# GLOVIA G2 by Fujitsu Glovia, Inc.

for Discrete Manufacturing (ERP)

Ted Rohm, Senior ERP Analyst// August 2017



# TEC CERTIFICATION REPORT

TEC Certification Reports provide detailed analysis of leading software solutions that have successfully completed TEC's Certification Program



# Table of Contents

Table of Contents	2
About This Report	3
GLOVIA G2—A Manufacturing Software Leader for 45 Years	4
Benchmark Results for Fujitsu Glovia, Inc.'s GLOVIA G2	5
Reading the TEC Focus Indicator	5
Product Review: Fujitsu Glovia, Inc.—GLOVIA G2	7
Fit and Finish	7
Support of Processes	9
Other Notable Features	12
TEC Analyst Observations on Fujitsu Glovia, Inc.—GLOVIA G2	15
Detailed Functionality Graphs for Fujitsu Glovia, Inc.—GLOVIA G2	17

# **About This Report**

Product: GLOVIA G2

Version: 3.1.0

Release date: August 2016

#### Certification by:

Ted Rohm, Senior ERP Analyst, Technology Evaluation Centers

#### Demonstration conducted by:

Nancy Skibinski, Pre-Sales Consultant, Fujitsu Glovia, Inc. Jim Errington, Executive Vice President, Fujitsu Glovia, Inc.

Technology Evaluation Centers (TEC) is pleased to announce that GLOVIA G2 by Fujitsu Glovia, Inc. is now TEC Certified for online evaluation of enterprise resource planning (ERP) for discrete manufacturing solutions in the ERP Evaluation Center. The Discrete Manufacturing (ERP) Evaluation Center enables you to compare and evaluate functionality based on TEC's comprehensive model of ERP for discrete manufacturing software. Data used in the Evaluation Center are obtained from the vendor's responses to TEC's research questionnaire. Certification ensures that Fujitsu Glovia, Inc. has demonstrated GLOVIA G2's support for specific real-world business processes chosen by TEC analysts, and that TEC analysts have analytically and comparatively reviewed research questionnaire data about GLOVIA G2 against known benchmarks.

# GLOVIA G2—A Manufacturing Software Leader for 45 Years

GLOVIA G2 is a powerful and flexible software solution built to support the needs of assembly, manufacturing, and distribution organizations. The software supports a wide array of manufacturing processes including make-to-stock (MTS), make-to-order (MTO), configure-to-order (CTO), engineer-to-order (ETO), and material supply operations. The solution is one of the few that can effectively manage these differing modes of operation at the same time, i.e., it supports a mixed-mode manufacturing environment.

The solution supports companies ranging in size from smaller to very large, global implementations, but the sweet spot for GLOVIA G2 is from 25 to 100 users. The solution is very well suited for automotive, electronic equipment, aerospace and defense, industrial machinery, and telecommunications industries. Fujitsu, the parent company and multinational technology and services company, is one of the largest users of the solution and operates 30+ manufacturing sites worldwide on the Glovia software.

GLOVIA G2 has its roots in a solution that was called Xerox ChESS MRP II, which had its beginnings in the 1980s and was first released in 1990. That solution was implemented and used in Fujitsu's manufacturing facilities in the 1990s, and Fujitsu, seeing the product's potential, purchased a 30% stake in the company in 1997 and acquired 100% control in 2000. Over the course of the decades, the solution's capabilities grew to support complex and precision manufacturing needs of Fujitsu and suppliers of automotive giants such as Toyota and Honda. In manufacturing, the system has support for various manufacturing strategies including lean philosophies such as Kanban, Seiban, and Just-in-time (JIT) flow manufacturing. These different strategies can also be deployed on different products within the same site and running down the same manufacturing line.

GLOVIA G2 V1 was released in 2010 when the solution was reengineered to be a rich internet application. Further significant engineering efforts included added support for the Microsoft SQL Server database in 2012. The solution had previously only supported the Oracle RDBMS. In 2013, Glovia was an early pioneer in bringing Excel-like data grids to the user interface, and has continued to invest heavily in supporting the shift to a mobile workplace.

These extensive engineering efforts have been done while still growing the system to meet the changing customer and regulatory demands on the industries that use the software. Last year saw the largest set of functional enhancements to the GLOVIA G2 series, with additional support for customer relationship management (CRM) opportunities, product data management (PDM) integration, and service (repairs and field service) support.

# Benchmark Results for Fujitsu Glovia, Inc.'s GLOVIA G2

The TEC Focus Indicator presents the results of benchmarking GLOVIA G2 against an **Industry Average**. TEC calculates the industry average for a given software market space based on product data from real-world software solutions, scoring solution support for hundreds to thousands of features and functions. The Industry Average circle in the middle of the graph is a normalized representation of the average of the scores.

- The Focus Indicator represents neither the quality of the product nor an absolute quantity of supported functionality. Rather, the **graph is normalized** to show support relative to the average quantity of functionality supported.
- The functional criteria have been equalized (attributed equal weight).
- High and low thresholds have been set in order to create the "Dominant,"
   "Competitive," and "Minimal Support" zones (see below for more details).

## Reading the TEC Focus Indicator

The axes represent the main modules of a typical ERP for discrete manufacturing product and the red dots show the relative support of the product compared with the Industry Average. The closer a red dot is to the center, the more functionality the product supports for that module.

The **Industry Average circle** marks the relative support of the average ERP for discrete manufacturing product within the indicated market space.

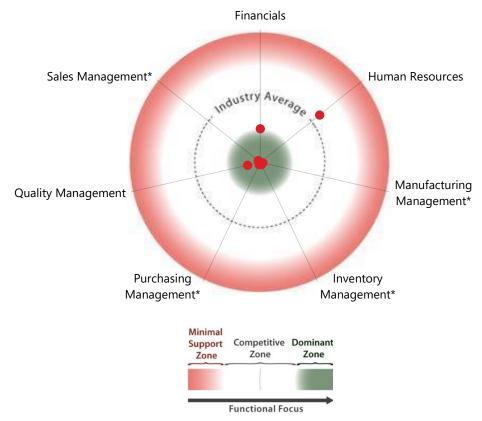
The **Dominant Zone** (green) shows where the product supports more functionality than the average solution. Dominant modules are likely to be competitive differentiators for the vendor.

The **Competitive Zone** (white) shows where the product supports about the same amount of functionality as the average solution. This typically indicates that most vendors in this market space support this functionality.

The **Minimal Support Zone** (red) shows where the product supports less functionality than the average solution. Minimal Support modules might indicate less of a focus for this functionality, as it may not have as much of an importance within the vendor's target market.

If your needs correspond to modules ranked closer to the center of the Focus Indicator Fujitsu Glovia's GLOVIA G2 may be an application worth evaluating.

This **TEC Focus Indicator™** shows you which types of functionality are likely differentiators for Fujitsu Glovia's GLOVIA G2 solution in the ERP for discrete manufacturing software space.



TEC Focus Indicator for GLOVIA G2

Based on the information obtained by TEC, GLOVIA G2 scores as a highly competitive solution in the ERP for discrete manufacturing software space. In the Focus Indicator, the Manufacturing Management, Inventory Management, Purchasing Management, and Sales Management modules are shown with an asterisk next to the module name. This indicates that GLOVIA G2 scores in the maximum range of functionality for these modules.

The only area where GLOVIA G2 scores lower than the average solution is Human Resources (HR). This is because GLOVIA G2 is a global solution, and Fujitsu Glovia utilizes third-party solutions to meet the HR requirements.

Use TEC Advisor to compare for Fujitsu Glovia's GLOVIA G2 with other solutions for ERP for discrete manufacturing, according to your organization's needs and characteristics. Compare now.

# Product Review: Fujitsu Glovia, Inc.—GLOVIA G2

#### Fit and Finish

GLOVIA G2 is built to make manufacturers more productive, and Fujitsu Glovia has permeated the lessons of lean manufacturing down into the solution. The user experience has been refined to bring the execution of tasks to the user, as opposed to making the user seek out the next operation. Just as manufacturers continually improve every step of a process, the GLOVIA G2 system has been continuously improved on over the past years to present the important, actionable tasks to the user.

Upon entering the GLOVIA G2 system, a user is presented with a homepage that contains a set of panes that provide immediate insight into the tasks, messages, or actions that she/he needs to address (figure 1). The home screen displays work process insights which are created by triggers in the database that push the information in the system to the user, instead of a user having to run a report or go into a screen to determine the status of a work process. The frequency that these triggers are run can be set based on individual preferences, e.g., daily or hourly.

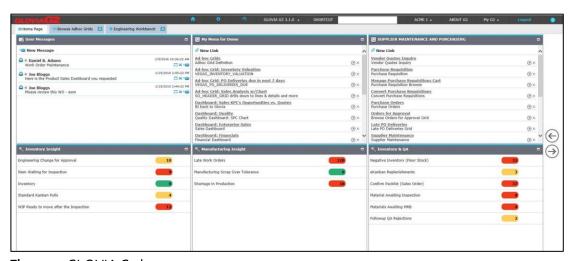
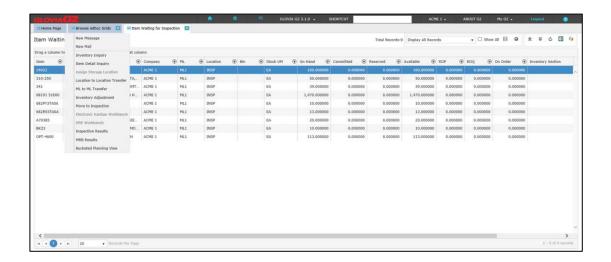


Figure 1. GLOVIA G2 homepage

From the homepage, a single click will take a user to the relevant operation within the system. One way of interacting with information in the system is via data grids (figure 2). These are Excel-like data grids that enable a user to personalize the view of the system records. A user can easily change the order of the columns, sort, filter, and perform other operations on the data in the grid. Right-clicking on a row opens a menu that takes the user to related transactions.



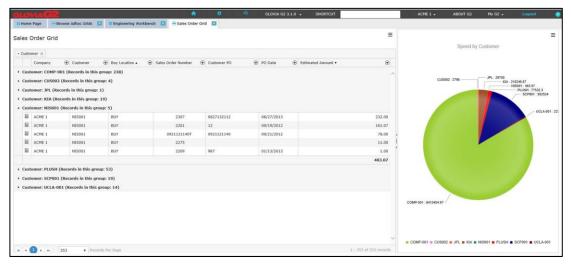


Figure 2. GLOVIA G2 ad-hoc grids

The grids support side-by-side charts, which can be displayed along with the grid. Each user is free to use the supplied grids, those shared by other users, or develop their own grids and save them for reuse later. In the latest release, numerous enhancements were made to the ad-hoc grids, including the ability to call another ad-hoc grid from an ad-hoc grid via a context menu, and the ability to call a URL with parameters sourced from the column data for a selected record.

Since ad-hoc grids are so popular and widely used, a new approach to managing the grids was developed to make it easier to use and customize the standard grids: the business logic for a grid is stored in a database view as opposed to using individual grid logic. The database views are more easily shared and reused across the system.

A user can navigate to a transaction screen from a record on an ad-hoc grid or directly from the homepage. Like the ad-hoc grids, the screens within GLOVIA G2 can be personalized to meet specific user requirements (figure 3). Almost all aspects of a transaction screen can be personalized.

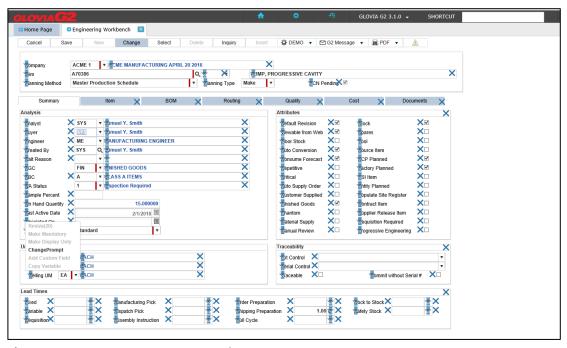


Figure 3. GLOVIA G2 screen personalization

The screen interface personalization possibilities include moving fields within an existing tab; reducing screen field lengths; hiding fields, button, or tabs that aren't being used; relabeling fields to match industry- or company-specific terminology; and adding new buttons to link to other functions or pages. The screens also support the Kendo UI framework, which is used to build powerful HTML interfaces.

# **Support of Processes**

GLOVIA G2 has been a solid manufacturing ERP system for many years, and has historically been used to support highly complex manufacturing operations for some of the more demanding customers in the world. The system has been able to manage both infinite and finite scheduling when planning production. It is also one of the few systems that can also plan manufacturing down to hour, minute, and second granularity. Most ERP systems can schedule production in only day increments.

The previous TEC Certification Report on <u>GLOVIA G2</u> discussed some other important features of the application. However, this system is quite expansive, encompassing 70+ modules to support areas such as product management, manufacturing management, financial management, customer management, supplier management, supply chain management, and more. It is not possible to cover all system modules in depth here, but this section will talk about some of the highlights of the application.

#### **Shop Floor Dispatch**

This application was built for operators on the factory floor to give visibility into all the jobs planned for the individual's workstation. Shop floor dispatch is linked to Glovia's planning tools, and enables an operator to better manage the work orders being processed. In some manufacturing environments, it may be necessary to put aside a particular task because of a material shortage or the need for a tool that requires a consumable that isn't currently available. Or, the operator may see that it is better to perform a couple of tasks at the same time because the same tool is needed for those tasks. The shop floor dispatch screen gives the operator the ability to manage her/his orders and manage these dynamic situations. The tool has been developed with several graphical indicators to highlight the important information for the user. The shop floor dispatch feature will be fully available in the next release of GLOVIA G2, V 3.5.0.

#### Capable-to-Promise

The system supports calculating the capability of the manufacturing operations to promise an order on a particular date. Calculating the "capable-to-promise" date is particularly important for engineer-to-order and even configure-to-order environments, where an order needs to be filled with a combination of existing on-hand materials and custom-manufactured or -configured materials. The capable-to-promise algorithms will work through finite inventory, production bill of materials (BOM), and routings to determine the amount of time needed to produce the product order.

GLOVIA G2 also supports available-to-promise scheduling. Available-to-promise algorithms, unlike capable-to-promise algorithms, look at existing inventory and assume infinite capacity for building the customer components of the order, and will, therefore, not result in the most accurate commitment date for custom orders.

#### MFG Cell Level Optimization

GLOVIA G2 has a graphical factory planning tool to enable planners to optimize shop floor operations. The tool leverages the real-time information managed by GLOVIA G2 across the manufacturing operation, which includes all material, machine capacity, labor skillset capacity, setup and run-time capacity, and tooling capacity. The tool gives planners a visual display of operations in manufacturing cells. The planner can use the tool to perform what-if scenarios and set the most appropriate manufacturing steps across cells in the factory. This is different from traditional manufacturing requirements planning/manufacturing production schedule (MRP/MPS) systems, which work with daily time buckets and assume infinite capacity for materials. The GLOVIA G2 factory planning engine, being the MFG cell level planning tool, is a memory-resident advanced planning system (APS) that takes into account all the manufacturing constraints in a finite manner (figure 4).

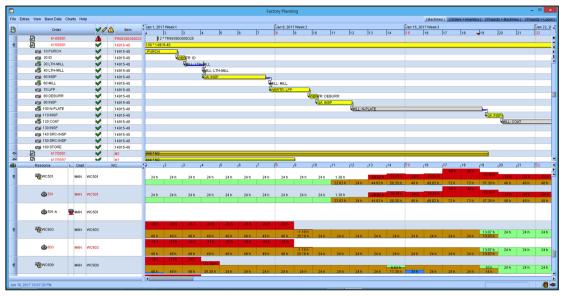


Figure 4. GLOVIA G2 MFG cell level optimization

#### Sequencing Planning Tool

The sequencing planning tool manages the sequence of "mixed-model" orders flowing down one or more production lines. This tool uses constraint-based rules to assist in the identification of the most appropriate build sequence for the orders. It affords the ability to automatically schedule orders based on rules, and the ability to manually drop orders into product line slots for manual overrides and emergency orders.

This planning tool was developed specifically for large equipment configure-to-order manufacturers, such as Caterpillar, to meet their unique assembly-line needs. For these manufacturers, an unusual order may force an assembly line to halt because a feature on a particular order holds it up.

Constraint rules can be defined to take into account a number of factors such as supply constraints, line-side storage, feeder-line restrictions, model complexity, build difficulty, etc. The types of constraints supported are date constraints and capacity constraints. The date constraints may be "no earlier than" or "no later than." Capacity constraints include "maximum bucket capacity," "maximum weekly capacity," or "maximum daily capacity."

### **Product Configurator**

The GLOVIA G2 configurator is a powerful, web-based product that enables an organization and its customers to create accurate sales quotes and sales orders for make-to-order, assemble-to-order, and configure-to-order products quickly and easily. Configurator is seamlessly integrated with GLOVIA G2 and has a flexible, rules-based configuration engine.

The GLOVIA G2 configurator features common estimating, sales quote, and sales order functionality (figure 5).

#### The features include:

- User-defined data entry screens and controls
- Complete support for complex, multi-level product configurations
- Ability to produce estimates at project, quote, or line levels
- Full configuration version control
- Various pricing approaches, including feature-based and cost-plus-based pricing
- Real-time validation of product configuration and option compatibilities
- Ability to identify both configured and non-configured items on a single quote/order
- Full product selection and guided-selling capabilities
- 24/7 Access via the internet

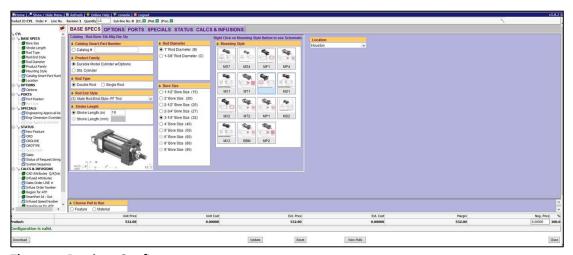


Figure 5. Product Configurator

#### Other Notable Features

GLOVIA G2 includes a number of other system capabilities that should not be overlooked.

#### Workflow Designer

GLOVIA G2 V3 added improved workflow capabilities. The designer interface is an intuitive, drag-and-drop and browser-based tool. The designer is built on Microsoft SharePoint with integrated features such as a ribbon interface, business connectivity services (BCS), and Excel services.

The workflows can be seamlessly integrated with other systems using REST/SOAP web services, lightweight directory access protocol (LDAP), active directory, and export to Visio. The workflow tool capabilities include real-time notification and alerts via task notification or email, scheduled and timed workflow for repetitive processes, and ad-hoc delegation of tasks to other users. There are extended features for lump-sum approvals, purchasing approvals, and engineering or master data creation processes.

#### Security

GLOVIA G2 has adopted the following internet-based security standards:

- No web "plug-ins" are required
- No Telnet connection is required
- Microsoft Windows Communications Foundation (WCF) services communicate information between the user and web server
- Secured socket connections used between the web server and the application server
- All data communications are encrypted

#### Mobility

GLOVIA G2's front end is written using HTML5, which supports a responsive user interface. This architecture supports the bring-your-own-device (BYOD) mindset, which continues to gain momentum in manufacturing settings. This is partly because mobile devices are now relatively inexpensive and can be positioned all across manufacturing operations—from material receipt, to quality inspection, to product manufacture. It is now possible to get some of these devices for less than \$100, so there is no reason not to have mobile devices everywhere. Fujitsu Glovia also develops native mobile apps that are built for Apple and Android smartphones to support entry of expense reports, purchase requisitions, purchase order approvals, and service operations. These are available in the Google Play and Apple App stores for download.

### Source Code Availability and Control

Fujitsu Glovia is one of the few providers that actually make the ERP source code available to their customers. However, up until the GLOVIA G2 V3.1.0 release, there were no tools provided for managing the source code and debugging it. This is changed with a new source control application that tracks changes to the source code, supports check-out and check-in of source code, maintains a version control repository, and does other tasks such as check-in/check-out for groups of code and a version library. Additionally, a debugger is available to GLOVIA G2 customers, so that developers can more easily debug changes made to the application.

### GLOVIA G2 V3.5.0—Industry 4.0 and IoT ready

Fujitsu Glovia realizes that the Internet of Things (IoT) will be a key technology enabling the next generation of manufacturing or what is being referred to as Industry 4.0. The next release of GLOVIA G2, V3.5.0, is being built to support this next generation. Fujitsu Glovia sees the following as key characteristics of this evolving manufacturing generation:

- "On-demand" manufacturing
- Mass customization & product options
- Multiple makes and models on one line

- Record-high new product introduction rates
- Unprecedented supply chain complexity

To support the next-generation manufacturing, GLOVIA G2 V3.5.0 will support a new IoT framework and the Fujitsu Cloud K5. Fujitsu Cloud Service K5 is a next-generation cloud platform, specifically created to enable efficient, easy, and cost-effective enterprise-level digital transformation. Major parts of the new release will include enterprise search and numerous enhancements for the automotive industry.

# TEC Analyst Observations on Fujitsu Glovia, Inc.—GLOVIA G2

GLOVIA G2 is a hidden jewel in the discrete manufacturing ERP software space. The solution has extensive and deep functionality, yet is able to present these complex manufacturing processes in a very simple and intuitive fashion. The solution embodies the lean manufacturing principles it is built to support, with a lean user experience that has been honed through years of continuous improvements.

The name GLOVIA is an acronym for GLObal Value Integrated Applications. As the name implies, the system is built as a set of integrated but distinct applications. Many of the applications can operate independently, can access GLOVIA G2, or be integrated with other software applications. Figure 6 below shows the current set of application modules, which is both extensive and well defined. Fujitsu Glovia is continuing to add additional modules as the industry changes and as requested by the customers. For example, new customer relationship management and service management modules were recently added to the application suite (figure 6).

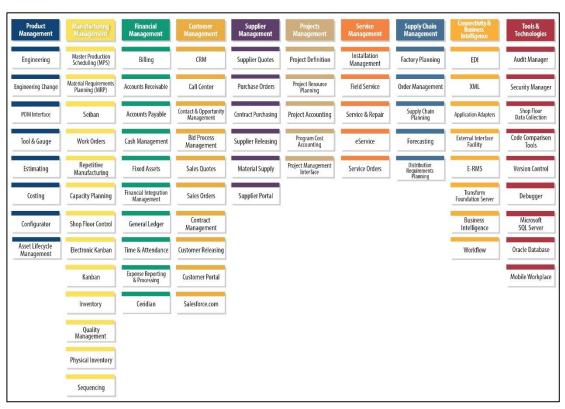


Figure 6. GLOVIA G2 application modules

The application supports organizations of different sizes (from just a few to thousands of users), various industries (automotive, electronics, aerospace and defense, capital equipment, and other manufacturers), and supports multiple manufacturing processes

(MTS, MTO, CTO, ETO, etc.). The system supports anywhere from high-touch engineer-to-order operations to manufacturers that can completely automate and have virtually lights-out operations. As someone once said, Fujitsu liked the software so much that they decided to buy the company.

The system has deep functionality in many areas and we at TEC are always impressed with the solution and never fail to learn something new from every product demonstration. Organizations requiring a sophisticated discrete manufacturing ERP solution owe it to themselves to look at GLOVIA G<sub>2</sub>.

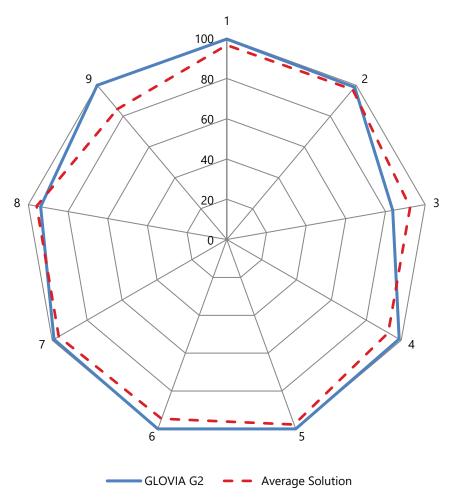
# Detailed Functionality Graphs for Fujitsu Glovia, Inc.—GLOVIA G2

The following functionality benchmark graphs represent the quantity of support by GLOVIA G2 for the functionality within each module identified in the TEC Focus Indicator, on a scale of 0 to 100 points. The closer the plotted value is to 100 (toward the outside in spider graphs, toward the top in bar graphs), the more functionality GLOVIA G2 supports. The functionality of GLOVIA G2 is shown in blue; an average of what competitor solutions offer is shown in red.

Financials	18
Human Resources	19
Manufacturing Management	20
Inventory Management	21
Purchasing Management	22
Quality Management	23
Sales Management	24

#### **Financials**

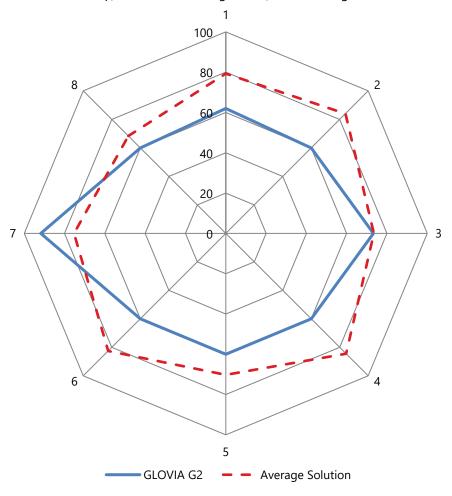
The Financials module provides features and functions that allow accountants and financial managers to ensure financial transactions are tracked and properly recorded, and that this information is available via reports and other data retrieval tools. Traditionally, this module includes the General Ledger, Accounts Payable, Fixed Assets, Cost Accounting, Cash Management, Accounts Receivable, and Financial Reporting submodules.



Cri	iteria	GLOVIA G2 Score	Average Score
1	General Ledger	99.5	96.5
2	Accounts Payable (A/P)	98.7	97.2
3	Fixed Assets	83.6	92.4
4	Cost Accounting	98.8	92.5
5	Cash Management	100	97.7
6	Budgeting	100	94.6
7	Accounts Receivable	99.0	96.3
8	Financial Reporting	93.8	95.8
9	Project Accounting	100	84.5

#### **Human Resources**

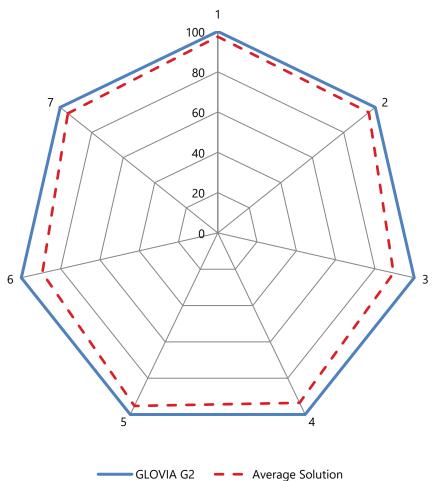
Human Resources management encompasses all the applications necessary for handling personnel-related tasks for corporate managers and individual employees. Submodules include Personnel Management, Benefits, Payroll, Employee Self-Service, Employee Metrics, Health and Safety, Workforce Management, and Training.



Cri	teria	GLOVIA G2 Score	Average Score
1	Personnel Management	62.0	79-3
2	Benefits	60.0	84
3	Payroll	73.3	73.5
4	Employee Self-Service	60.0	84.5
5	Employee Metrics	60.0	70.2
6	Health and Safety	60.0	82.5
7	Workforce	91.8	75⋅3
	Management		
8	Training	60.0	68.4

## Manufacturing Management

Manufacturing Management module covers discrete manufacturing and provides the ability to plan production at various scales, rolling high-level plans down into daily schedules of individual machines and workers, and tracing real-time situations on the production shop floor and in planning to control manufacturing. This ensures that manufacturing facilities follow production plans in an accurate and timely manner, and that manufacturing schedules and operations are altered as required. It involves product configuring, work centers and machines dispatching, all aspects of work-in-progress management, and comprehensive product costing functionality. It also provides a consolidated view of the production situation using extensive multi-level reporting capabilities.

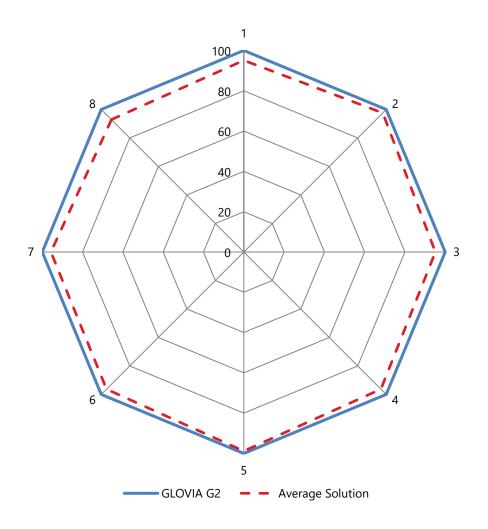


Cri	teria	GLOVIA G2 Score	Average Score
1	Product Costing	100	97.4
2	Shop Floor Control	100	95.9
3	Field Service and Repairs	100	89.5
4	Production Planning	100	93.6
5	Project Management	100	95.3
6	Product Data Management (PDM)	100	89.3
7	Product/Item Configurator	100	95.1

## **Inventory Management**

Inventory Management functionality addresses the record-keeping of warehoused goods, and managing the movement of these goods to, from, and through warehouses.

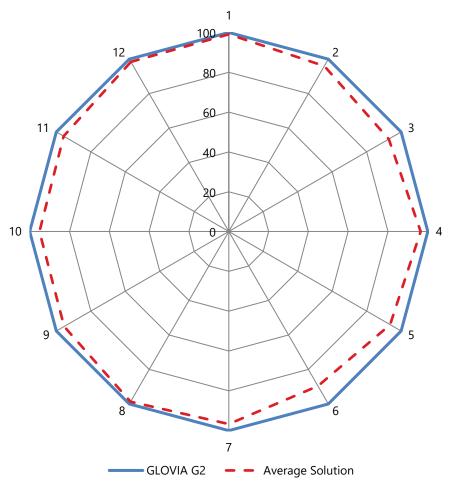
Forecasting, finished goods reservation and allocation processes, and inventory adjustments are also a part of this functional module.



Cri	teria	GLOVIA G2 Score	Average Score
1 Inventory Management—			
	Online Requirements	100	95.1
2	Processing Requirements	100	97.6
3	Data Requirements	100	95.1
4	Reporting and Interfacing		
	Requirements (Inventory		
	Management)	100	96.3
5	Locations and Lot Control	100	98.8
6	Forecasting	100	96.3
7	Reservations and Allocations	100	95.7
8	Adjusting Inventory	100	92.9

## **Purchasing Management**

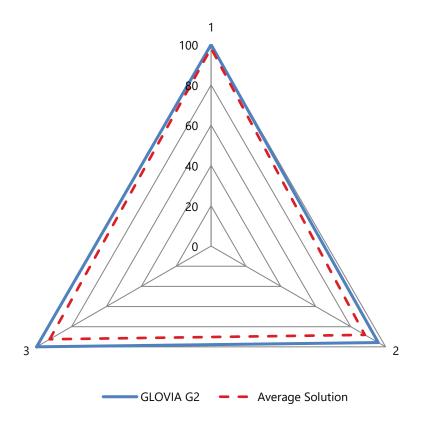
Purchasing Management encompasses a group of applications that controls the purchasing of raw materials and manages inventory stocks. It also involves creating purchase orders/contracts, supplier tracking, goods receipt and payment, and associated regulatory compliance analysis and reporting.



Crit	eria	GLOVIA G2 Score	Average Score
1	Profile of Suppliers	100	99.1
2	Rating of Suppliers	100	96.0
3	Requisitions and Quotations	100	92.8
4	Purchase Orders (POs)	100	96.4
5	Pricing	100	93.6
6	Vendor Contracts and Agreements	100	89.6
7	Management of POs	100	96.7
8	Procurement Reporting and Online		
	Reporting	100	98.7
9	Repeat Procurement	100	95.5
10	Receipts for Procurement	100	95.1
11	Online Requirements for Purchasing		
	Management	100	95.8
12	Reporting and Interfacing Requirements	100	98.4

## **Quality Management**

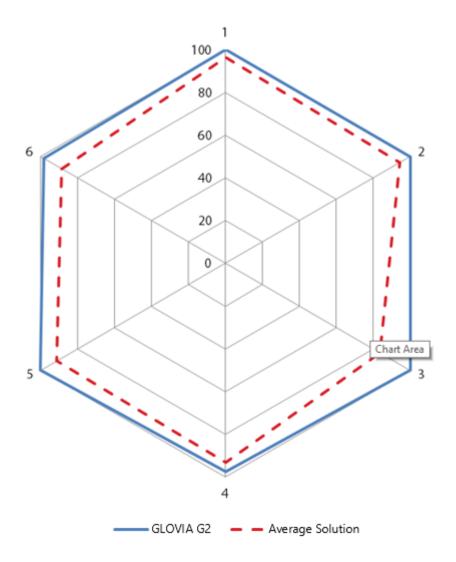
Quality Management refers to the set of actions taken by an organization to ensure that it creates and delivers high-quality products. Organizations must comply with national and international rules and regulations related to product quality, but they often also create and use internal requirements for quality control. Specific procedures need to be set up in order to ensure that the end products comply with internal or external quality standards. All these activities need to be well documented in order to provide the information needed when customers are not satisfied with the quality of the products received. Government agencies may also require this information for control and verification.



Cr	iteria	GLOVIA G2 Score	Average Score
1	Production Quality Management	100	98.2
2	Non-Production Quality Management	95.8	88.1
3	Inventory Quality Management	100	92.5

## Sales Management

Sales Management encompasses a group of applications that automates the data entry process of customer orders and keeps track of the status of orders. It involves order entry, order tracing and status reporting, pricing, invoicing, etc. It also provides basic functionality for lead tracking, customer information, quote processing, pricing and rebates, etc.



Cri	teria	GLOVIA G2 Score	Average Score
1	Online Requirements (Sales Management)	100	99.3
2	Reporting and Interfacing Requirements	100	97.3
3	Available-to-Promise (ATP)	100	95.7
4	Pricing and Discounting	100	96.0
5	Customer Relationship Management (CRM)	100	92.8
6	Customer Service and Returned Goods Handling	100	97.7

Use TEC Advisor to compare for Fujitsu Glovia, Inc.'s GLOVIA G2 with other solutions for ERP for discrete manufacturing, according to your organization's needs and characteristics. Compare now.