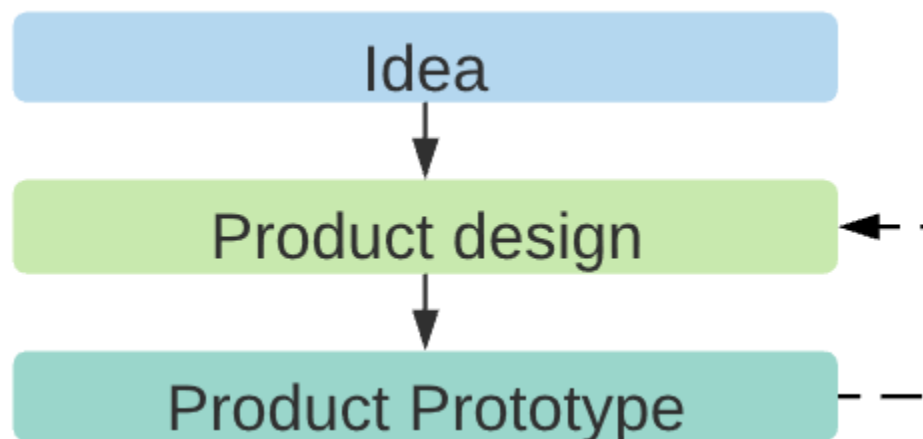


As explained in (Chapter 4) the idea for the product has already been established and initial design characteristics and basic product research have already been carried out. This is representative of an actual implementation of the Odoo software in the real world because although Odoo have good project management and communication applications, those are external to the inventory and manufacturing applications and, more importantly, share no integration with the engineering design CAD software. In this simulation, the idea has been put to paper and have been turned into a CAD design using the Solidworks software generating a CAD file locally stored in the engineer computer.



**Figure 36 Sectioned diagram regarding product development**

如《第四章》所解釋的，產品的構想已經確立，並且已經進行了初步的設計特徵和基本的產品研究。這代表了 Odoo 軟件在現實世界中的實際應用，因為儘管 Odoo 具有良好的項目管理和溝通應用程序，但這些應用程序與庫存和製造應用程序是外部的，更重要的是，它們與工程設計 CAD 軟件沒有集成。在這個模擬中，這個想法已經被紙上實現，並且已經使用 Solidworks 軟件將其轉換為 CAD 設計，生成了一個在工程師計算機上本地存儲的 CAD 文件

It is at this point that the utilization of the Odoo software can officially take place. The first step is to understand what the subject of production is as far as product items are concerned. There are two takes in how to do this:

在這一點上，正式可以開始利用 Odoo 軟件。第一步是了解生產的主題是什麼，就產品項目而言。有兩種方法可以做到這一點

★ The first is to consider the prototype an early revision of the final product, that is the prototype item created in Odoo would be the same as the final product item with revisions been carried out during development. That would be the recommended if the prototype is achieved by identical means to the ones used in the final production. An example of this approach would be if the product is simple enough that product and production aspects of development can be carried out together.

✦ The second one is to consider the prototype as a separate item from the final product - this is the path was taken in this simulation. The main reason for this decision was that the ways in which our prototype production were carried out differed from the final production since 3D printing was used for the prototypes.

- 第一種方法是將原型視為最終產品的早期版本，也就是說，在 Odoo 中創建的原型項目將與在開發過程中進行了修訂的最終產品項目相同。如果原型是通過與最終生產使用相同手段實現的，那麼這將是推薦的做法。這種方法的一個例子是，如果產品足夠簡單，使得產品和生產方面的開發可以同時進行。
- 第二種方法是將原型視為與最終產品不同的獨立項目 - 這是本模擬中所採取的路徑。做出這一決定的主要原因是我們的原型生產方式與最終生產方式有所不同，因為我們使用了 3D 打印技術來製作原型

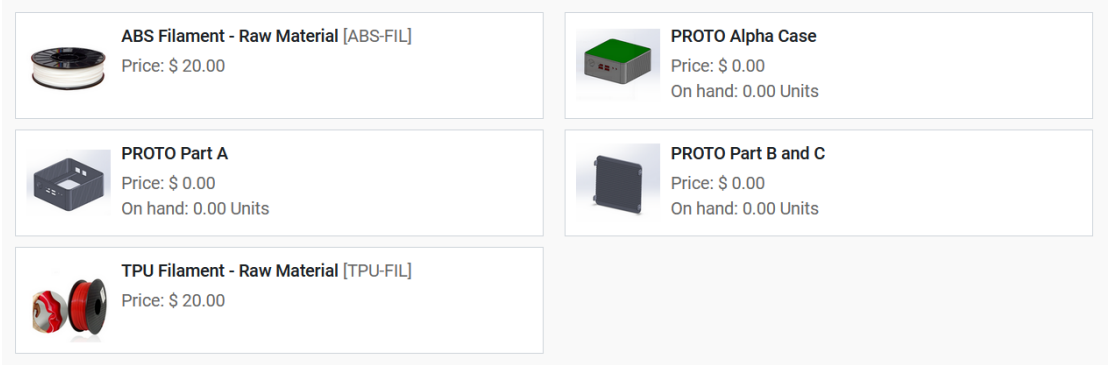
Starting from the root, a product item called PROTO Alpha Case (Figure 37) was created (Alpha Case being the name of the product). From this point on we will refer to prototype products as ‘proto item’. As we can see, this allows for a nice representation of the proto item. Since it is a prototype, it will not be marked as something that can be sold or purchased, and sales price will be set to 0\$ since it is unimportant. This proto item will be used to connect the different aspects of its development but for now it is left alone.

The screenshot shows the Odoo product form for 'PROTO Alpha Case'. At the top, there is a toolbar with icons for 'On Hand' (0.00 Units), 'Forecasted' (0.00 Units), 'Product Moves', 'Reordering ...', 'Bill of Mater...', 'ECOs', and 'Quality Points'. Below the toolbar, the product name 'PROTO Alpha Case' is displayed, followed by two checkboxes: 'Can be Sold' and 'Can be Purchased', both of which are unchecked. To the right of the product name is a small 3D model of a green box. Below the product name, there are two tabs: 'General Information' and 'Inventory'. The 'General Information' tab is active, showing fields for 'Product Type' (Storable Product), 'Product Category' (All), 'Internal Reference', 'Barcode', 'Version' (1), 'Sales Price' (\$ 1.00), 'Customer Taxes' (Tax 15.00%), 'TaxCloud Category', and 'Cost' (\$ 0.00). At the bottom, there is an 'Internal Notes' section with the text 'This will be the prototype for the Alphacase Product'.

Figure 37 Image of the prototype product item

從根本開始，創建了一個名為 PROTO Alpha Case（見圖 37）的產品項目（Alpha Case 是產品的名稱）。從這一點開始，我們將把原型產品稱為“proto item”。正如我們所看到的，這可以很好地呈現原型項目。由於它是一個原型，它不會被標記為可以出售或購買的物品，銷售價格將設置為 0 美元，因為這不重要。這個原型項目將用於連接其開發的不同方面，但目前它被獨立放置。

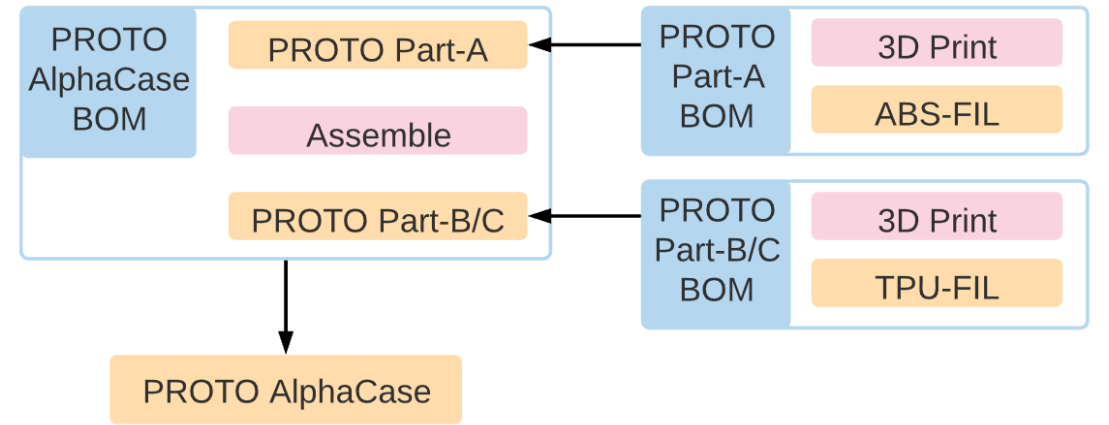
As we have previously established in chapter 3, the product will consist of 3 pieces Part A, Part B and Part C. These need to be prototyped and created as products as well so that they can be added to the bill of materials of the PROTO Alpha Case. Finally, it was decided to use specific plastic filaments (see section 4.1.1) for the 3D printing of PROTO Part A and PROTO Part B and C and these need to be added as products as well (Figure 38).



**Figure 38 Overview of Product class items for prototype**

正如我們在第 3 章中先前確定的，產品將由 3 個零件組成，即零件 A、零件 B 和零件 C。這些零件需要作為產品進行原型設計和創建，以便它們可以被添加到 PROTO Alpha Case 的物料清單中。最後，決定使用特定的塑料填料（見第 4.1.1 節）來進行 PROTO Part A、PROTO Part B 和 C 的 3D 打印，這些也需要作為產品添加（見圖 38）。

At this point, the relevant product items for the prototyping of the Alpha Case were finished, which makes possible the creation of the its relevant BOMs. There are 3 of them and they follow the structure in (Figure 39):



**Figure 39 BOM diagrams for prototyping**

在這一點上，用於原型設計 Alpha Case 的相關產品項目已經完成，這使得創建其相關的物料清單成為可能。這有 3 個物料清單，它們遵循（見圖 39）中的結構：

Something worth mentioning is that Odoo used the kit option (Figure 40) on the item to

infer that this product is a component of another product. This is very interesting because it automatically creates dependencies between the product items for production.

</

Figure 40 Image of the prototype product BOM (Part-A)

值得一提的是，Odoo 在產品項目上使用了套件選項（見圖 40），以推斷該產品是另一個產品的組件。這非常有趣，因為它自動創建了產品項目之間的生產依賴關係。

As the reader can see (Figure 41), while making the BOMs it is simple to create the specific operation items necessary for the manufacturing procedure and specify its work center. One of the best functionalities regarding MES in Odoo is the ability to track the time of operations based on default duration. This can be dynamically changed based on tracked time or set manually. It is also in the operation item that we can add instruction files for the operation. Even though it is limited to PDF text or a link to a google slides file, this is one of the few opportunities presented by Odoo for file management connected directly to an item.

**Figure 41 Image of operation item as presented by Odoo (BOM Part-A)**

	Product	Reference	BoM Type
<input type="checkbox"/>	PROTO Part A		Kit
<input type="checkbox"/>	PROTO Part B and C		Kit
<input type="checkbox"/>	PROTO Alpha Case		Manufacture this product

**Figure 42 Overview of BOMs created for prototyping**

正如讀者所看到的（見圖 41），在製作物料清單時，可以輕鬆地創建必要的製造程序特定操作項目並指定其工作中心。在 Odoo 中，關於 MES 的最佳功能之一是能夠根據默認持續時間跟踪操作時間。這可以根據跟踪的時間動態更改，或者手動設置。在操作項目中，我們還可以添加操作的指令文件。儘管僅限於 PDF 文本或連結到 Google 幻燈片文件，但這是 Odoo 為與項目直接相連的文件管理提供的少數機會之一。

Speaking of this lack of upload opportunities, we can notice that while making the product item there was no way to directly upload files regarding the product to the item. In our case, we have the CAD files regarding the parts that we are prototyping, to not be able to upload these files in any way would be a complete failure from a PLM perspective. Thankfully there is a workaround. As explained in section 5.1.3.5, the ECO is

an item that is linked to either product items or BOMs and allow uploaded files to be attached to it. It is a minor workaround but basically means that if we want to upload our CAD files to the items in any significant manner, we need to emit an ECO even if there is no “change” being made.

Products / [PROTO Part B and C](#) / [Engineering Change Orders](#) / ECO0001: Files Upload For PROTO

[SAVE](#) [DISCARD](#)

UPDATE DOCUMENTS NEW IN PROGRESS VALIDATED EFFECTIVE

0 Documents

### Short Summary

#### ECO0001: Files Upload For PROTO

Type	New Product Introduction	Responsible	Lucas
Apply on	Product Only	Effectivity	<input checked="" type="radio"/> As soon as possible
Product	<a href="#">PROTO Part B and C</a>		<input type="radio"/> At Date
		Tags	

Note Routing Changes Approvals

Description of the change and its reason.

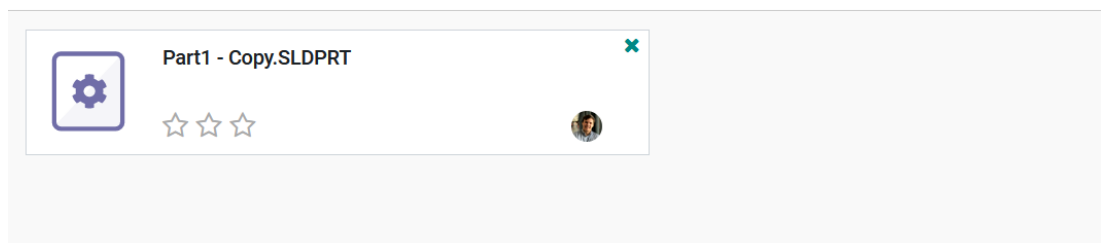
**Figure 43 ECO example**

談到這種缺乏上傳機會，我們可以注意到，在製作產品項目時，沒有直接上傳與產品相關的文件到項目的方式。在我們的情況下，我們有關於我們正在進行原型設計的零件的 CAD 文件，如果無法以任何方式上傳這些文件，從產品生命週期管理的角度來看，這將是一個完全的失敗。幸運的是，有一個解決方法。正如在第 5.1.3.5 節中所解釋的那樣，ECO 是一個與產品項目或物料清單相關聯的項目，允許上傳的文件附加到它。這是一個小的解決方法，但基本上意味著如果我們想以任何重要的方式將我們的 CAD 文件上傳到項目中，即使沒有進行“更改”，我們也需要發出一個 ECO。

It can only be assumed that this was part of Odoo’s team strategy to implement PLM as an external application in its ERP base. It is reasonable, but still, this is one of the few aspects of this software interface that is not as straightforward. It is an extremely valuable feature, but it is somewhat hidden. The documents icon appears in the top right corner (Figure 43) only after the ECO is created and saved.

UPLOAD

Filters Group By Favorites



**Figure 44 Overview of attached files to ECO**

可以假設這是 Odoo 團隊實施 PLM 作為其 ERP 基礎的外部應用程式的一部分策略。這是合理的，但仍然，這是這個軟件界面中少數不那麼直觀的方面之一。這是一個非常有價值的功能，但它有些隱藏。只有在創建並保存 ECO 之後，文件圖標才會出現在右上角（見圖 43）。

Since there is no direct integration between Odoo and the CAD software, uploading the file do not cause any automatic change to the product metadata. This is not ideal from the PLM perspective, still, it is a well implemented feature. By allowing product items to link directly to not only one existing ECO but to the list of all ECOs ever applied to the item, the software does well in tracking version control and development.

Something interesting that can be done for the sake of process control is adding quality control points to operations. This allows the responsible personnel to give feedback during the production regarding concerning points to the engineering team. In our case, we are concerned about 3D printing warping. This is something that happens when temperature varies to much during the 3D printing procedure. To this end a Quality Control Point item will be created (Figure 45) that will enquire with the operator to check if there is warping in the piece and mark pass or fail.

**Quality** Overview Quality Control Reporting Configuration

Quality Control Points / QCP00001

EDIT CREATE Action 1 / 1

QCP00001

Title	Check for warping	Control Type	All Operations
Products	PROTO Alpha Case PROTO Part A PROTO Part B and C	Type	Take a Picture
Operations	CaseFiction Design : Manufacturing	Team	Main Quality Team
Work Order Operation	3D Printing	Responsible	Lucas
		Worksheet	Do not update page

Instructions Notes

Print the part and check for warping from the 3D printing, take a picture for reference

0 Quality Checks

**Figure 45 Quality Control Point item for the prototype production**

由於 Odoo 與 CAD 軟件之間沒有直接集成，上傳文件不會導致產品元數據的任何自動更改。從 PLM 的角度來看，這並不理想，但這是一個良好實施的功能。通過允許產品項目直接鏈接到不僅是一個現有的 ECO，而且是適用於該項目的所有 ECO 的列表，軟件在跟踪版本控制和開發方面表現良好。

為了進行流程控制，可以做一些有趣的事情是在操作中添加質量控制點。這使得負責人員在生產過程中可以就有關點向工程團隊提供反饋。在我們的案例中，我們關注的是 3D 打印翹曲問題。這是在 3D 打印過程中溫度變化太大時發生的情況。為此，將創建一個質量控制點項目（見圖 45），該項目將要求操作員檢查零件是否存在翹曲情況並標記通過或不通過。

The last step of a prototype cycle would be the production of prototypes for testing and evaluation. Production is something quite straightforward in Odoo and really the point where everything we have done before come together. The metadata and the items that have been created allow us to start the Manufacturing Order (MO) (Figure 46). This, in turn, pull the necessary workorders from the operations and components listed in the BOM. The workorders appear for manufacturing operators and production can commence/be tracked.

Manufacturing Orders / New

[SAVE](#) [DISCARD](#)

[CONFIRM](#) [MAINTENANCE REQUEST](#) [DRAFT](#) [CONFIRMED](#) [IN PROGRESS](#) [DONE](#)

☆ New

Product:  [✕](#) [🔗](#) Scheduled Date:  [✕](#)

Quantity:  To Produce Responsible:  [✕](#) [🔗](#)

Bill of Material:  [✕](#) [🔗](#)

[Components](#) [Work Orders](#) [Miscellaneous](#)

Product	To Consume
[ABS-FIL] ABS Filament - Raw Material	1.00
[TPU-FIL] TPU Filament - Raw Material	2.00
<a href="#">Add a line</a>	

[Components](#) [Work Orders](#) [Miscellaneous](#)

Operation	Work Center	Scheduled Start Date	Expected Duration	Real Duration	Status
Assembly	Assembly Line 1		10:00		<a href="#">🔗</a> <a href="#">🗑</a>
3D Printing	Prototyping Station		120:00		<a href="#">🔗</a> <a href="#">🗑</a>
3D Printing	Prototyping Station		60:00		<a href="#">🔗</a> <a href="#">🗑</a>
<a href="#">Add a line</a>					

**Figure 46 Depiction of the manufacturing order**

原型週期的最後一個步驟將是為測試和評估而生產原型。在 Odoo 中，生產是



非常直接的，也是我們之前所做的一切都匯聚在一起的關鍵時刻。已經創建的元數據和項目使我們能夠開始製造訂單（MO）（見圖 46）。這反過來會從 BOM 中列出的操作和零件中提取所需的工單。工單會顯示給製造操作員，生產可以開始/被跟踪。

For the most part this operation is very well automated and clear. There are however a few problems that are result of structural changes from Odoo V13 to Odoo V14. For a long time, the software ordered the operations to be carried out using an extra item class called ‘Route’. These were a fundamental part of how the product moved within the inventory and manufacturing, but for some reason, was dropped in the manufacturing aspect of the new version in favor of a simplified sequence data built into the BOM. As of the writing of this work, there have been reports of problems and confusions regarding how that works, which are aggravated by the fact that material explaining the use of this functionality are either nonexistent or still referencing old versions of the software (in which ‘routes’ are still in use).

The avid reader will notice in Figure 47 that the order in which operations are being made available are not in the correct sequence. This is due to exactly this problem and for now the only solution is to count on the awareness of the operators regarding the order of production or manually scheduling the operations in the plan tab. During the period of research for this work (before Odoo V14) familiarization experiments were made in which there were no problem of this nature. In addition, there are examples online even from Odoo website demonstrating the use of routes and how they are useful for this exact situation.

<input type="checkbox"/>	Operation	Work Center	Manufacturing Order	Scheduled Start Date	Expected Duration	Real Duration	Status
<input type="checkbox"/>	Assembly	Assembly Line 1	WH/MO/00002	11/04/2020 18:08:19	10:00	00:00	Ready Start Block
<input type="checkbox"/>	3D Printing	Prototyping Station	WH/MO/00002	11/03/2020 17:08:19	120:00	00:00	Ready Start Block
<input type="checkbox"/>	3D Printing	Prototyping Station	WH/MO/00002	11/04/2020 09:38:19	60:00	00:00	Ready Start Block


**Figure 47 Overview of the resulted Work Orders**


在很大程度上，這個操作是非常自動化和清晰的。然而，由於從 Odoo V13 到 Odoo V14 的結構性變化，出現了一些問題。長時間以來，該軟件通過一個名為“路線”（Route）的額外項目類來指示進行操作。這些是產品在庫存和製造中移動的基本部分，但出於某種原因，在新版本的製造方面中被取消了，改為在 BOM 中內置了簡化的順序數據。截至撰寫本文時，有關該功能如何工作的問題和困惑的報告已經出現，這些問題更加嚴重，因為解釋該功能使用的資料要麼不存在，要麼還在引用舊版本的軟件（其中“路線”仍在使用）。

熱心的讀者將會注意到圖 47 中操作可用的順序並不正確。這正是由於這個問題，目前唯一的解決方案是依賴操作員對生產順序的意識，或者在計劃標籤中手動安排操作。在進行本研究的期間（在 Odoo V14 之前），進行了熟悉性實驗，其中並沒有這種性質的問題。此外，甚至從 Odoo 網站上也可以找到示例，展示了如何使用“路線”及其在這種情況下的用途。

The problem has been reported by other people (Figure 48) to the Odoo company and is been and hopefully it will be resolved shortly (this is after all a extremelly recent version of the software). That been said, it is a problem even if it is a minor one.

## ☆ Problems with V14 - Manufacturing and inventory

**Sharon Marckado erez**  
8 octobre 2020

**version**  
missing

s262811@studenti.polito.it

S'inscrire


Hello to the Forum.... we are starting to use the online odoo 14 in our small Manufacturing company. We are having serious problems with version 14 vis-a-vis version 13. For example in manufacturing the whole area of routings is gone. you can do some routings in the BOM of an item...but in a very clumsy way. another problem in Inventory - when defining a location for a WH- it is no longer possible to define the physical localisation - as it was in version 13....(corridor, shelve, height...) - did we get some king of Beta version of Odoo 14 ? is anyone else having the same problems ? Many thanks

Répondre


Commentaire

Partager

2 Commentaires

**Matthew Harrison** - 15 novembre 2020

Why is the documentation not reflecting that decision?  
[https://www.odoo.com/documentation/user/14.0/manufacturing/management/manufacturing\\_order.html#manage-manufacturing-without-routings](https://www.odoo.com/documentation/user/14.0/manufacturing/management/manufacturing_order.html#manage-manufacturing-without-routings)

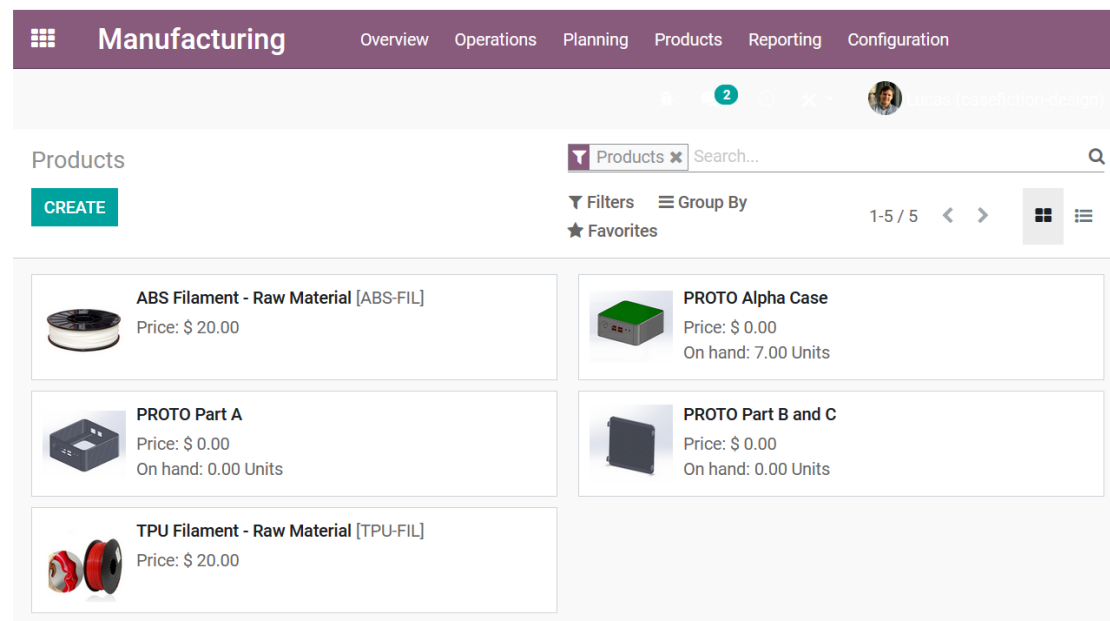
**Lucas** - 7 novembre 2020

I am having the same issue. I cannot find the proper way to order the operations. all material i find on ordering the manufacturing operations is for V13 and it explains how to do it through routing. My final product is composed of of 3 parts that are also manufactured by me and i added them as (Kit) BOMs to my final product BOM. the problem is that there is nothing stoping me from assembling the unit before manufacturing the parts.  
  
The page :  
[https://www.odoo.com/documentation/user/14.0/manufacturing/management/routing\\_kit\\_bom.html#finished-product-kit-component-havent-the-same-routing](https://www.odoo.com/documentation/user/14.0/manufacturing/management/routing_kit_bom.html#finished-product-kit-component-havent-the-same-routing)  
  
Which should be the instructions for V14 regarding this issue rely heavily on the use of routes ... that do not exist....

Figure 48 Image of Odoo forum question regarding routes

這個問題已經被其他人向 Odoo 公司報告了（見圖 48），並且正在解決中，希望它會很快得到解決（畢竟這是一個非常新的軟件版本）。這樣說來，即使這只是一個小問題，它也是一個問題。

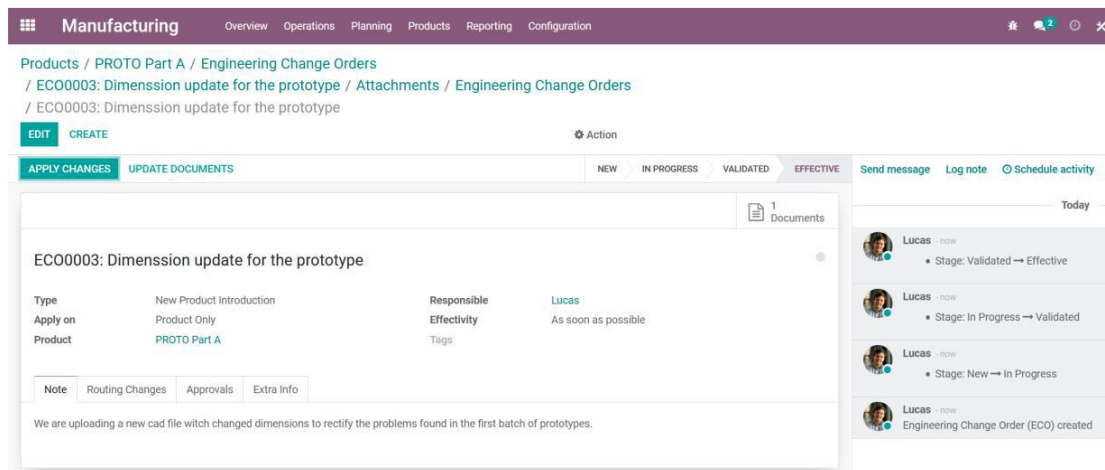
The manufacturing process was repeated 7 times (Figure 49) to simulate a small batch of prototypes for testing and tolerance checking. It is rare to get a perfect prototype in the first batch, for this reason it was chosen to represent correction through the simulation. In this simulation this problem was a fit problem that resulted in a change of dimension of PROTO Part A.



**Figure 49 Overview of the products after manufacturing**

製造過程被重複了 7 次（見圖 49），以模擬一小批原型進行測試和公差檢查。很少能在第一批中得到完美的原型，因此選擇通過模擬來代表修正。在這個模擬中，這個問題是一個適合問題，導致了 PROTO 零件 A 尺寸的變化。

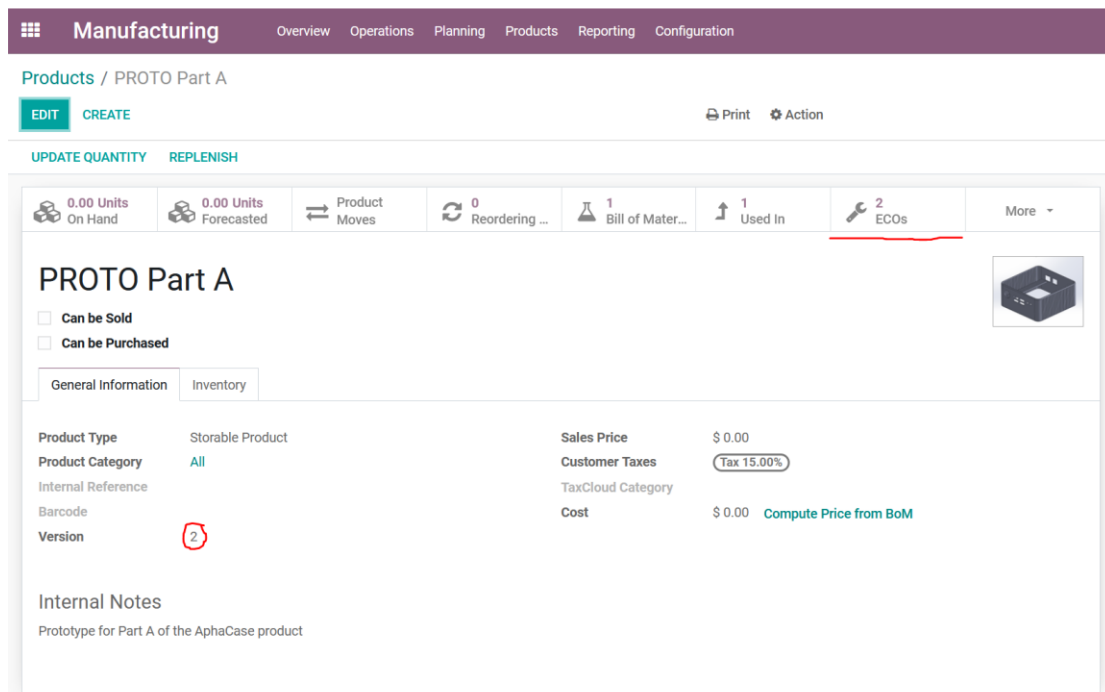
This give us the opportunity to use ECOs for their actual purpose, stablsh and control a change to the product item. The changes to be carried out were on the CAD file regarding the product item. As before we can start the ECO and fill in the description, then the files are uploaded, and the ECO (Figure 50) goes through necessary validation before been made effective.



**Figure 50 Depiction of the validation of the ECO**

這給了我們利用 ECO 的實際目的的機會，即確立和控制對產品項目的更改。要進行的更改是針對產品項目的 CAD 文件。與之前一樣，我們可以啟動 ECO 並填寫描述，然後上傳文件，然後 ECO（見圖 50）在生效前經過必要的驗證。

The validation procedure basically is set to ask for validation of someone with proper access permissions or specific personnel. In this case, the master account was used to validate and make effective as can be seen from the log in the right side of the image. Once the change is applied you can see that the product item version has been iterated to version 2 as well as a new ECO has been added to the list of ECOs linked to the item (Figure 51).



**Figure 51 Depiction of changes provoked by the ECO to product item**

驗證程序基本上設置為要求具有適當訪問權限或特定人員進行驗證。在這種情況下，主帳戶被用來進行驗證和生效，正如圖像右側的日誌所示。一旦更改應

用，您可以看到產品項目版本已經迭代為版本 2，以及新的 ECO 已經添加到與該項目相關聯的 ECO 列表中（見圖 51）。

That update is followed by another batch of prototypes, the cycle would continue until the prototypes produced satisfy the criteria established by the design team. In the case of this simulation it was assumed that one correction was representative enough of this process. This finalizes the development from idea to prototype.

隨後是另一批原型，這個循環將持續進行，直到所生產的原型滿足設計團隊確立的標準。在這個模擬中，假設一次修正已經足夠代表這個過程。這樣完成了從構想到原型的開發過程。

Now that the prototype phase is complete the focus will shift to the process. As established before, it was decided to separate the prototype products from the final product item to isolate the product from the production process during the development. This way many aspects of development of the product could be evaluated in an ordered manner. Now that the process is been developed it seems reasonable to create the product items that will represent the final products since the product of a successful run of the process will be the production ready samples of it (Figure 52).

現在原型階段已經完成，焦點將轉移到流程上。正如之前所確定的，決定將原型產品與最終產品項目分開，以在開發過程中將產品與生產過程隔離開來。這樣，產品開發的許多方面可以有序地進行評估。現在流程已經開發，創建代表最終產品的產品項目似乎是合理的，因為成功運行該流程的產品將是其生產就緒樣本（見圖 52）。