

Building factory level data collection framework for APC/FDC applications - Chikfufumi Tsuchiya

ctsuchi@jp.ibm.com

IBM Japan Services Company Ltd.

Kawaramachi NNN Bld, 733 Uematsu-cho, Shimogyo-ku, Kyoto 600-8028 Japan

Phone: +81 -(75)365-5673 Fax: +81-(75)351-7869

The data collection from manufacturing tool is very important subject for EES (Equipment Engineering System). There are two types of EES. The one is local EES (L-EES) which takes care of one specific tool or process. The other type is factory level EES (F-EES) which requires data from any tools in factory. As for L-EES application, the tool vender may be the best provider because they can retrieve data from manufacturing tool using their proprietary point-to-point (P2P) access. But, P2P approach may not be the best way of data collection for F-EES applications. Because there will be many tools and applications in a factory, building proprietary system for each application and its dependent tools makes system too complicated. It brings not only less operability for users, but also less maintainability and manageability for IT persons. That's why we introduced a common framework of data collection for F-EES applications such as APC and FDC.

The purpose of building the data collection framework are a) unified management of data collection plan for all tools and applications in factory which makes engineers easier to configure data collection, b) unified interface to the F-EES application which makes IT persons easier to develop and maintain applications.

The followings are capabilities required for data collection framework.

Data collection plan management – provide a way to define what kind of data should be reported from a tool and how the data should be distributed to applications. This capability should be provided by a *rich user interface* to make it easy to view and modify these definitions.

Data collection – receives data reported from tools according to the protocol.

Data distribution – distributes the data to application which is registered as a subscriber. The data should be tailored for subscribing application and formatted independently from the tool and protocol of the data source. Also it is better to enrich the data by attaching *MES context*.

The MES solution SiView Standard provides Data Collection Service (DCS) as a framework for data collection for supporting F-EES. The figure 1 shows a big picture of F-EES framework. DCS is a central component of the F-EES framework. DCS manages data collection plan for tools, receives data from tools and publish data to any applications such as APC, FDC and so on.

The DCS consists of following four components, a) data collection plan, b) data collection (EI), c) stream data processing, d) data distribution.

The *data collection plan* component provides a GUI (figure 2) to define what kind of data will be reported from manufacturing tool and how the data should be distributed. The information defined by this component will be used by other runtime components. It also provides function to monitor the data collection.

The *data collection* component is an interface to manufacturing tool. Currently GEM/SECS and EDA (Interface-A) are supported protocol. In case of GEM/SECS, it is integrated to tool control system. It interacts for setting data collection plan to tool and receive data from tool. This component does not have to care the content of the reported data. It just sends data to stream data processing component.

The *stream data processing* component receives data transferred by data collection component. It analyzes the raw data and interprets it based on data collection plan. It also maps the data to MES context using Lot ID and Wafer ID and so on provided by MES. Finally it sends the data to data distribution component attaching MES context.

The *data distribution* transforms data to XML which is tailored to each subscribing application according to data distribution plan. The data contained by XML is formatted as “name-value” pair in order to make it easy to handle it.

This paper describes what will be provided by data collection framework.

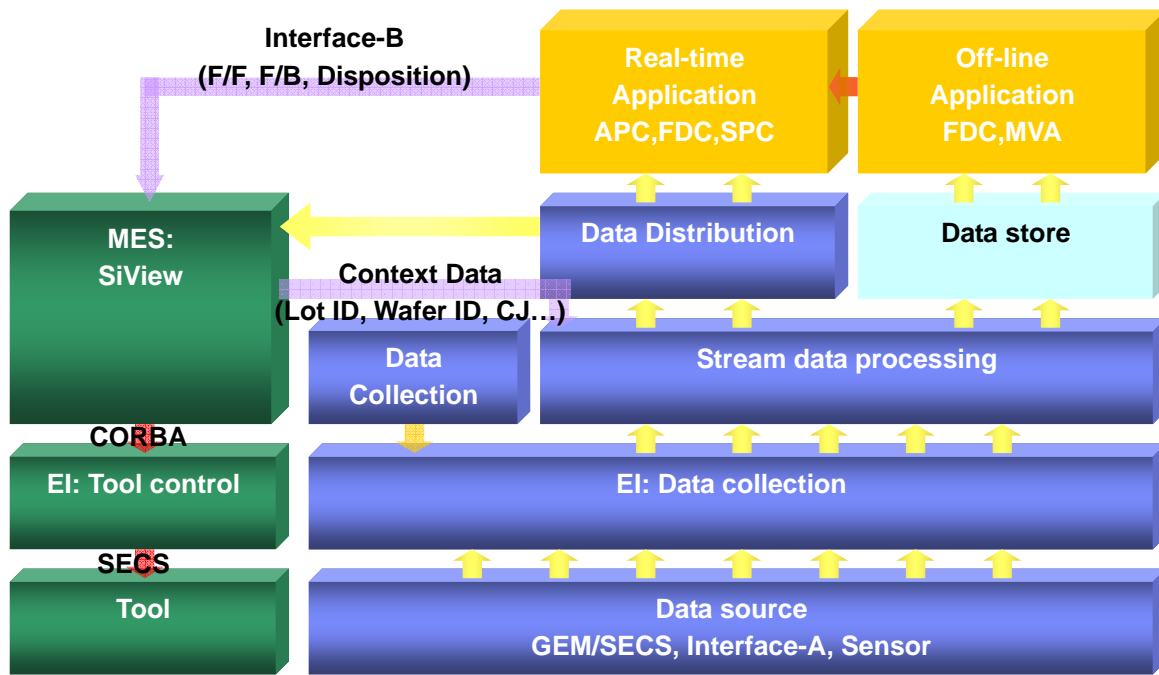


Figure1. Big picture of F-EES Framework

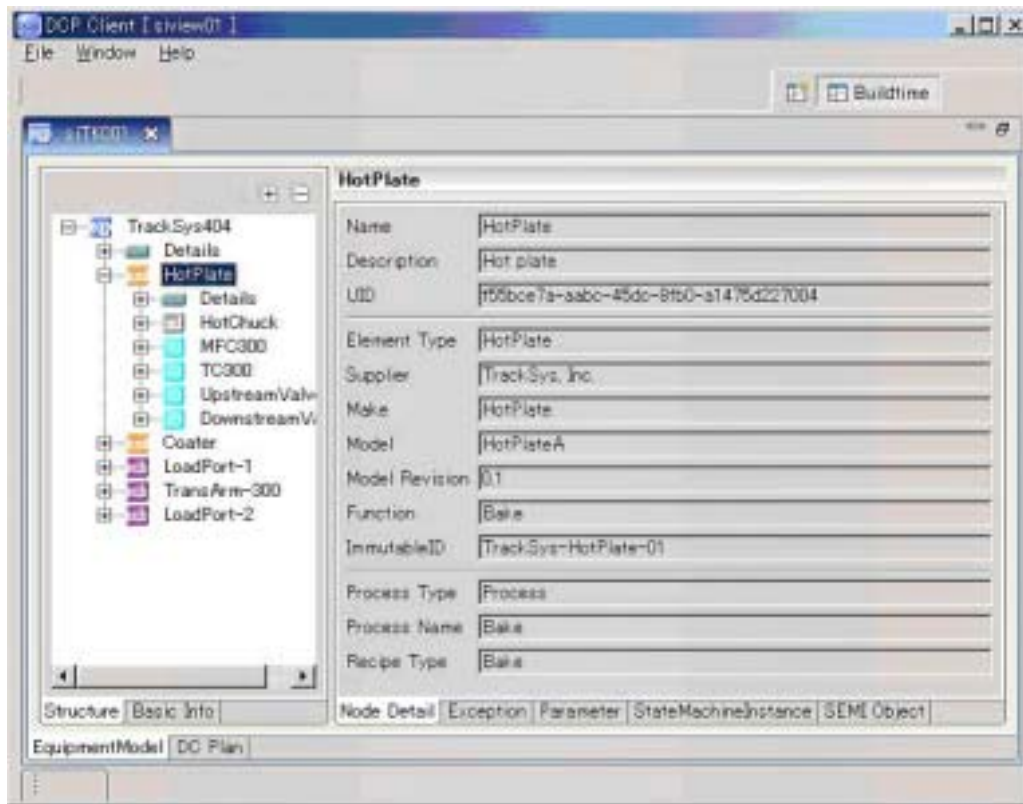


Figure2. GUI of data collection plan component