Configuration functionality, users can set up, log, and view status of alarms; they can also send notifications for alarms as well as create alarm groups.

Additionally, users have the capability to determine what type or combination of alarms they would like to set up and to set them to be triggered by a tags' value tag calculations, tag events, or other tag functions. This feature enables users to use Prophecy IoT® as a real edge and central monitoring element for the overall IoT infrastructure.

Observations and Commentary

Today it is no mystery for manufacturers that production equipment can generate vast amounts of data and that this data can have enormous value, when used both in real time and historical analysis. When collected and analyzed properly, this data can have great value for any manufacturing organization.

Yet another aspect of properly managing the data has a lot to do with the ability of the available software technology to blend this data with other data originating from relevant systems (such as ERP solutions) in order to elevate the degree of analytic completeness for the organization.

Just as data points can be used to automate transactions or events, by an ERP software system, they can also be used to generate predictive and advanced analysis as well as alerts that can be delivered in real time to individuals or groups, by an IIoT Analytics system.

Prophecy IoT® allows manufacturers to deploy a full IoT solution via a simple two-way mechanism. First, by offering a solution that enables them to collect relevant and contextual manufacturing and operations data and perform relevant manufacturing and operations data analysis, and then blending it with third-party enterprise software systems. Second, by offering a prebuilt productivity pack that provides defined data from machines and focused charting for manufacturing-centric KPIs .

By smoothly blending effective IoT with ERP data, Prophecy IoT® aims to deliver significant benefits to an organization—increasing operational efficiency, lowering operational costs, or even minimizing downtimes.

Simply having a connected plant is not enough—intelligent strategies and solutions are necessary to ensure that the data gathered from many potential data points is being stored, treated, and processed, and seamlessly embedded with the rest of the data arising from various sources to ensure that comprehensive, accurate, efficient, and timely insights are provided to all key stakeholders. In turn, this process has the potential to support substantial improvements in operations and result in increased enterprise performance.

Prophecy IoT® from Godlan has quite a few interesting attributes, including its ease of integration and use, plus agile deployment—enough to help push it to the forefront of the competitive arena of IIoT software for manufacturers.

While a new player in the IIoT field, Prophecy IoT® has what it takes to be considered a serious candidate for taking over a manufacturer's IIoT initiative.

A Success Story of a Customer Using Prophecy IoT®

[EuroKera Gains Transformational Visibility into Factory Floor Data with Prophecy IoT®](#)

About the Author

Jorge Garcia is a senior business intelligence (BI) and data management analyst for TEC. He has more than 20 years of experience in all phases of application development, database and data warehouse (DWH) design, as well as 9 years in project management, covering best practices and new technologies in the BI/DWH space.

Prior to joining TEC, Garcia was a senior project manager and senior analyst developing BI, DWH, and data integration applications with Oracle, SAP Business Objects, and data integration. He has also worked on projects related to the implementation of BI solutions for the private sector, including the banking and services sectors. He has had the opportunity to work with some of the most important BI and DWH tools on the market.

Garcia is a member of the [Boulder BI Brain Trust](#).



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