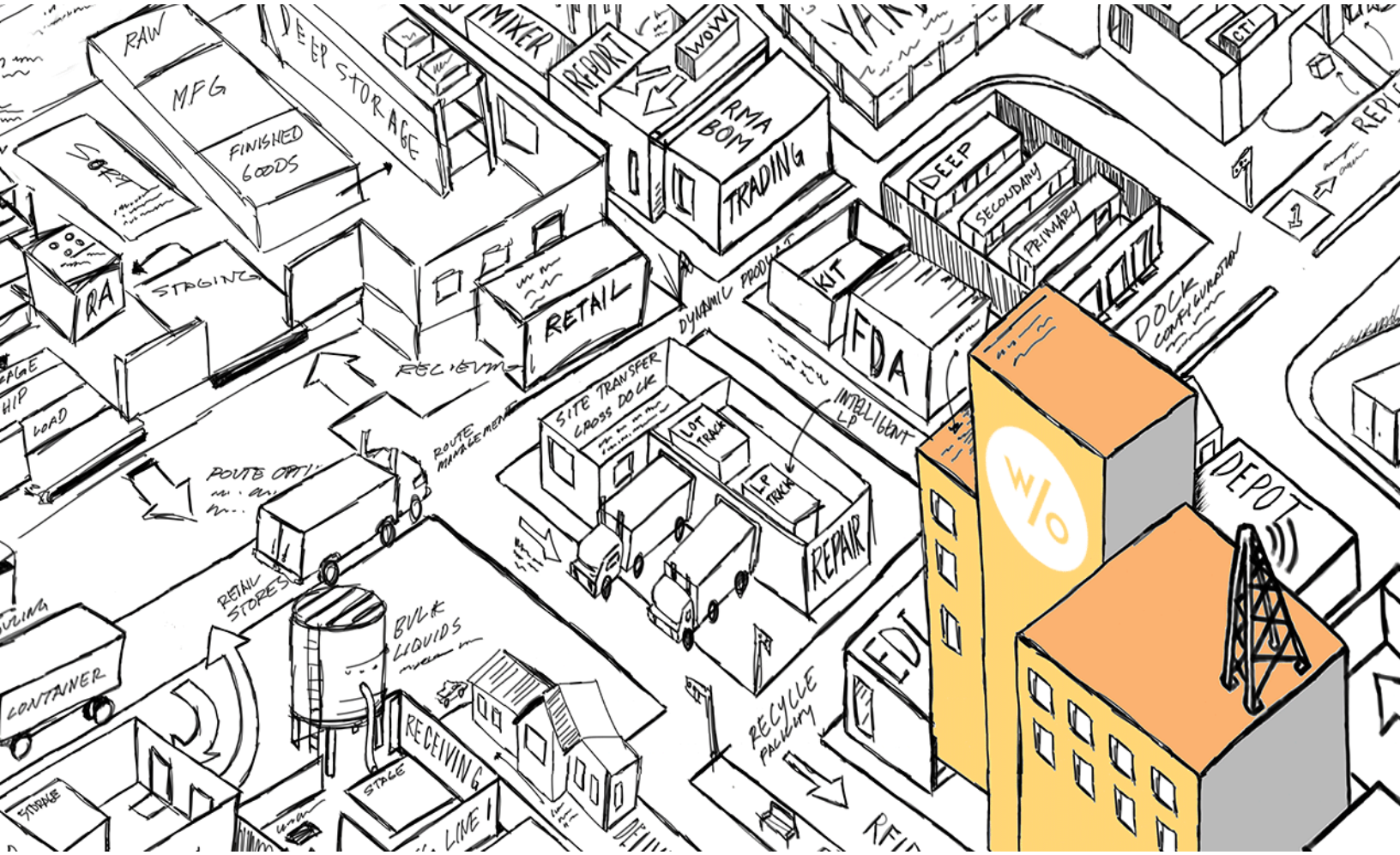


Executive Planning Guide

SUPPLY CHAIN MANAGEMENT IN FIELD SERVICE

WITHOUTWIRE
INVENTORY SCIENCES

WithoutWire has developed this planning guide to help supply chain managers deal with the complexities of inventory within field service. The goal of this planning guide is to share what we've learned along with our customers in order to help save you time as you design the best platform and processes. Good processes that are well defined along with a modern inventory platform can have a great impact on the organizations ability to execute on its strategy.

Working Towards a Plan

Important elements to planning include topics like training/ease of use, real-time visibility, security, and rapid deployment for new sites and techs. The last part of this guide is about the most important part of your plan; getting your process flows documented. In order to help you plan out your own process flows, we have introduced some concepts; **site types, license plates** and **inventory traceability options**. The section **Process Flows** below puts forth some example user stories that help to define the high-level requirements of a specific user activity.

Challenges of the Global Supply Chain View

A competitive field service operation should learn to leverage the trends found in the "global supply chain view" to successfully execute new business strategies. This global view of real-time inventory is made possible in part by the use of mobile apps. Procuring and updating apps are a real challenge for field service organizations. Android and iOS public or private App stores provide the best way to distribute new versions for the entire workforce to install.

To help develop a global view, here are 3 topics that often overlooked in supply chain management for field service organizations.

Authentication with 1099 workers

User management is a real challenge in field service. To support a global supply chain view, your plan should consider the security and authentication requirements of your different users and roles. From the temp worker on a job site using her Samsung phone, to the distribution center employee using a rugged Android Zebra with a long-range scanner, the security and management of users should be considered. A global supply chain view should insure the right users have the right access at the right time. This requires an easy to manage, yet powerful security and authentication.

There are multiple considerations for choosing the right authentication provider. If your organization manages a large number of users in existing internal system behind a firewall, then hybrid Active Directory deployments with trust relationships can be setup to centrally managing both internal and external users. If your organization leverages large numbers of 1099 technicians, then users are going to log into apps with their own email addresses. If this is the case, then **Azure Active Directory B2C** would be likely. Active Directory Business to Consumer (AD B2B for short) includes the option of allowing users to authenticate using their own **Facebook or Google+ accounts.**

Mass Deployment and Management of Cycle Counts

Ensuring accurate inventory often times means periodic and strategic inventory counts. Take for example planning, communicating, and executing cycle counts on items classified as high priority (A) only. Technical steps have to be simple and fast. Many field technicians don't have the equivalent technological experience as younger technicians, which means the inventory platform must be very simple to understand and use. One extra tap can make adoption a serious challenge.

Because each customer site is an independent site with bins, inventory and other customer specific business rules, a mass coordination and deployment of thousands of cycle counts can consume a lot of manual labor if your inventory platform doesn't efficiently handle cross site task management.

To add to the complexity, techs can be 1099 employed and require financial payment in order to accomplish the count at a customer site, so accurate counts need to happen fast, and they should be inexpensive to administer.

Inventory Visibility and Site Provisioning with Many Techs and Sites

Field service organizations deal with large quantities of inventory sites which often results in more work for management. Global visibility across all sites, techs, and customers must be seamless to manage technician schedules and know when inventory is ready for the job to begin. Inventory information should be available from any level user on any device; at any time as long as it is deemed to be within the business requirements. In some businesses, technicians often need global visibility to another technician's inventory. Here, inventory for customer specific jobs or even parts on hold, should not be visible to another local technician searching the pool for a critical part that is expense and may be aging somewhere else in the supply chain.

Another significant challenge to supply chain management is site provisioning. Provisioning and decommissioning of technicians, customer sites and their associated inventory can be very labor intensive if not well designed. This should be an efficient process to cope with today's dynamic, "need it yesterday" business climate.

Defining Inventory Sites for Field Service

Most field service operations consist of 2 of more of these site types:

- **Warehouses** – A warehouse is typically used to store job inventory, a general pool of parts, equipment/assets, and repair services. The operations here often consist of receiving, put away, cycle counting, wave picking, single order picking, assembly, repair, transfers, and shipping.

- **Technicians** – Technicians often manage inventory for either general use or break fix, or project related parts. Some inventory is often owned by the service provider and some owned by a customer or project. If technicians carry customer owned inventory, transactions must be routed to the correct accounting system depending on who owns it. Often customer owned inventory will not be tracked within the organization's accounting system.

Operations here often consist of receiving, moves, gets, puts, consumption, write-off, request inventory, transfer parts to other techs, and cycle counts.

- **Storage Lockers (micro inventory sites)** – Storage lockers are used to minimize transportation time and expenses**.** Technicians can be directed to pull inventory directly from these sites. It is common to see replenishment minimum levels set here so that reorder points can be maintained and restocked. It is also common to see replenishment inventory received by a tech and moved to the storage locker as part of their role.

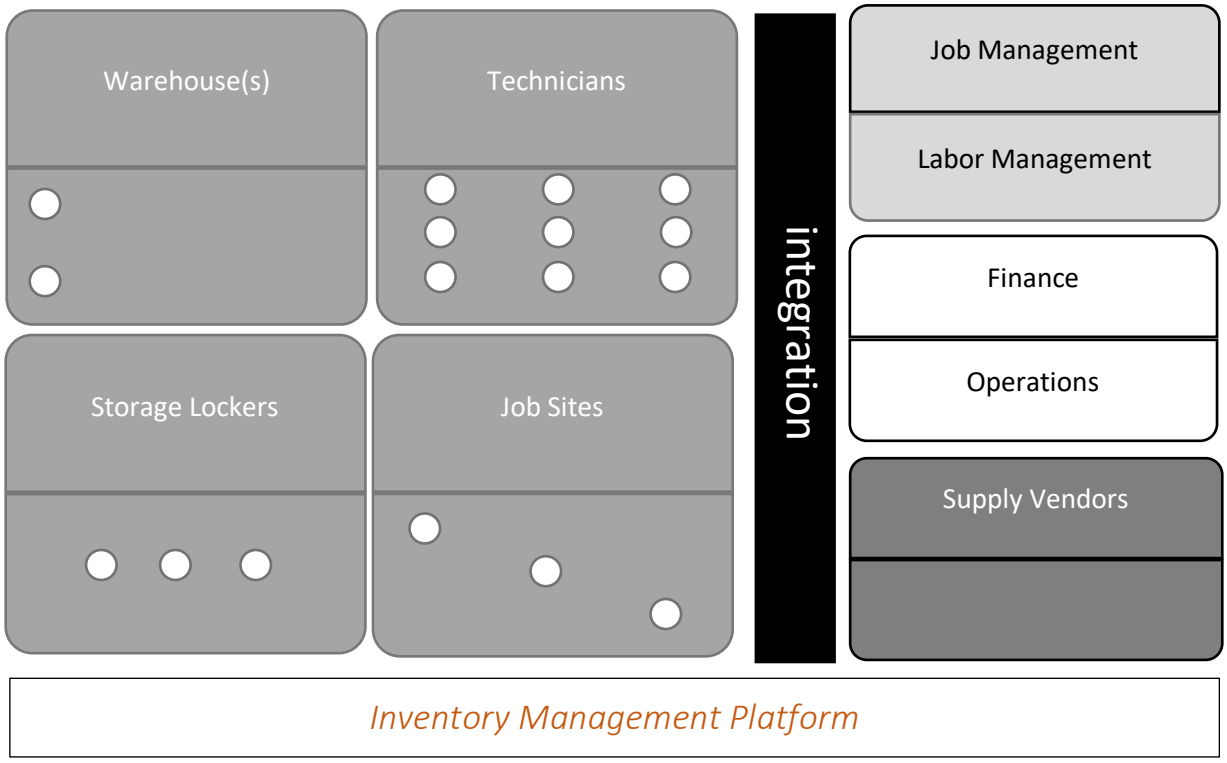
- **Job Sites** – Job sites can be one-time projects, or they can be used as vendor managed inventory where customers have the ability to use parts resulting in a financial transaction and typically a replenishment event upon reaching minimum stock levels. Key operations consist of receiving, returns, moves, consumption, write-off, and count.

These sites typically require inventory management that integrate to **Finance, Operations, Suppliers, and Job/Labor Management** to support appropriate financial transactions (invoices, credits, purchase orders), reporting and process controls and compliance.

Site Design

An inventory management platform must incapsulate the needs of the organization for all these types of systems, processes, users and device types. Below is a diagram of a typical inventory site design for field service. Like job and labor management, inventory management platforms typically are not part of the ERP system simply because ERP systems do not offer the depth of capabilities as best of breed vendors in these specific areas.

Sites as shown as white circles are grouped into common types such as warehouses, technicians, storage lockers, and job sites. An inventory management platform considers the unique characteristics and behaviors of each type.



Robust integration is required to the functional systems on the right of the diagram. This includes financial, operational, job management, and labor management. These systems are either cloud or on-premise systems that are provided in single ERP system or via separate systems.

Later in this planning guide you will learn about the transactions as part of the overall supply chain system. Transactions along with task requests are considered communication layers that affect site design along with integration. Site transfers and cycle counts are two areas where the efficiency found in an inventory management platform can make a big difference in site design.

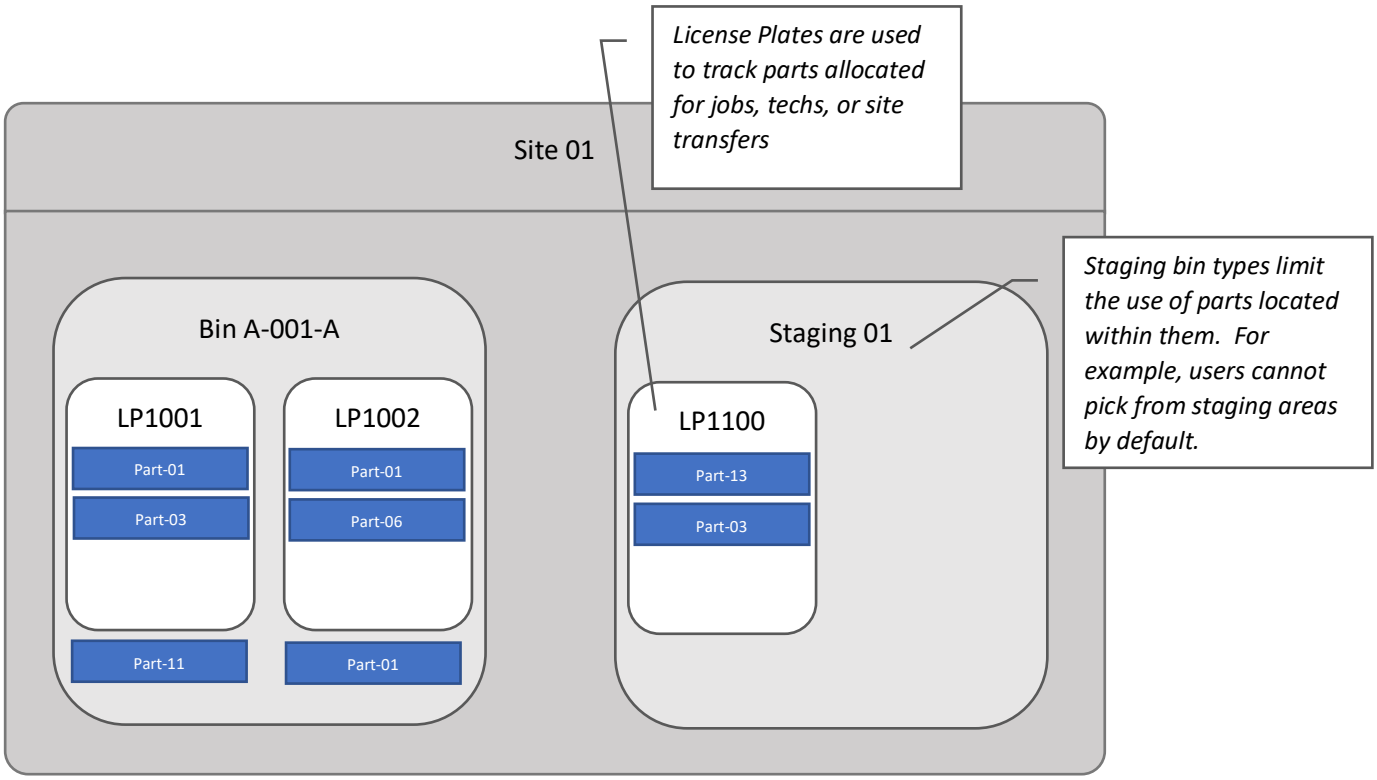
Inventory Management Platforms alleviate many of these short comings of ERP based solutions in these two areas and have a significant impact in a good design.

Inventory Bins, and License Plates

To help manage inventory across all parts of the supply chain, we recommend that each **site** regardless of type, have the same basic structure. This structure consists of different **bins**, each of which has an associated **bin type**. These bin types have associated rules and behaviors associated with them.

Within each bin, we find license plates and/or inventory items like parts. **License plates** are a collection of related parts that are referenced by scanning or typing in a serialized number called a license plate. License plates are kept at a bin level or nested within another license plate that ultimately is in a bin.

License plates are unique numbered collections that can be used to associate parts with a job as they are intermingled within a site with other job-related parts or even general part supplies. In some environments, license plates are overkill, in others, they make the difference for a high performing supply chain. When you design your supply chain, consider each task request and inventory transaction and whether a license plate will make it easier or more difficult for the user operators.



Inventory Traceability Options

Your inventory platform should be capable of tracking inventory at a variety of levels to suit the needs of traceability requirements and business processes. Certainly not all businesses deal with all these traceability requirements, but if future strategy includes new inventory types, it should be at least considered in planning.

Traceability usually fits into the following categories:

- **Transaction Audit History by User with Time Date Stamp** – Issue resolution requires filtering and reporting on inventory transactions. History reports with time date stamp allow you to hone into the history of all inventory movements. Historical records are often needed for reporting well into the future. To account for this seamless historical reporting data, archiving should be built into your inventory platform to offset load on system performance.
- **HOLD Management and Historical Reporting** – holds are common to environments with strict quality approval processes. For example, some clients of service providers will ask that configurations and MAC addresses are verified before being used in the field.
- **Expiration Date or Date** – Date tracking can be useful both from limiting expired products from being used or shipped, it can also be used to drive FEFO (first expiring first out) picking logic. This shelf life is less common in field service.
- **Lot Based** – Lot based tracking can be used to support recall scenarios. This tracking is common in manufactured parts that are purchased from multiple vendors where there can be version and design changes over time.
- **Internal Generated Lot Based** – This form of lot traceability is common in highly regulated materials or industries such as medical equipment. This feature allows for vendor supplied lot numbers to be tracked as custom attributes for external references. It establishes receipt level lot numbers which allows an organization to distinguish the same lot number as different receipt lots in case a recall is needed for just a timeframe not an entire vendor lot.
- **Serial Tracking** – Many electronic parts and high-end mechanical parts are tracked at a serial number level. This is especially useful when doing warranty management. Each serial number is covered under a vendor warranty. Serial Tracking is very helpful in verifying legitimate product returns.
- **Custom Attributes** – Often business processes require a part to support additional data elements to be tracked along with it. Custom attributes are used to gather vendor scoring information, confirm receiving quality assurance steps, photograph the parts, or record compliance data such as temperature. An inventory management platform should support flexible attribute collection.

Preparing for Designing Process Flows

To facilitate the creation of process flows for inventory management, information flows across different inventory sites, users, and software systems. Here are a few areas to consider as you think about your own processes:

- **Authentication and Approval** – Security and authentication should be independently verified and ubiquitous across both internal company users as well as temporary workers that are leveraging apps as technicians handling client sensitive equipment and parts. Password management especially in 1099 environments should be left to the platform not an administrator as this task can consume a fair amount of overhead.

- **Job Notifications** – Communications to all stakeholders is an important part of the inventory platform. When parts arrive in a warehouse for a given job, project managers and customers may need to be notified via email, text, or even within the apps themselves. Customers can also request notifications when job inventory is scheduled to arrive at a job site.

- **Access to Inventory Information** – inventory information is the most important capability of the inventory platform. Therefore, to have a global view of inventory you need to support access from all directions. Inventory information should be made available via ERP business systems, secure API access, web portals, reports, notifications, and user apps. Inventory levels are used to support vendor inventory replenishment, or internal cross site transfers or even warehouse replenishment requests. If a field service job requires pre-assembly before delivery on-site, inventory levels are used to direct staff to pull components into a specific work cell as an example. These inventory levels are used to manage site transfers to field techs that are running low. Replenishments for sites and techs are further management by inventory minimum triggers.

- **Task Requests** – Task requests are communications from one device or system to initiate inventory movements, receive, pick, count, ship, install, place on hold, replenish, assemble, process return, or even generate a request for a part. These tasks are commonly driven by the job management system and financial systems (ERP). Many of these task request must adhere to both loosely directed or strictly enforced business rules. As you scope out your future supply chain, this area is very important to define, otherwise, you can lead to missed expectations and bad data.

- **Inventory and Job Transactions** – invoicing and job management need fail safe real-time updates to inventory usage or even damaging or cycle count adjustments. These communications are key to any reliable system that depends on accurate inventory reporting. These inventory and job transactions can be created by API access or web and mobile apps. A robust field service

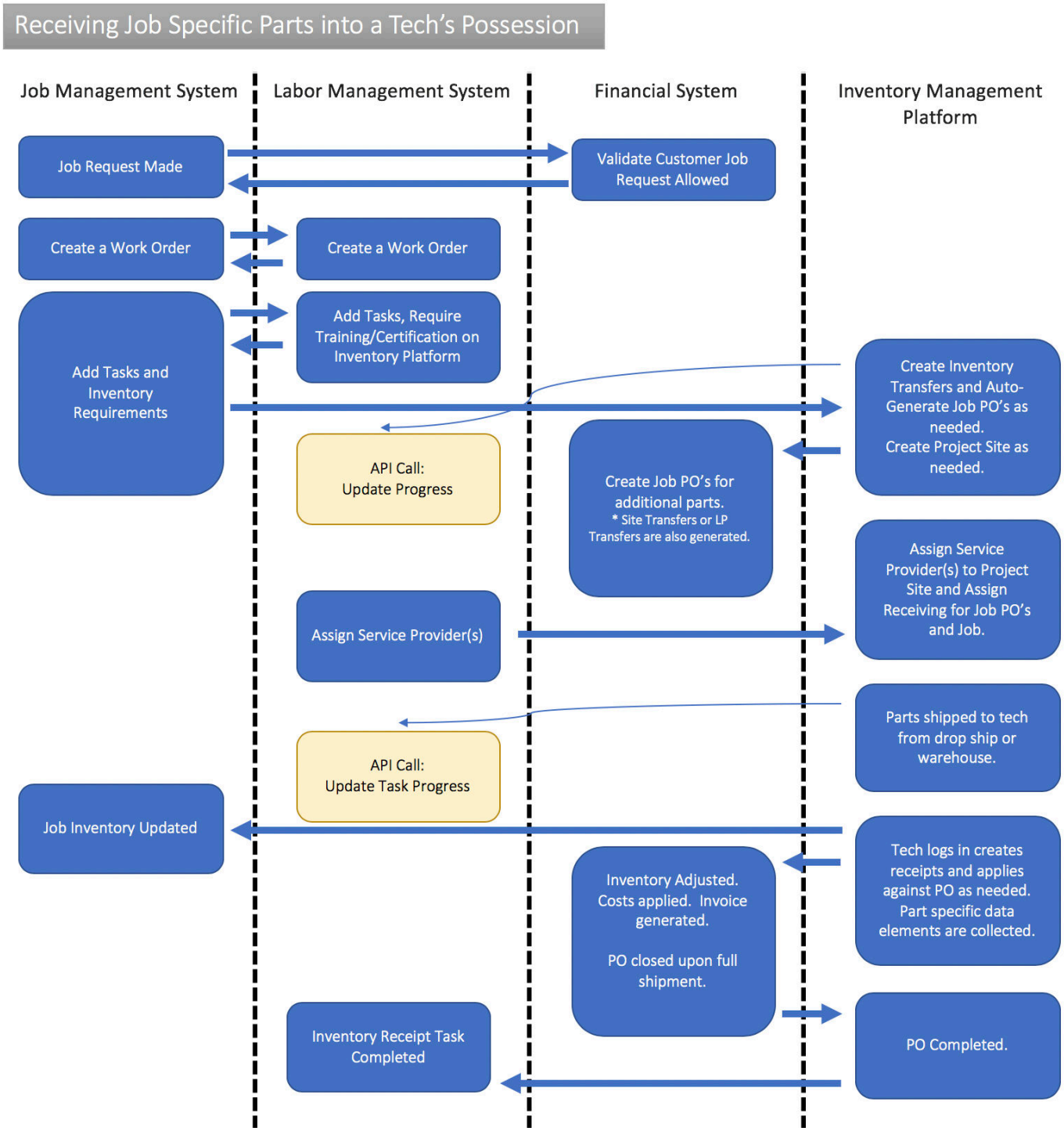
inventory platform should support both ERP related inventory transactions as well as non-financial inventory transactions. Customer owned inventory isn't usually transacted within ERP systems.

- **Compliance Data** – a solid inventory platform must efficiently collect and report attribute and traceability data for its parts and equipment. This includes information like serial numbers, expiration dates, warranty dates, and quality holds for compliance and regulatory management. An inventory management platform must allow for item class and specific item level custom attributes in order to provide a future proof platform. Examples of custom attributes might include:
    - **MAC Address**
    - **Images**
    - **Warranty Expiration Date**
    - **Manufactured Date**
    - **Configuration Information**

- **Integration Layer** – The business communications rely on a robust API set that adheres to best practices for RESTful API's that support standard JSON objects. These standards are universally supported by the largest range of software systems and devices.

Process Flows

We put forth the idea of process flows to visually demonstrate how the systems should be work based on your specific business needs. Below is an example of a swim lane diagram for the process flow to "**Receive job specific parts into a tech's possession**".



These flows should consider your traceability options. For example, financial systems should only be used to track financially relevant inventory, meaning inventory that is owned. Therefore, **inventory and job transactions** will determine what systems need these transactional updates. If a fulfillment order is needed for customer owned inventory, the financial system does not track these movements and their associated inventory and job transactions. However, once a job is completed, it may need to update the **Job (task request)** to insure invoicing and costing are correctly accounted for.

Here are some common user stories that need process flows for your specific supply chain requirements:

- Receive job specific parts into a tech's possession
- Receive general parts into a tech's possession
- Receive general parts into warehouse
- Receive job specific parts into a warehouse
- Put away job specific parts into warehouse storage
- Put away general parts into warehouse storage
- Return parts to vendor from warehouse
- Return parts to warehouse from job site
- Customer returns to warehouse
- Tech to tech transfer
- Replenish stock for technicians
- Request inventory from technician
- Consume general parts to a job on site by tech
- Consume job specific parts to a job on site by tech
- Cycle Count Warehouse
- Cycle Count Tech
- Cycle Count Storage Locker
- Cycle Count Job Site

The platform communications layers and traceability options must be carefully considered as these process flows impact 3rd party systems, financial, compliance, efficiency, and security areas.

Once you've documented your requirements (we refer to them as detail level designs) for these user stories, each user story can then be associated with a swim lane diagram.

As you go through the process of defining your own process flows, here are just a few other topics to consider:

- When a technician quits, what should happen to their existing inventory? Does it make sense to have another technician cycle count, box up, and ship the parts via FedEx or UPS?
- Do you want to need to allow for duplicate serial numbers in the global inventory network? Some inventory systems do not work in these scenarios where serial numbers are assumed globally unique.

Expert Consulting

The work of a supply chain manager is often filled with running the day to day operations. To help, we offer design consulting by our product team to help you create a global supply chain that's the best in your industry. Please contact us if you'd like design services, process flows, or training on these concepts to the entire organization.

Thanks for giving us the opportunity to help you create a fantastic system for managing your field service supply chain.

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