

Exensys Software Solutions Ltd.		AA/B/CCDD V x.y
White Paper		W. E. F. dd/mm/yy




Best Practice
eXensys – Finite / Infinite Capacity

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Introduction

Objective of this document is to understand the concept of finite and infinite capacity. The document initially addresses the flow of production planning and the confirmation of planning processes through capacity checks during Sales and Operations Planning (SOP), Master Production Scheduling (MPS) and Material Requirements Planning (MRP). The document then addresses finite and infinite scheduling logic during Rough-cut Capacity Planning (RCCP) and Capacity Requirement Planning (CRP).

Overview

1.0 Capacity Management - Overview

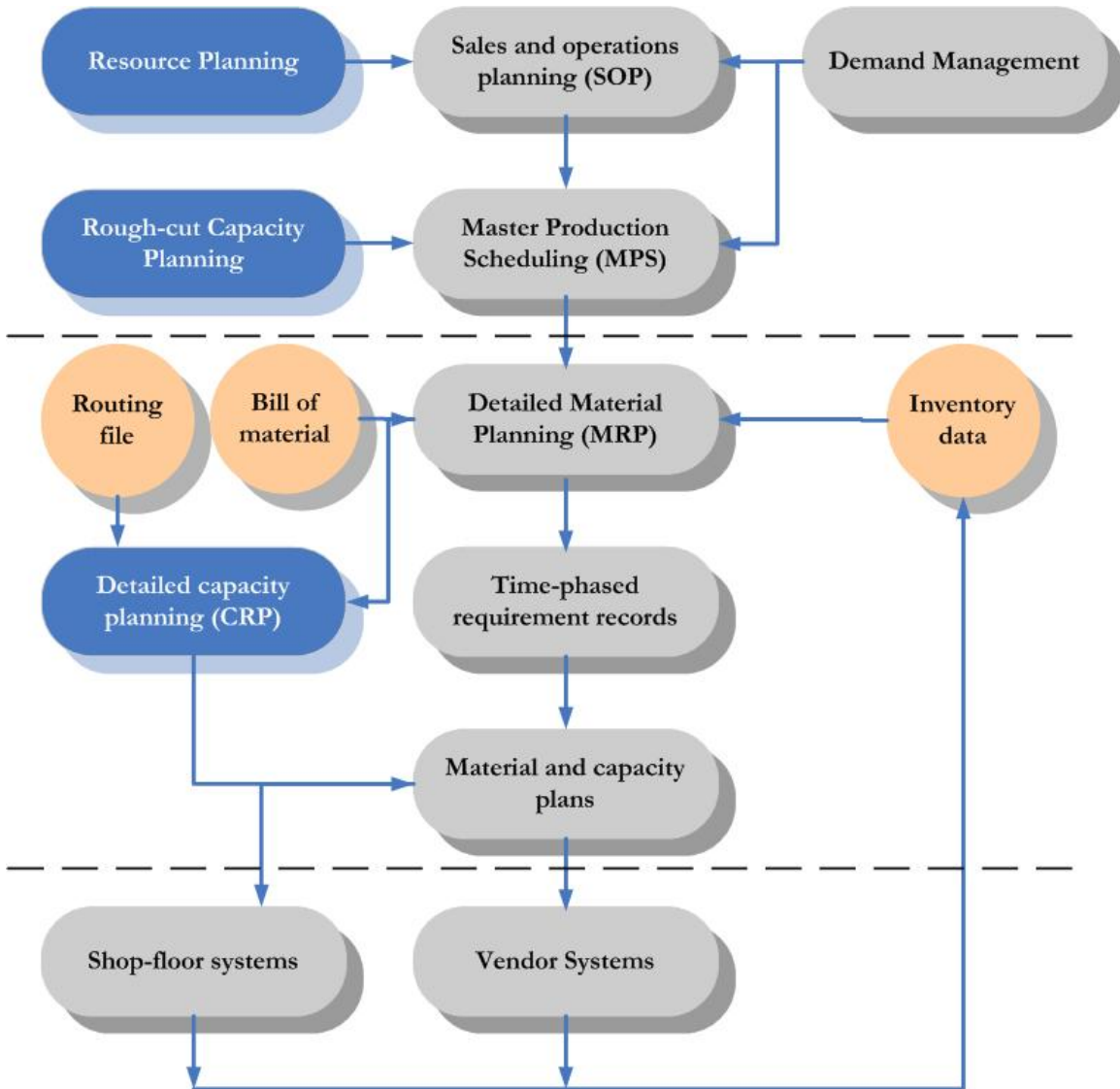
In eXensys, capacity management is addressed in the following stages:

1. Sales & Operations Planning – Resource Planning
2. Master Production Scheduling – Rough-cut Capacity Planning
3. Material Requirements Planning – Capacity Requirements Planning

A brief description for the above mentioned business processes is given below:

Business Process	Capacity Management
<p>Sales & Operations Planning (SOP)</p> <p>Sales and operations planning provide the key communication links for the top management to coordinate the various planning activities in a business. For example, if marketing is planning to introduce some new products, it will result in the increase of capacity in the factory. This should be identified and actions should be taken before starting the production in the factory.</p>	<p>Resource Planning (RP)</p> <p>Resource Planning is the capacity planning conducted at SOP level. It is the process of establishing, measuring, and adjusting limits or levels of long range Capacity. Resource planning is normally based on the production plan but may be driven by higher level plans beyond the time horizon for the production plan. It addresses those resources that take long period of time to acquire.</p>
<p>Master Production Scheduling (MPS)</p> <p>The MPS drives the material requirements plan. As a schedule of the items to be built, the MPS and bill of material determine what components are needed from manufacturing and purchasing. It keeps priorities valid. The</p>	<p>Rough-cut Capacity Planning (RCCP)</p> <p>RCCP checks whether critical resources are available to support the preliminary MPS plan that has been developed. Critical resources include bottle neck operations, labor and materials which will take long lead</p>

MPS is a priority plan for manufacturing.	time to procure or produce.
<p>Material Requirements Planning (MRP)</p> <p>Material Requirements planning runs for MPS Items. This will find the dependent requirements for all the assemblies/end products and finalize the time period in which the activities such as purchasing or in-house manufacturing should start and finish for completing the order.</p>	<p>Capacity Requirements Planning (CRP)</p> <p>The CRP occurs at the level of the MRP. It is the process of determining in detail the amount of labor and machine resources needed to achieve the required production. Planned order and open shop orders (scheduled receipts) are converted into demand for time in each work center in each period of time.</p>



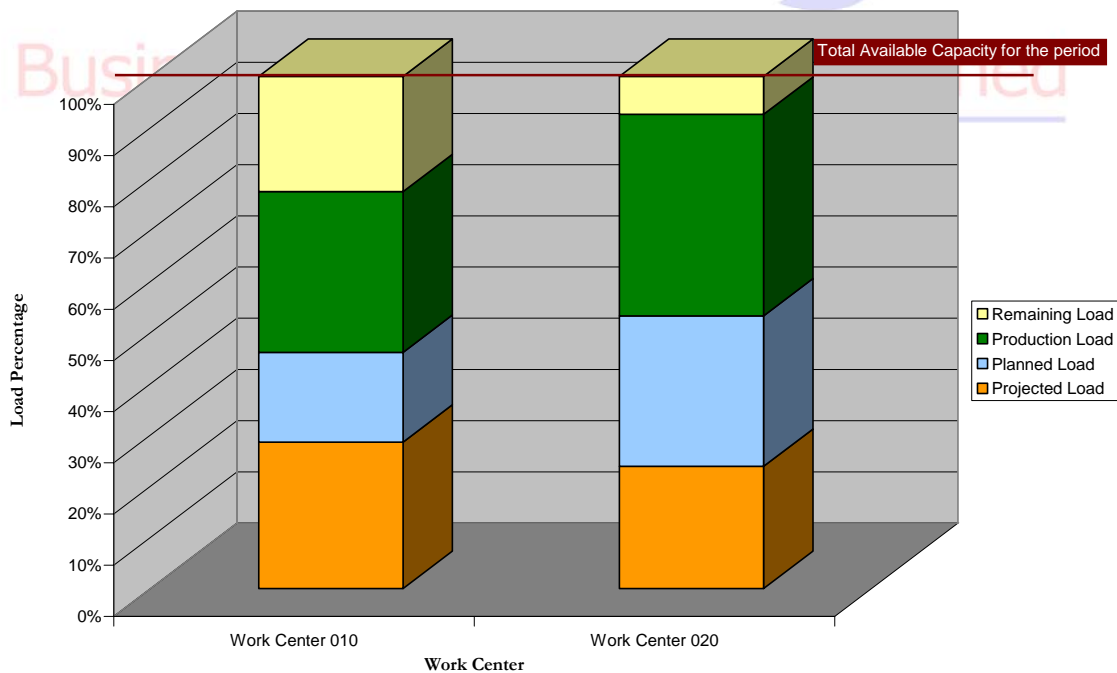
2.0 Infinite and Finite Capacity

2.1 Work Center Load

Depending upon the orders release confirmed, the work centers are loaded for a period. The various load descriptions are given below:

Load Type	Description
Total available capacity	This is the total capacity available for the work center for the given period
Projected load	On running RCCP, the firm quantities load for the finished items are loaded. Based on which critical work center details can be identified
Planned load	On completion of CRP and running a detailed capacity plan, each operation wise load is verified. Here the projected load occupied for a particular item is replaced with planned load
Production load	On releasing production orders to shop floor, the planned load for that particular order is replaced with production load. On completion of each operation and during shop floor reporting, the loads are released
Remaining available capacity	This is capacity of the work center still not occupied by any loads. This can be occupied by any production or planned or projected loads.

Work Center Load



2.2 Infinite Capacity

Infinite Capacity is assigning more work to a work center that is already loaded during a given time period. While using Infinite Capacity system calculates the capacity required at work centers in the time periods required regardless of the capacity available to perform this work.

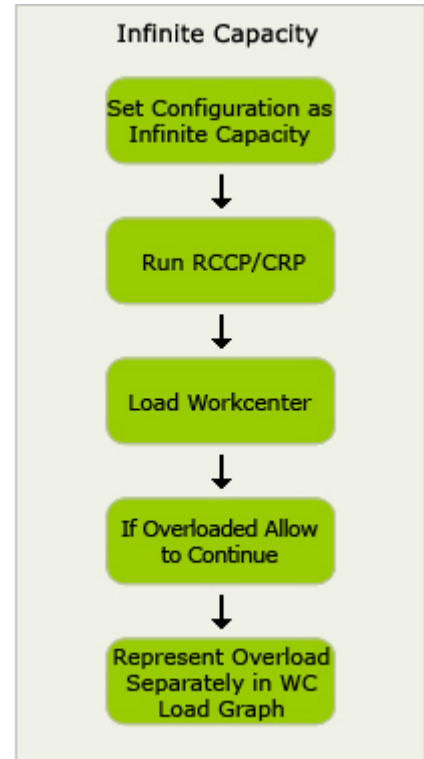
Infinite Capacity takes place as follows:

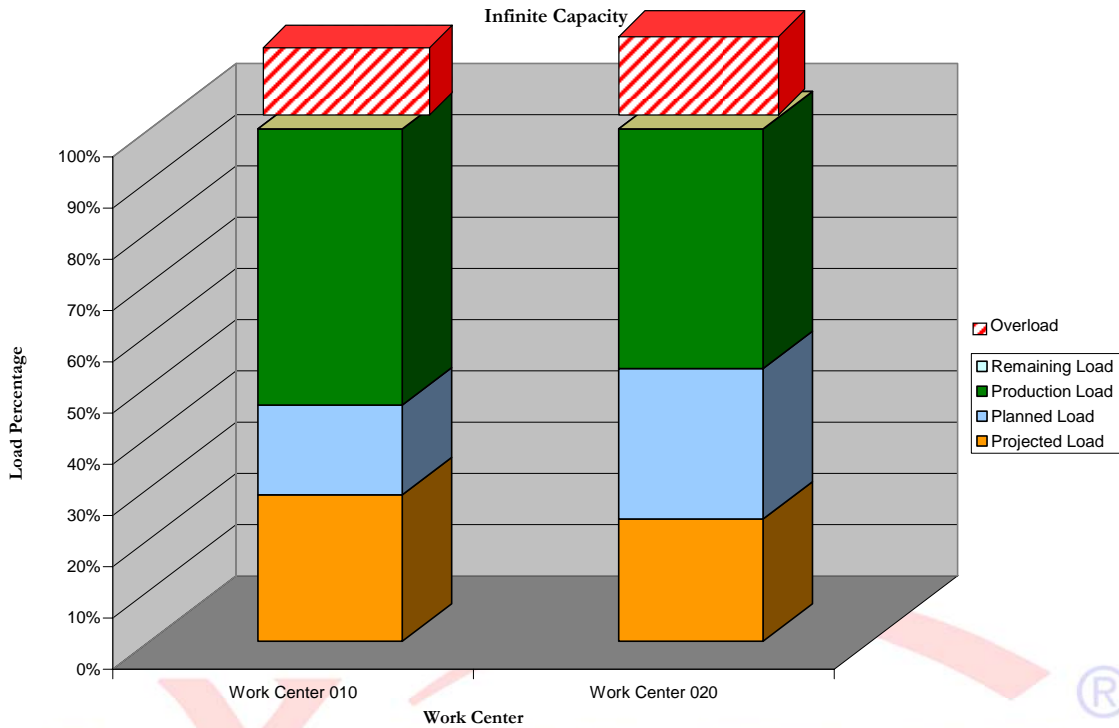
1. For every operation to be scheduled, available capacity is checked on the required date.
2. If sufficient capacity is available then the operation is carried out on the required date.
3. If there is insufficient capacity, then the operation is still carried out by adding extra capacity in the form of overtime, extra shifts etc.

Infinite capacity is initiated by setting the configuration settings as finite capacity is required. Once the MPS and MRP establishes order due dates RCCP and CRP are run respectively to check whether the capacity is available.

If capacity is available then the capacity for the order is allocated. If there is a shortage in capacity then the work center will be overloaded that is through overtime, adding extra shifts etc.

Infinite capacity focuses on completing the customer order's on time irrespective of the capacity available during the given time period.



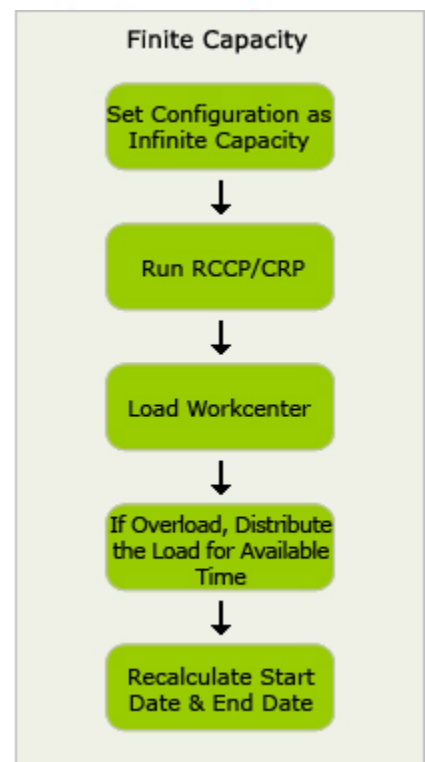


2.3 Finite Capacity

Finite Capacity is assigning no more work to a work center that is already loaded during a given time period. Finite Capacity takes place as follows:

1. For every operation to be scheduled, available capacity is checked on the required date.
2. If sufficient capacity is available then the operation is carried out on the required date.
3. If there is insufficient capacity, then the operation is moved to a date when it can be processed without any capacity constraints.

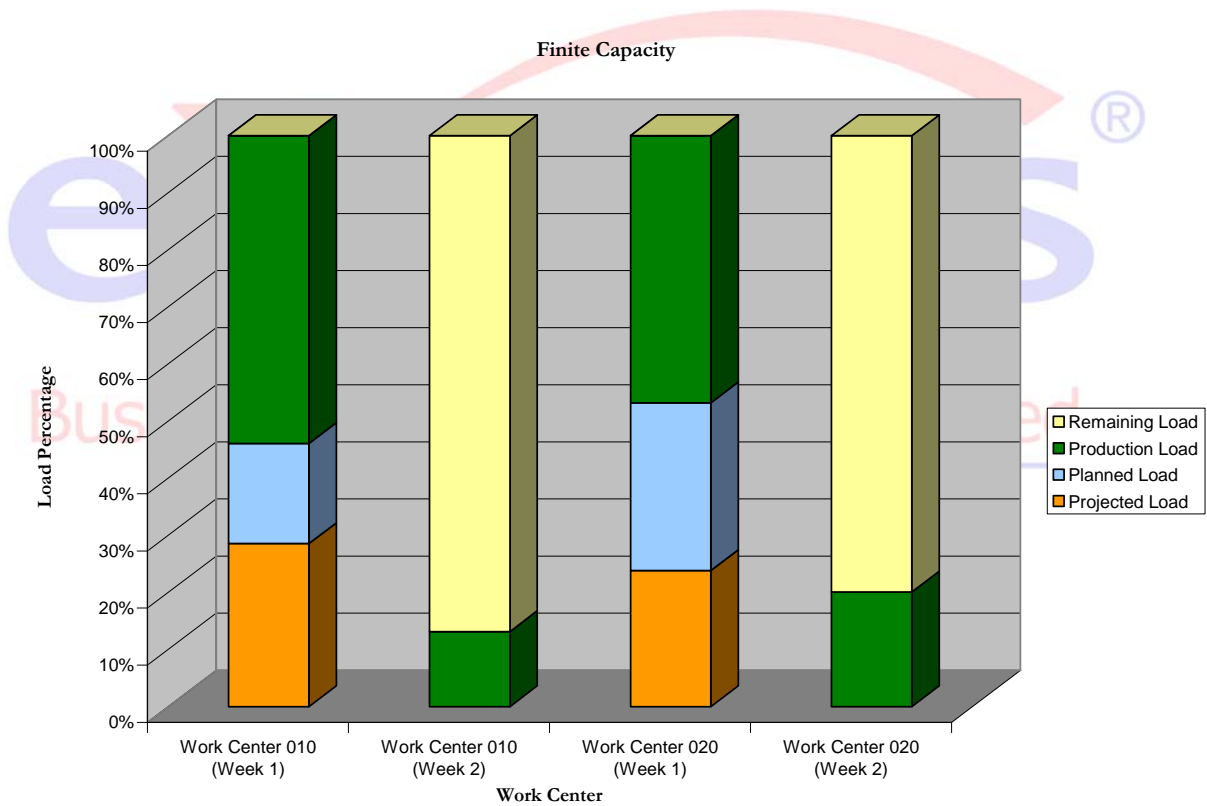
Finite capacity is initiated by setting the configuration settings as finite capacity is required. Once the MPS and MRP establishes order due dates RCCP and CRP are run respectively to check whether the capacity is available.



If capacity is available then the capacity for the order is allocated. If there is a shortage in capacity then the order due date is shifted to a next date when capacity is available.

Finite capacity accurately models factory capacity, including calendars, work centers, labor, and tooling resources. Accurate Finite capacity defines secondary resources like labor, tools, and materials.

The result of using finite capacity method will be a set of start and finish dates for each operation at each work center. Here detailed schedules for each job through each work center based on work center capacities are established.



Benefits:

1. Faster decisions
2. Able to achieve Capable-to-Promise (CTP)
3. Utilize the work centers to the fullest capacity

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4. Helps in achieving better production scheduling
5. Helps in performing “What-if” scenario’s

Conclusion:

The document is prepared to understand the concept capacity management in production planning and importance of finite and infinite capacity. The details of capacity management at each stage of production planning are explained. The flow of finite and infinite capacity is addressed to understand the difference in load pattern. This will help in user to take decision whether to opt for finite or infinite capacity depending upon the nature of manufacturing plant.

