Field Service Management using ServiceMax

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Abstract - *Field service organizations employ technicians, who install machines, perform inspection, do preventive or emergency maintenance in the field and provide on-site training. It consists of forecasting, planning and optimization, execution and control. This requires Scheduling and Dispatching, work order management by fulfilling service level agreements that increases customer value, preventive maintenance, parts management to ensure a hassle-free replacement or repair of products, keeping accurate service contracts, warranties and maintenance plans and an environment to view the key performance indicators (KPIs) to measure success.. To optimize efficiency, forward-thinking field service organizations need to blend modern technology and predictive analytics to look at field service operations holistically. To solve this problem, this paper attempts to create a field service management solution that incorporates different features for its effective management.*

***Key Words*: ServiceMax, field services, vendor neutral archive, Centricity Clinical Archive**

1. INTRODUCTION

To maximize the value in field services, it is important to realize maximum efficiency in the whole value chain of upstream and downstream processes along with related business processes. The effectiveness of field services has a widespread reach throughout the enterprise as it affects everything from customer retention to the company profitability. The industry faces a unique challenge of disorganized business processes.

The companies must realize maximum efficiency in each step of the process. There needs to be attainment of maximum efficiency in all the related business processes like dispatch of resources for resolution of requests, tracking of inventory and invoices, completion of orders to the ability to take advantage of cross sell and service contract renewal opportunities and maximum resource utilization. There is a need to address the challenges of lowering operational costs, robust scheduling with resource optimization. The challenges are many, including insufficient deployment of technology, insufficient field performance metrics, extreme consequences for failing to deliver service at any stage of the customer life cycle. With the advent of time, the question has changed from "How should we optimize field service operation?" To "How quickly can we optimize field service operation?" Hence improved efficiency and productivity are the top goals for field service organizations. With the aid of better customer satisfaction and customer retention, the companies are now focusing on newer products and services which will increase the potential for high revenue streams. Organizations report 76% performance in on-time compliance, indicating that when appointment is set or arrival time determined by contract, organizations fail to meet those times nearly 25% of the time. This results in low customer satisfaction, loss in revenue because customers then seek for alternative service providers. In fact, one survey revealed that US companies deemed to have poor customer service are losing a staggering US$41 billion a year. So, it should be no surprise that 44 percent of US customers are taking their business elsewhere as a result of inadequate service; and of those, 89 percent have switched service providers at least once or twice in the last year. This will lead to direct impact on profitability of the business, wiping out the efficiency gains from improved operational investments. The phrase "first time fix" has gained the utmost importance in field services industry with more focus on effective scheduling of field technicians to meet customer demands. The ability to achieve maximum efficiency hinges upon the core capabilities: Advanced and Enhanced Technology, Data Analytics to monitor the performance, Field service Planning, Resource scheduling & Mobilization and Visibility in to Operations review metrics.

2. DESIGN OF SERVICEMAX

Whether an organization must coordinate hundreds or thousands of field workers or is simply trying to stretch the resources of a few dozen people, effective field service management is a challenge. Assigning workers to jobs based on each employee's skill set, the availability of certain tools and parts, the shift schedule on a given day, and proximity to the job can be complex. To solve this problem, a field service management solution that incorporates the following features is considered.

1. Automation That Accommodates Multiple Teams and Jobs-

Field service management software should use a set of predefined rules to build the field schedule. If there is bad weather, traffic, a customer cancelation, or any other disruption to the daily schedule, the software system should allow central control of the field force to keep the schedule running efficiently and on time. Additionally, the solution needs an optimization and exception engine that will automate processes such as dispatch and manage exceptions that occur throughout the day. Finally, this same automation engine should allow for the creation of different rules for each team

within a workforce. An ideal field service management solution requires an optimization and exception engine that will automate processes such as dispatch, manage exceptions that occur throughout the day, and allow for the creation of different rules for each team within a workforce.

As an example of these rules, an organization may have a team that only performs preventive maintenance checks on installed equipment. Therefore, optimizing the team to maximize the number of checks per day without having to pay overtime would be ideal. Within this same organization, there may be a team that focuses on commissioning new equipment and, in that case, allowing overtime might be more tolerable because the faster completion of work results in the activation of a new revenue stream. A holistic system should be able to accommodate a multitude of rules for different team and job requirements.

2.   Integration with Business Processes-

Field service management software needs to enable a holistic and comprehensive approach to field service. The solution should not only include an extensive set of features but should also integrate seamlessly into existing business processes.

First, be sure that the solution will integrate efficiently with all other back-office systems in use, such as inventory management, customer relationship management (CRM), or enterprise resource planning (ERP).

Second, verify that the solution addresses the needs of multiple stakeholders within the field service organization. This should include complete sets of tools for field technicians, as well as the dispatcher, supervisors, operations managers, contractors, customer service representatives, and even customers. The field service management solution should not only include an extensive set of features but should also integrate seamlessly into existing business processes.

3.   Interaction Between the System and the Field Team-

Field service management software must also enable rich interaction between the mobile workforce and the system. In addition to providing real-time routes and schedules, the system should provide tools that assist technicians with their work once they arrive at a job location: tools that allow technicians to ask for help, retrieve customer information, track down parts, and look up asset history. All these tools must be designed to help the technicians achieve higher first-time fix rates and increased customer satisfaction. In addition, cloud-based solutions enable easy access for third-

party contractors providing critical customer service support and directly interfacing with customers.

4.   Customer Inclusion-

Finally, and most importantly, a field service management solution must bring the customer into the process. Too often, the customer is left out of the service process, resulting in uncertainty and a feeling of helplessness.

Field service management solutions that can enable self-service portals should receive heavy consideration. Such self-service features enable customers to track a task, reschedule or cancel an appointment, and provide feedback to the company. The software should also allow for the creation of appointment reminders based on every customer's unique preference—phone, text, e-mail, or social media.

Bringing the customer into the process also eliminates the waiting period. Customers know exactly when to expect the technician. Being in the know reduces the likelihood of a customer turning to social media to vent about bad service. In addition, improving the service window is a prime opportunity for businesses to enhance their relationships with customers. When the job is consistently performed with efficiency, the customer will be retained for life—even if someone else can do the job for less money—and recurring revenue is secured.

3. PROPOSED SOLUTION

3.1 Components of the solution

Work orders represent work to be completed for customers and are central to field service operations in Salesforce. To divide the work further for billing purposes or to track subtasks, add work order line items, which are child records of work orders.

Work orders offer a great deal of flexibility. They can be associated with many types of records which form the basic components of the system. They are:

•   Assets, to track work performed on a specific asset
•   Cases, to indicate that the work is being performed as part of a customer case
•   Accounts and contacts, representing the customer
•   Entitlements and service contracts, to indicate that the work is being done to fulfill a service-level agreement

While work orders describe the work to be performed, service appointments represent the visits a team makes to the field to perform the work. They include scheduling settings such as an arrival window, scheduled start and end times, and appointment duration. Every service appointment has a parent record. The parent record is

typically a work order or work order line item, but child service appointments can also be added to accounts, assets, leads, or opportunities to track related visits. A record can have multiple child service appointments; for example, a work order may have two service appointments if two visits were needed to complete the work. Fig 1 shows the Field Service core objects that are used to complete essential field service tasks like managing work orders, defining service territories, and tracking workforce.
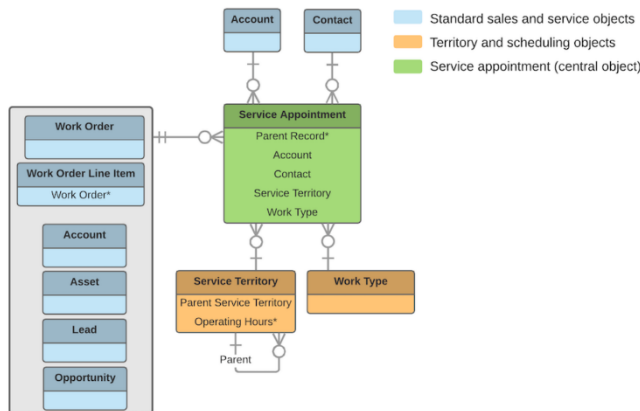

Fig -1: Field Service core objects

3.2 Functional Description of Modules

The internal working of each of the modules is explained in this section. It also describes the software component and subcomponent of the system.

1. Field Service Dispatcher Console for Dispatchers-

   This is the module of the system which is responsible for the functionality of Field Service Dispatcher Console for Dispatchers.
   The dispatcher console includes an appointment list, easy-to-reach scheduling actions, a dynamic Gantt chart, an interactive map, and several other nifty features. Because everyone's needs are different, it's also highly customizable. One can customize all kinds of things: time horizon, dates displayed, Gantt and map display preferences, color schemes and data filters
   With the mere knowledge of Service Appointments, the following functionalities can be carried out-
   - Monitor service appointments in the assigned service area.

   - Reschedule or cancel service appointments.
   - Reassign service appointments to nearby service resources when the situation changes.
   - Optimize the schedule based on worker skills, location, availability, and job priority.
   - Keep service resources busy by managing their schedules.
   - Coordinate resources, back office, and warehouse services.

   - Dispatch service appointments to third-party contractors and crews and track them to completion.
   Designated dispatchers perform some tasks while an admin or a select group of agents perform others. No matter who does the dispatching, the dispatcher console makes these tasks straightforward.

2. Dispatcher Console for Admins Module-

   This is the module of the system which is responsible for the functionality of Field Service Dispatcher Console Admins. The purpose of this module is to set up the configuration parameters that will control the Field Service Management as a whole. According to the business needs of the organization, one can customize the field service features using this console.
   The core customizations that help achieve the requirements are:
   - Admin settings: These settings control the nuts and bolts of Field Service Lightning. They are used to define the life cycle of a service appointment, customize global actions, set up scheduling and optimization policies and more.
   - Customize field sets: Field sets determine which fields are displayed or used for filtering in the Gantt. Add or remove fields from the field sets to see just the fields that dispatchers need.
   - Custom filters: Enable custom filters, then create filters for the service appointments picklist.
   - Custom icons for the Gantt: Add custom icons to service appointments on the Gantt and the map.
   - Custom actions: Add custom actions to the Gantt. Custom actions can either call an Apex class or open a Visual force page, and can be run on records in several areas of the dispatcher console.

3. Field Service Lightning Scheduling Module-

   This is the last module of the system which tracks jobs in a Gantt schedule. Its main purpose is to track how to meet business priorities using key performance indicators, like travel times. Qualifications, time constraints, and business priorities. These KPIs are important factors when choosing the best service resource to perform a job. With business priorities known before hand, scheduling is done easily to perform the job.

   Business priorities to be considered when making schedules are:
   - Great customer service, particularly for VIP customers: Same-day service, a high first-time

fix rate, and for service resources to arrive during the arrival window.

- Manageable costs: Jumping right into action costs money. Keep an eye on travel times and overtime costs, and make sure the most cost-effective resource is performing each job.
- Happy employees: Employees are key to success. It works to retain them by ensuring efficient routing to jobs, keeping paperwork to a minimum, and making sure everyone works reasonable hours.
- Long-term business growth: The business must have a reasonable profit per job and cover all service appointments even as the business grows

3.3 Storage on Cloud Server

The images that clinicians see from an MRI or a CT scan can have life-altering impacts on a patient's care—and as healthcare providers, the need to easily save, store, and retrieve the files is basic. To do it, vendor neutral archive (VNA), a medical imaging technology that stores images in a standard format so they can be accessed by other systems is used.

GE Healthcare's VNA specific to this use case is called Centricity Clinical Archive (CCA), augmented by its analytics solution, Centricity Clinical Archive Analytics, which runs in the Microsoft Azure cloud platform. Fig 2 shows the diagram of the GE Healthcare Azure-based environment.

Centricity Image Archive is a vendor-neutral, cloud-based data-storage service that helps reduce the total cost of storage. It provides peace of mind by offloading the burden of managing onsite storage and helps prevent loss of critical patient data in the event of disasters. Simultaneously, it gives clinicians easy access to prior images to help with the process of diagnosis and treatment planning.

With more than 10 years of experience providing remote-hosted archiving services and storing over 2 PB of data, 47M patient cases and 4B images, Centricity Image Archive is a trusted partner.

Centricity Image Archive offers two levels of services to meet storage needs. They are-

- Disaster Recovery: To safeguard critical patient data by automated backup of onsite primary archive.
- Long-Term Archive with Disaster Recovery: To reduce costly overheads by offloading long-term archive into our remote data centers. Clinicians then get near real-time access to patients' prior images and gain an affordable, secure and reliable way to manage growing storage needs.
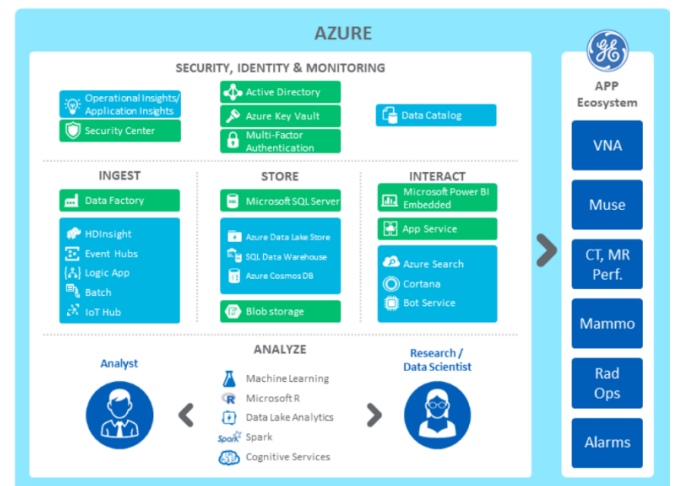

Fig -2: Diagram of the Azure-based environment.

3.4 Integrated Platform for Connected Field Service

By using Internet-centric technologies to connect physical objects to each other, to centralized platforms, and to external data sources, businesses can transform static infrastructure into dynamic, self-governing systems that deliver new types of capabilities and value.

In this hyper-connected environment, servicing infrastructure and devices becomes more essential than ever before and addressing service issues after an incident has occurred is no longer adequate. Real-time monitoring provides a current view of asset status at all times. Anticipating service needs through predictive analytics and preventive intervention has become the new standard. When a service issue does occur, using remote maintenance technologies can reduce reliance on repair crews visiting a field location.

Cloud computing technologies are a critical enabler of connected field services, since the cloud provides superior performance, availability, scalability, technical and business agility, security, and cost efficiency vs. traditional on-premise solutions.

The customized IoT solution development services shown in Fig. 3 conceptualizes how IoT can create value within the unique parameters of each individual business, and then translate the concept into fully-functioning, deployed solutions that integrate seamlessly with the help of the ServiceMax Platform for Field Service Management (FSM). Connected to IoT and Asset Performance Management, this field service management platform enables customers, such as original equipment manufacturers and equipment owners/operators, to increase productivity, drive efficiencies, reduce compliance and safety risks, grow service revenue, and improve customer experience by transforming the way service is delivered.

4. CONCLUSIONS

This project was initiated because of a need for field service environment and automating all aspects of the process ensure that the right worker gets to the right job at the right time, based upon specific criteria.

Taking a holistic approach to field service management results in more-efficient operations and improved service. Key to this approach is field service management software that builds and controls technician schedules for increased productivity and customer satisfaction. Thanks to cloud-based solutions, the mobile internet, and the ubiquitous nature of smartphone technology, field service management solutions are now becoming readily available to organizations of all sizes.

Fig -2: Integrated Platform for Connected Field Service.

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[6] Boyer, G., Arnason, A. N. (2002). Application of the Simulation and Mean Value Analysis to a Repair Facility Model for Finding Optimal Staffing Levels. Procee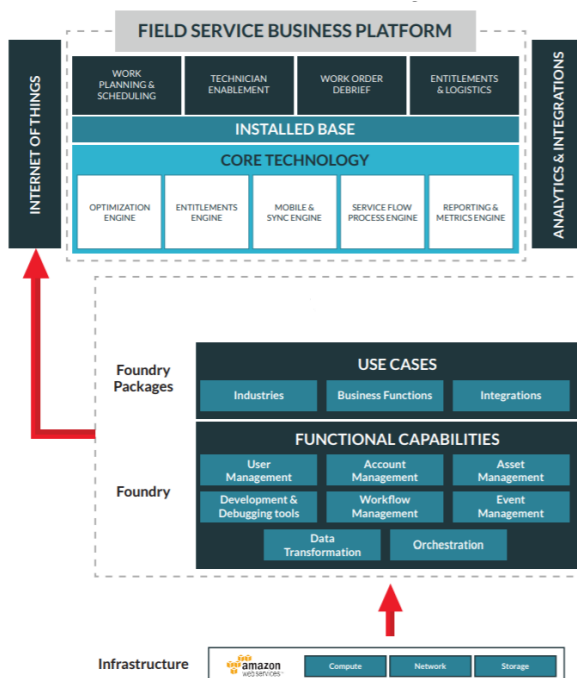dings of the 2002 Winter Simulation Conference, USA