



Talk on “Digitalization & Predix: An Overview” by Ir. Amir Hussein bin Jaafar and Dr Siow Chun Lim

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The Electrical Engineering Technical Division (EETD) has successfully organised a technical talk on “Digitalisation & Predix: An Overview” on 30th October 2017 at Wisma IEM. The speaker, Mr. Gabriel Tse (Gabe), is currently the Director of Digital & Growth Initiatives ASEAN at General Electrics. Gabe started his presentation by providing the global context of digitalisation and IoT. Numerous examples of digitalisation of industrial applications have been covered. For instance, predicting motor-pump failure. Typically, there are 6-7 types of transducers be it sensors and instrumentations are required to monitor vibration, thermography, heat, smoke and several other parameters.

As the result, failure predictive curves can be generated. For instance, the condition of certain motor parts against time. Analysis of such curves allow determination of the point of time at which failure would most likely happen. Then, actions can be thought of to move the prediction point further to the left to allow earlier detection of failure thus reducing downtime costs. Another example quoted was the spectral analysis of electric pump audio. Each behaviour of the motor for instance when it is running normally, suddenly accelerates or bearing’s noise exhibits unique signal signature.

By superimposing the present audio curve on the distinctive curve, the type of abnormality in the motor’s condition can be identified. The mechanical integrity of a physical system can also be monitored real time with the provision of continuous visibility of thermal n thickness inspection.

Gabe then went on to highlight the main differences between industrial Internet and Internet alone. Table 1 summarises the comparisons.

Table 1: Comparison between Industrial Internet against the Internet alone

Aspect	Internet	Industrial Internet
Data volume	Terabytes of data per day	Petabytes of data per day
Events of interest	Millions per day	Few per year
Predictive analytics	Correlation is sufficient	Causation is required
Security	Mostly user-managed	Multi-layer security
Cloud-edge	Mostly reactive	Edge controls and optimisation

Before moving on to introduce the Predix platform, Gabe first briefly introduced GE's main business which includes power plant, utility, jet engine, factory, locomotive, hospital and turbine. Next, Gabe highlighted the dire need of a platform to collect, organise and analyse massive amount data in the industries which then calls for the creation of Predix.

Predix is a cloud-based platform which enables industrial-scale analytics for asset performance management (APM) and operations optimization by providing a standard way to connect machines, data, and people. Predix allows cross technology data sharing to create values like efficiency, cost, profitability, security, connection and downtime. It catalyses faster software development and is an open source platform for client. Predix, as the operating system for industry, provisions a spectrum ranging from machine connectivity to industry insight. Built for industry with the domain expertise for many years coupled with the application and analytic for IoT usage cases allows Predix to provide competitive advantage to its users.

The last interesting technology introduced by Gabe was the concept of digital twinning. Digital twin is a learning digital version of a physical asset. In other words, it is a physical asset consisting of a physical model and machine learning. Digital twin marries artificial intelligence, machine learning and data analytics to generate digital simulation models which replicates the behaviour of their real physical counterpart. By having a digital twin, resources can be optimised and productivity can be increased for industries like manufacturing.

The talk concluded with presentation of token of appreciation by EETD to Gabe as shown in figures below.

