The Position of Siemens Industry Regarding the Internet of Things and Industrie 4.0

The following article was written in connection with an interview carried out by Ulrich Sendler with Anton S. Huber, CEO of the Division Digital Factory at Siemens. The article represents the view of Siemens Industry.

The Internet revolutionizes the economy

Some call it the Internet of Things (IoT) while others call it Industrie 4.0. In both cases, what is meant is more or less the same – the extensive networking of humans and machines and the resulting (and truly new) implicit and explicit actions and reactions that are leading to a change of paradigm.

As well as humans, who in the past have used the Internet to communicate while generating ever-increasing amounts of data, there now must be added devices and machines that also are capable of transferring very large data volumes into the network. The gamut runs all the way from soft drinks dispensers that must be refilled through to a company that manufactures T-shirts and requests the desired sizes and printing from its customers via the Internet. But they have one thing in common – with the Internet technology available today, every order can now be processed much faster than was possible even just a few years ago.

All of the leading experts are now of the opinion that in future the data fed into the Internet by “things” will make up a greater proportion of the data circulating there than the information and data input by humans.

In the current definition, Industrie 4.0 is only concerned with a part of IoT, namely that part that affects the manufacturing industry. Even although one can assume that the manufacturing industry will distribute large amounts of data over the Internet, it will still only represent a fraction of the entire data volume present there. Even though just a (quasi-) junior partner in the network, this represents a very special challenge for the manufacturing industry. It must be able to bring its specific technical requirements for secure and economically efficient operations – which are considerable – into the Internet infrastructure and ensure that these are taken into account in further development of any sort.
As a global real-time communications platform, the Internet acts as an enormous accelerator of business processes around the globe and is now capable of reaching out to both manufacturers and consumers in the most faraway places. It enables both small and big companies to very quickly synchronize activities with their business partners and makes possible direct contact to the end customer. Make-to-order manufacturing and just-in-time delivery to the customer are becoming decisive competitive factors for more and more industries. This development has for quite some time not only affected the manufacturers of consumer goods, but also the automobile industry, aerospace and the manufacturers of certain types of machines, plant and components. Mass customization is expected almost everywhere, as are individual products manufactured at speed but at mass-manufacturing costs.

These market requirements and the resulting competitive pressure means that manufacturing companies are faced with unprecedented challenges. The fast-approaching upheaval can therefore be better seen as a revolution – in this case the Fourth Industrial Revolution.

The Industrie 4.0 initiative, started by German industry and supported by the Federal Government, has as its goal the creation of the necessary framework conditions to permit German industry – in particular mid-range manufacturing companies – to achieve the transformation to an Internet-based industry and economy and in this way retain or even extend the German industrial manufacturing base.

**Every company desires its own Digital Enterprise Platform**

Because the transformation will only occur gradually, specific technical solutions will in the coming years differ from industry to industry and even from user to user depending on current IT usage and the specific market and business needs. The individual solutions themselves, however, will be more and more based on joint standards and common technological platforms – as represented by the Internet itself.

In spite of its immense resources, it is not possible for Siemens alone to create a complete portfolio containing all the necessary products and technologies for Industrie 4.0. The choice made by Siemens is therefore based on a long-foreseen development, namely that all the value creation steps in the industry will require end-to-end support by software tools. This is the only way that the humans involved, and even the companies themselves, will be able to deal with the enormously increasing technical and process complexity and also achieve the huge rise in flexibility and speed demanded by the Internet economy. This is at the heart of the Digital Enterprise, and it is a precondition for Industrie 4.0.
Siemens is convinced that every company will have to develop its own comprehensive digital enterprise platform on the way to the Digital Enterprise. It includes machines, automation systems and in particular the software tools that are starting to play an ever-greater role in all these areas. Siemens has set itself the goal of supporting its customers in building such platforms from engineering through to automation.

**Continuous digitalization of the value creation chain**

Siemens Industry has invested a large part of its total investment in the last 15 years in building up and extending its software portfolio. This portfolio serves to support the entire industrial value creation chain, from product definition through to after-sales service. The suite of software, the extension and integration of which continues to be pursued with vigor, is called the “Digital Enterprise Software Suite”. Today it already offers the basic software framework needed by companies wanting to maintain their position in the Internet industry.

The beginning and the basis of digital company is a joint data storage and data management system. Teamcenter from Siemens PLM Software is the leading software product for data management on the
market and permits Siemens to offer its customers a secure and long-term foundation for all follow-on software investments.

**Machine Learning and the topic of cybersecurity**

The wide-ranging digitalization of industrial processes and the software tools provided for processing purposes will lead to a massive increase in data volumes. “Big Data” is often referred to as the major challenge here but it should be noted that for various reasons this data differs significantly from the data generated in the world of consumer goods and individual user apps. In many cases, industrial data represents a considerable portion of the value of the company. For this reason alone it is hardly ever made freely available to third parties because by using data mining tools they could carve it up and, with their own business model, use it to generate profit – as can already be seen across large swathes of the consumer world. In addition, manufacturing industry applications represent only a small niche in the huge worldwide data universe, meaning that the corresponding technologies and tools can hardly be driven or even influenced by this industry.

In spite of this, the analysis tools that are coming into being and the further-developing possibilities of machine learning will lead to optimization in industrial processes. New business activity opportunities will result, especially in the coupling of the Internet with the areas of remote service and predictive maintenance. This is exactly where Siemens has positioned itself with its new cloud-based service platform. The huge amounts of data continually produced by machines and systems must be clearly agreed between the manufacturers and the customers in order to make the data usable. In the past this was carried out by means of hosted solutions, but in the future Siemens will offer a cloud-based solution for this purpose.

In conclusion, another important point should be addressed that forms part of the discussion concerning Industrie 4.0, but whose effects are still not well understood or assessed. This is the so-called cybersecurity.

As soon as data that needs to be protected, for example that emanating from machine controllers or transport systems, is found in the public infrastructure of the global Internet, a new class of risk arises that is currently difficult to delineate. The effort needed to ensure that this data is protected, whether it is one’s own data or that of a customer, can very quickly and very considerably exceed any advantage that use of this public infrastructure can bring. Moreover, it is worth noting that nations may perceive that their national security and even their sovereignty interests are threatened by the global Internet infrastructure. Although difficult, it is possible to imagine that a country could switch off its major companies or even entire industries operating in its jurisdiction when in times of crisis the country exercises its sovereign rights and limits or switches off territorial data transport. A “control in the cloud” concept for global manufacturing networks would in such circumstances quickly lose its value.

It is therefore a matter of urgency that a detailed risk analysis for Internet-based IT/control applications is undertaken, not only regarding the potential use of such concepts but also regarding the decision as to whether such concepts should be developed at all. Any return on a corresponding investment could quickly disappear into thin air.

**Kommentar**