**3D Printing Case Study **

In late 2015, Mark Peterson acquired a 3D printer from Best Buy for $500. As he began to play around with it, he discovered that he could use designs he downloaded from the Internet to create a wide variety of objects. One day as he was exploring designs on the website MyMiniFactory.com (<https://www.myminifactory.com/>), he came across a category of accessibility items. He was very excited to discover such things as an umbrella holder for a wheelchair, because his brother Peter uses a wheelchair for mobility. He downloaded the umbrella holder design and made one for Peter. The first time Peter used the umbrella holder, several people came up and asked him where he had gotten it. Of course, he was proud to say his brother had made it, but he had no idea how much it would cost for Mark to make one for a customer. Peter took the names and phone numbers of two people he encountered and promised to get back to them. When Peter approached Mark with the requests, Mark knew that he had found the start of something good. He figured out what the time and material cost would be to make the holders, called the interested parties, and made his first two sales.

As he continued exploring, Mark ran across an article describing ten 3D printable assistive and accessibility devices (<https://3dprint.com/126214/103dp-devices-for-the-disabled/>). After investing in a heavy duty 3D printer, Mark used his Facebook page to advertise his growing business in 3D printing assistive and accessibility devices. He soon had many orders and his 3D printing hobby became his fulltime occupation.

Mark rented space in an industrial park, bought two more wireless 3D printers, and hired two part-time assistants. He brought his PC from home to control the 3D printers, and set up an Internet connection using Verizon FiOS. His PC is connected to a FiOS modem which has a built-in wireless router. Mark obtains his 3D printing designs from sources on the internet. He uses Google email and keeps track of his orders on a spreadsheet on his PC.

**Mark's Expansion Plan:** Now, just three months later, he is ready to add seven more 3D printers and a 3D scanner, and hire five fulltime employees. Before he grows that much, he needs to set up his IT infrastructure to manage not only the additional 3D printers, but also to manage his business. He wants to implement a small business enterprise resource management (ERP) information system in his facility to help him manage his business (customer orders, invoices, supply ordering, employees, etc.) more effectively. He realizes he will also need a document printer to print invoices, etc. In addition, he wants each of his employees to have mobile access to the ERP system and the 3D design files and printers from anywhere in the facility, and he wants as much flexibility in which computers control which 3D printers as possible. He has a large collection of 3D print design files and has downloaded some training videos that he will use to train his new employees. Mark has already decided that he wants to store all of his 3D production files and his business management information locally in his facility, and to use cloud storage for his backup files.

**Your assignment**, which will be done in four stages, is to assist Mark in understanding what kind of infrastructure he needs; how it would be configured; how it will change when his business grows into a much larger, multi-location operation; and how the various devices communicate with each other. Specific instructions for each of the four staged assignments may be found under the Assignments tab.