



Time-phased Product Structure Generator – TIPS

Minor Project

Disclaimer

This Software Requirements Specification document is a guideline. The document details all the high level requirements. The document also describes the broad scope of the project. While developing the solution if the developer has a valid point to add more details being within the scope specified then it can be accommodated after consultation with IBM designated Mentor.

INTRODUCTION

The purpose of this document is to define scope and requirements of a Time-phased Product Structure Generator – TIPS for an electronic design house. The design house is engaged in producing new electronic designs regularly. As a part of design hand-off to production house, time-phased product structure is required to aid the production house. Creation of a visual time-phased product structure is a tedious and error prone task.

The proposed system – TIPS will assist design teams to generate the time-phased product structure automatically.

This document is the primary input to the development team to architect a solution for this project.

System Users

The design team of design house and the production team of the production house will primarily use the Time-phased Product Structure Generator, TIPS.

Assumptions

1. Lead Times Master will be uploaded using a CSV file. This CSV file will contain 2 columns, viz. (a) Part Number, and (b) Time in hours. **Note:** Lead-time is the time required to acquire (i.e. purchase, produce or assemble) an item.
2. The BOM will be received from the CAD system in the CSV format.

REQUIREMENTS

TIPS will provide a web-based BOM Analysis Tool for production and design teams.

Basic System Operation

Key elements of the system along with their basic operation are outlined below:

Upload Lead Times Master

The administrator will upload this master file. This file will have 2-columns viz. (a) part number, and (b) lead time in hours.

Upload BOM

The BOM is received in CSV format from the CAD tool. The CAD tool produces 2-files, viz. (a) made-to-specifications part master and (b) an “Indented BOM”. The made-to-specification part master has 2-columns viz. (a) part number and (b) part description. The indented BOM has 5-columns viz. (a) Parent Part Number, (b) Child Part Number, (c) Child Part’s Unit of Measure (UOM), and (d) Child Part Quantity required in the Parent Part.

The upload form has fields for the “name of the design”, “brief description”, “lead

times master file name” and “indented BOM file name”. User enters these details and clicks the “save” button. Upon successful save, all the BOM data is uploaded for that design and also the time-phased structure for that design is automatically created.

User will also be able to view his/her previously uploaded details in a list view.

Working with Time-phased Product Structure

Clicking on a design will display the complete time-phased structure of the product. At this stage, user will be able to edit/update the lead-times in the “lead-time master” and regenerate the time-phased product structure to fine tune details.

A user-friendly interface needs to be developed to ensure smooth usage of the system.

About BOM

The bill of materials (BOM) is, in its simplest form, a list of parts or components required to build a product. Indented Bill of Material is a hierarchical bill of material listing, where each row lists the parent part (assembly or sub assembly) and child part, its UOM and quantity. Such a list reflects the structure of the product by each assembly/sub-assembly level. This indented BOM can be processed to produce a Summarized Bill of Materials that totals the quantities for each part used in every level. It does not represent the structure level by level.

About Time-phased Product Structure

A time-phased product structure is the combination of lead-time of each part with product structure derived from the indented BOM. It shows the sequence in which each part must be “acquired” in order to deliver the final product. The sequence is derived from the child(s) dependency and their respective lead-times. Therefore, time-phased structure resembles a project network. Recall that the critical path of a project network indicates the total project duration. Similarly, the critical path of a time-phased structure will be the total time to manufacture/produce the product.

Here is an example to illustrate the concept using an over simplified Personal Computer (PC) assembly. The following 2-tables show the indented BOM and the lead-time master. The resulting time-phased structure is illustrated after tables.

Parent Part	Child Part	Child UOM	Child Qty
PC	Monitor	Each	1
PC	CPU	Each	1
PC	Keyboard	Each	1

Parent Part	Child Part	Child UOM	Child Qty
CPU	Enclosure	Each	1
CPU	Mother Board	Each	1
CPU	SMPS	Each	1

Indented BOM Table

Part	Lead-time
Monitor	1
Keyboard	2
Enclosure	3
Mother Board	2
SMPS	1
CPU	3
PC	2

Lead-time Master Table

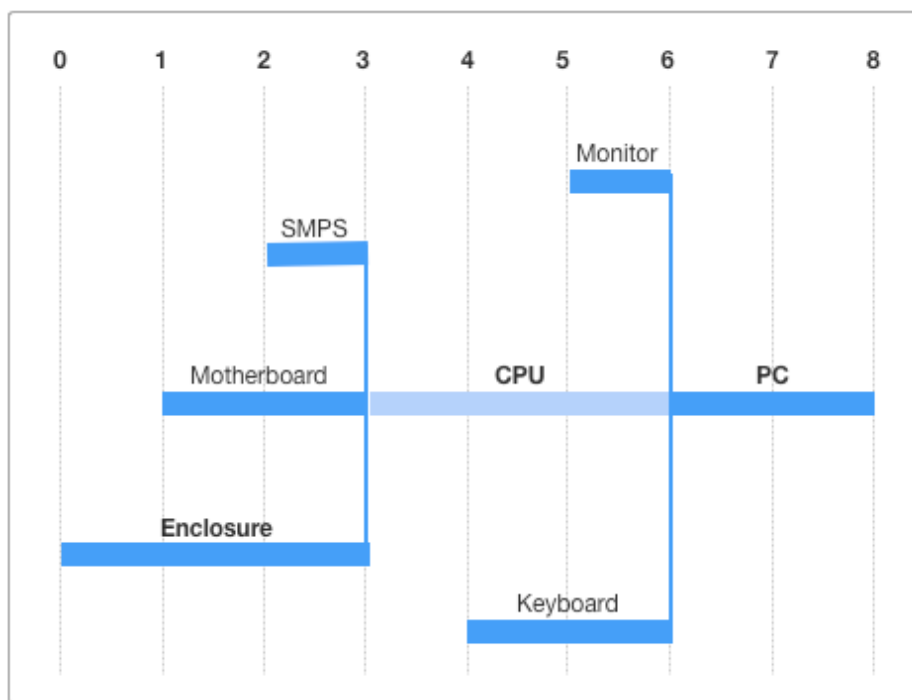


Figure 1 - Time-phased Product Structure

The x-axis displays time. All the parts in the critical path are highlighted in **bold**. The value of time-phased structure in production planning & sourcing is clearly visible from this example. In real life, BOMs' are much more complex.

DEVELOPMENT ENVIRONMENT

TIPS will be developed as a web application using Java/JSP and DB2 database. Eclipse will be used as the IDE for the same. You may consider using a JavaScript framework like Prototype/Scriptaculous /jQuery. Charting utility (e.g. High Charts or Google Charts) may be used to display time-phased product structure.