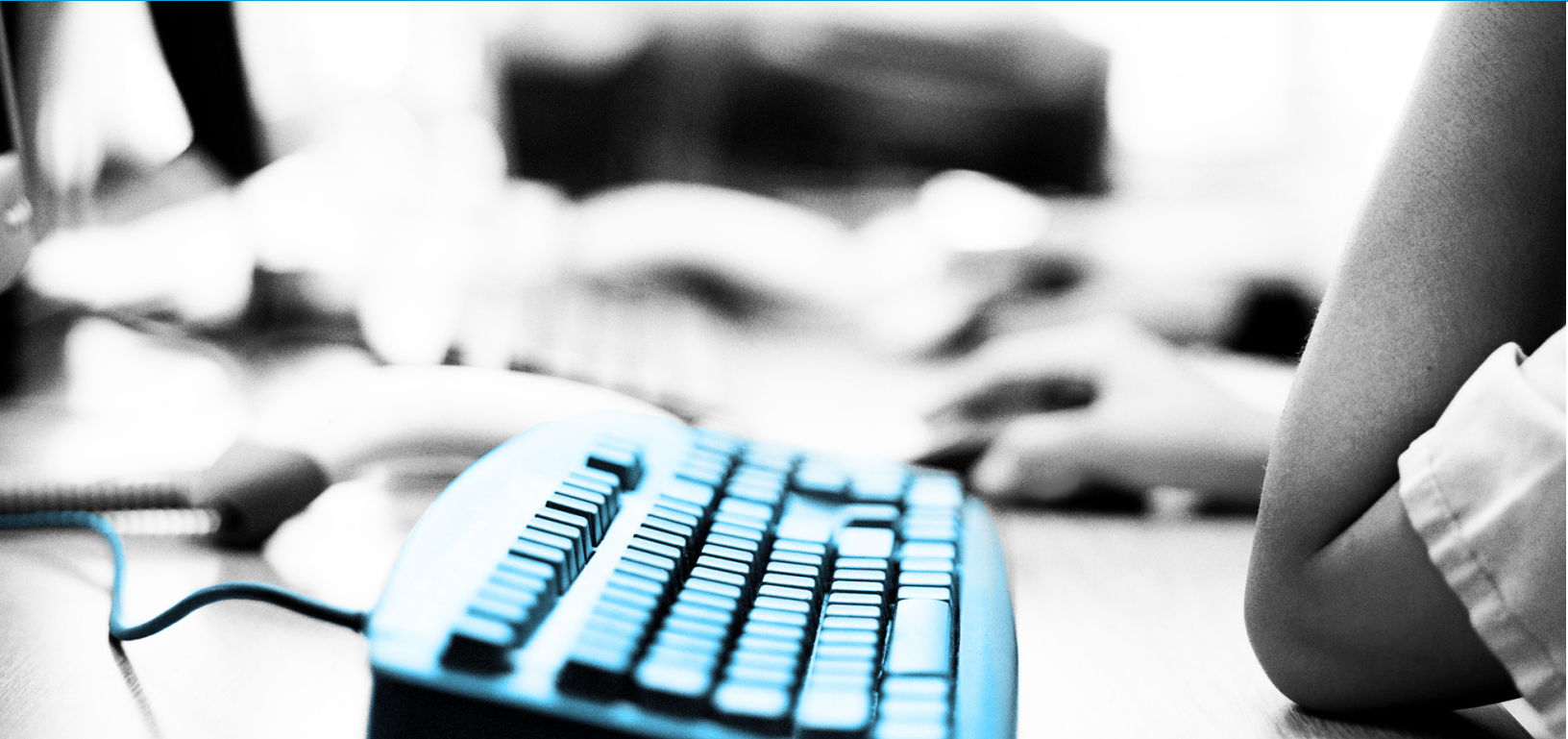# The Next Generation Approach to ERP Data Integration

At a Glance:

- This paper makes the case for a more effective, cost-efficient approach to ERP system integration using robust techniques.

- Manufacturers move beyond the limits of traditional low-level Application Programming Interface (API), flat files, and batch processes.

- Included are the business advantages of using industry standard, ready-made routines for multiple systems to communicate over the Internet.

- The Plex Manufacturing Cloud easily integrates core business applications by providing a library of connectors, or data sources, to third-party applications and services.

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The Case for Integration

Today's manufacturer faces an ever-accelerating pace of business, marked by growing product and process complexity along with demands for increased quality, speed, and agility.

The result is an ongoing need for the extended manufacturing enterprise to seamlessly connect the ERP system with mulitple software applications, databases, and business applications.

Aberdeen Group analysts concluded that manufacturers achieve best-in-class performance when they seamlessly share data within and without the extended enterprise. Companies achieve specific business benefits from fully integrating the quote-to-order process, engineering, plant floor, supply chain management, design, manufacturing, quality control, shipping, customer service, and critical points in between.

As the research concludes, full data integration leads to increased customer satisfaction and a more profitable business:

"... it is important to ensure that all systems are fully integrated and communicate in real time with ERP. Otherwise there will be redundancies and mistakes in the data, and the whole point of having an end-to-end solution is diminished. Best-in-class manufacturers are 63 percent more likely than all others to have fully integrated business systems serve as a complete and auditable system of record." Source: Aberdeen Group: "ERP in Manufacturing 2012: The Evolving ERP Strategy" July 2012 N. Castellina; K. Prouty; Aberdeen Group, Inc.

Beyond API Data Integration

Until recently, manufacturers had limited access to the necessary infrastructure and tools needed to effectively address these integration challenges.

A traditional approach usually involved the ERP vendors supporting integration to their solutions with low-level Application Programming Interfaces (API). While APIs can be used to access ERP data and metadata to facilitate ERP integration, the costly, limited API approach simply does not offer sufficient

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capabilities when the environment includes distributed processing across multiple applications.

With low-level APIs, manufacturers that need data to instantly link between multiple modules and applications enterprise-wide are faced with complex interfaces, programming, and custom coding. This effort siphons away precious IT resources, forcing a manufacturer's IT department to develop and maintain custom coding, security patches, database updates, and more.

"Web services-based integration simplifies the creation, deployment, and maintenance of critical connections, making it easier for manufacturers to seamlessly link technical components of the enterprise."

Ready-Made Integration Routines

A more robust integration option eliminates these issues. Web services-based integration simplifies the creation, deployment, and maintenance of critical integrations, making it easier for manufacturers to seamlessly link all the technical components of the enterprise.

Web service integrations enable applications to interact over the Internet, irrespective of language of the application or operating system.

Plex offers specific expertise in the deployment, management, and upgrades associated with enterprise application integrations.

Plex's integration approach delivers to the manufacturing enterprise powerful technology to connect core business applications by providing a ready-made web library of open integration points as well as connections to third-party applications and services.

Proven and reliable integrations leverage the same entry points that Plex users leverage when interacting directly with the system. These integrations are available over the Internet, deployed seamlessly within the Plex Manufacturing Cloud. Manufacturers maintain the advantages of a cloud-based application.

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Most importantly, manufacturers benefit from reliable integration solutions that are automatically updated, secure and stable, as well as up-to-date with the latest infrastructure and application version.

Integration Targets

Most manufacturers discover the need for full integration when business process exceptions rise, the need to change the process is recognized, and the improvement identified is to increase collaboration between the ERP solution and other applications such as plant floor systems, including programmable controllers, data collection, and other production and plant floor devices such as barcode systems and scanners.

Plex Cloud ERP integration seamlessly links with customer applications, plant floor equipment, and other vendor solutions.

As an example, the Plex integration routines seamlessly handle:

- Shipping integration.
- Ecommerce websites.
- Biometric time clocks.
- Freight integration.
- Salesforce Sales/CRM integration.
- PLC/machine integration.
- Vision System integration.
- SPC data integration.
- Currency conversions.
- Tax integration.
- CAD integration.
- Financial budgeting.
- Legacy ERP systems.

How It Works

The Manufacturing Cloud approach involves a robust integration layer designed, developed, and maintained by Plex. The integration components offer the same high level of redundancy and monitoring as the Plex Manufacturing Cloud by leveraging the same properly engineered and fully capable infrastructure backing all of Plex customers. Extensibility is automatically incorporated as Web Services enable us to extend the value of Plex to other systems.
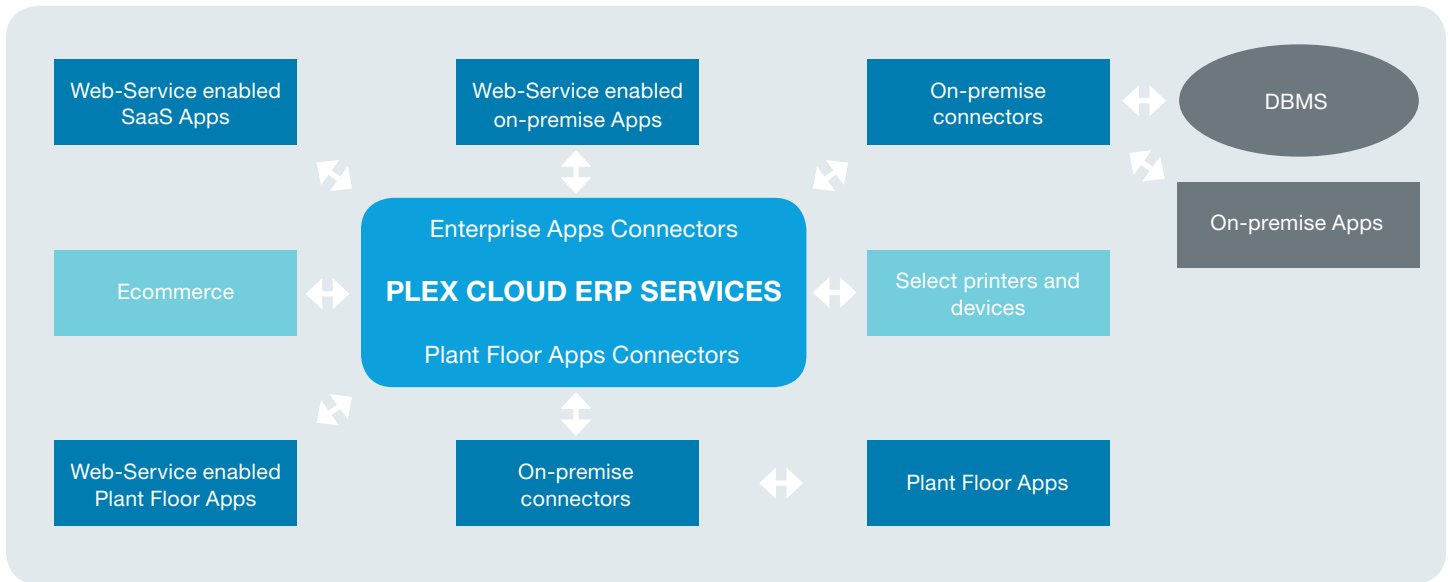
Plex makes integration easier by utilizing a single by utilizing a single Web Service Uniform Resource Location (URL) entry point of access for handling inbound service requests from external systems. When the inbound request is received, the Inbound Web Service handler calls the appropriate Plex SQL-stored procedure required to satisfy the request. In most cases, these are the same SQL-stored procedures used by user screens, providing process consistency.

Likewise, Plex utilizes a single Web Service for initiating outbound service requests to external applications. In this case, a Plex application utilizes a single Outbound Web Service configured to call an external Web Service to perform a symmetric service on behalf of a Plex customer, whether for integrated data, workflow, or business flow.
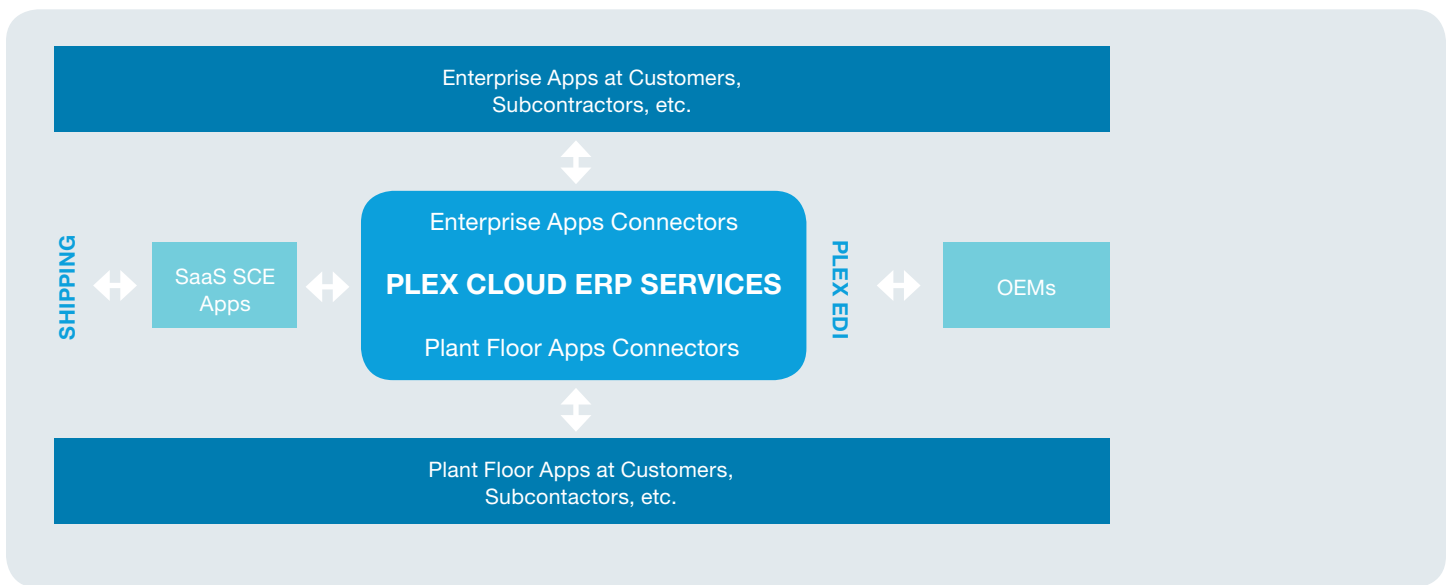
Virtually all existing inbound functions are already exposed. Documented integration connections exist for common business integration points such as plant floor equipment and shipping. For specific integrations, Plex customers or development partners can easily build integrations between the manufacturer's systems to Plex's Web Services layer as needed, making it easy and fast to leverage existing features and develop new integrations.

Integration within the Enterprise

Web-Service enabled SaaS Apps	Web-Service enabled on-premise Apps	On-premise connectors	DBMS
Ecommerce	**Enterprise Apps Connectors** **PLEX CLOUD ERP SERVICES** Plant Floor Apps Connectors	Select printers and devices	On-premise Apps
Web-Service enabled Plant Floor Apps	On-premise connectors	Plant Floor Apps	

Integration with Business Partners

Enterprise Apps at Customers, Subcontractors, etc.

SHIPPING

SaaS SCE Apps

Enterprise Apps Connectors
PLEX CLOUD ERP SERVICES
Plant Floor Apps Connectors

PLEX EDI

OEMs

Plant Floor Apps at Customers, Subcontactors, etc.

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Sample Inbound Functions

By no means an exhaustive list, below are selected data elements available for a variety of functions.

- **Data for PLC Integration**

    - Number of integrated workcenters.

    - Number of integrated operations per part.

    - Number of parts produced in a month/ standard pack.

    - Setup charges per workcenter per day.

    - Status changes per workcenter per day.

    - Quality checksheets per container/ per part.

    - Process: depletion, receipts, quality events, etc.

- **Data for Ecommerce Integration**

    - Number of customer orders per month.

    - Number of order lines.

    - Amount of customers to add per order.

    - Inventory.

    - Order status.

    - Taxes.

- **Data for Shipping Integration**

    - Number of integrated shipments per month.

    - Approximate number of instances per month.

    - Additional instance for each freight quote request at order entry.

"Tens of thousands of stored procedures are easily available over the Internet — proven reliable, reproducible, scalable. Organizations cut the cost and time once required with more cumbersome data integration techniques."

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Empowering the right people to make the right decisions with the right data

This advanced integration approach offers a more effective and efficient method of communication among multiple devices over the Internet. Manufacturers automate transactions among multiple systems, letting companies make decisions across systems in real time, eliminating any manual effort once needed to operate and maintain multiple systems and move data in either direction, with validation and error-proofing as part of the flow.

Plex data integration offers tens of thousands of stored procedures easily available over the Internet, that are proven reliable, reproducible, and scalable. Organizations cut the cost and time once required with more cumbersome data integration techniques.

Integration in Action: Integrating Order-to-Cash

A common automated order-to-cash business flow among the Plex user community integrates external applications with plant floor devices.

The process starts with an order entered at the merchant's B2C web store. Appropriate sales taxes are then calculated by Plex's partner, Avalara, and presented to the consumer. If the consumer submits the order, they are invoiced and the order is transferred to Plex via Web Services. The credit card payment authorization is performed by Authorized.net, invoked via Web Services by Plex. After the credit card is charged, the merchant is paid.

The next step is to produce the goods and ship them to the consumer. As packages are staged for shipping, barcodes on each package are scanned via mobile devices integrated into the Plex Manufacturing Cloud via Web Services. Plex then invokes its partner Pacejet Logistics, again via Web Services, which negotiates pick-up with a pre-specified carrier. Once confirmed, a carrier-provided shipping lable is printed locally and attached to the corresponding container.

When the carrier picks up the containers, the shipping department scans them as shipped which triggers inventory update, the recalculation of sales taxes by

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Avalara, and the generation of the final invoice for the consumer. From start to finish, the integrated order-to-cash process ensures order accuracy and timely delivery.

The Power of Integration

All told, the hallmark of Plex's integration approach is automating what was once cumbersome. Manufacturers managing business process exceptions because of disjoints in their applications may find relief by applying the library of easy-to-use data integrations available from Plex today to those processes. The data sources available have already solved a broad set of manufacturing issues, are proven, and solid.

Leading manufacturers benefit from the library of mission-ciritcal integrations to extend and complement the Plex Manufacturing Cloud. They gain key business benefits from tight integration with external applications, on-premise or in the cloud, that are not part of the Plex infrastructure.

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About Plex

The Plex Manufacturing Cloud is the first and only cloud ERP built to meet the tough requirements of today's manufacturers. Hundreds of innovative companies, across industries including aerospace and defense, food and beverage, and motor vehicles, rely on Plex to operate their manufacturing businesses and generate profit from every inch of the plant floor. With insight that starts on the production line, Plex helps manufacturing companies see and understand every aspect of their business, enabling them to lead in an ever-changing market.