



## MANUFACTURING SERVICE BUS THE FLEXIBLE SOLUTION FOR DIGITIZING PRODUCTION PROCESSES

### Fraunhofer Institute for Manufacturing Engineering and Automation IPA

Nobelstrasse 12 | 70569 Stuttgart  
Germany

#### Contact

Daniel Stock  
Phone +49 711 970-1215  
daniel.stock@ipa.fraunhofer.de

Daniel Schel  
Phone +49 711 970-1559  
daniel.schel@iap.fraunhofer.de

[www.ipa.fraunhofer.de](http://www.ipa.fraunhofer.de)

#### Starting point

Organizational and technical processes in the manufacturing industry are becoming ever-more complex. In order to keep on top of things, companies need the right IT support. If enterprises want to improve and speed up their planning processes, their IT has to be capable of digitally modeling the manufacturing environment in realtime.

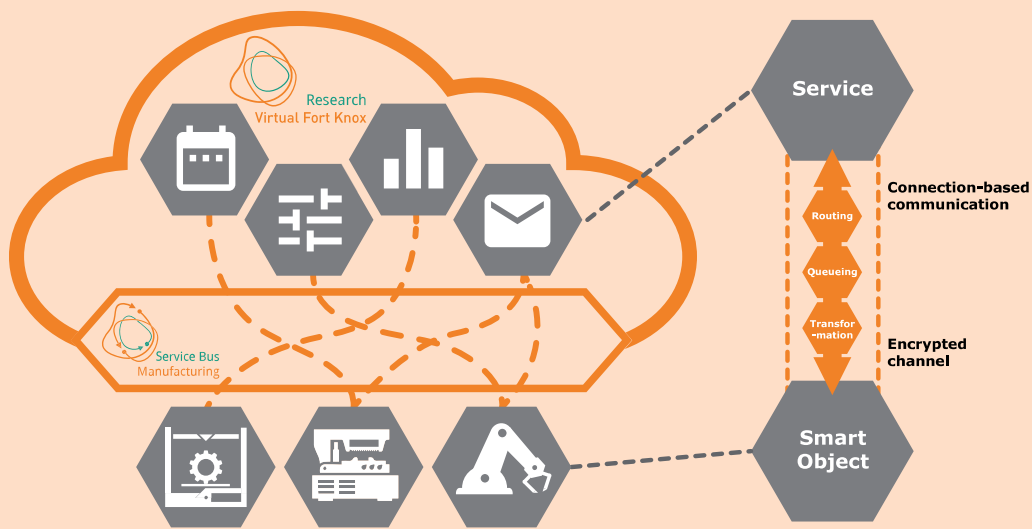
The greatest challenge is in integrating different systems. This can only be achieved by interlinking IT infrastructures, cloud platforms, cyber-physical production systems (CPPS) and digital services, with the latter representing business processes.

Communication between these components is generally difficult due to varying interfaces, data formats and transport protocols. Current solutions do not offer flexible integration mechanisms and can only be extended with great difficulty.

#### Solution

For some years now, Fraunhofer IPA has concerned itself with digital manufacturing tools and has developed a flexible integration concept for networking factories in an intelligent way. It is based on the idea of so-called service oriented architectures and builds upon the cloud platform "Virtual Fort Knox", which is capable of both providing and consuming IT systems. The platform is equipped with a homogeneous, service-based integration layer called a "Manufacturing Service Bus" (MSB).

The MSB is a key element of numerous research and industrial projects at Fraunhofer IPA. It serves as a universal interface for connecting and integrating different CPPS and digital tools. The links between the two are freely-configurable and can be flexibly adapted to suit environmental conditions. As a result, the MSB helps to control the ever-increasing flow of infor-



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mation in today's factories. It also enables different new and old communication and integration technologies to be used together.

### Realization

The MSB integrates all the production control systems into the IT structure, including strategic and analytical business services. The necessary digital tools can be flexibly integrated and shifted to the cloud, where they efficiently process data from any location. These distributed services can be interlinked and form the MSB-architecture.

To network the systems, the following integration services are necessary:

- Routing services
- Data transformation services
- Orchestration services

A particular feature of routing services is their ability to monitor certain events or changes in the status of production processes. For example, if there is a disruption in the production sequence, the services send a message based on defined rules to the respective recipient, who then initiates corrective actions.

Data transformation services enable information to be exchanged between different digital tools by converting data by converting data into a meta data model.

Any events arising are transferred by the orchestration services. For this, the company defines process descriptions for

sub-processes. The orchestration services use a workflow management system to control all process steps.

With these integration services, the MSB acts as a "multifunctional digital bridge" between the cyber-physical environment of the production facility and the digital tools.

### Our Services

Fraunhofer IPA helps you to digitize your processes and implement Industrie 4.0. We provide assistance as you integrate your production and IT landscape based on the Manufacturing Service Bus - from analyzing your opportunities and options, through drawing up a digitization concept tailored to your needs, right up to its implementation.

### Your advantages

Make your production and IT landscape more flexible by:

- Optimizing and integrating your systems flexibly into your IT landscape
- Making business processes more effective and adapted to your dynamics
- Improving the operative management of your organization/production facility
- Increasing ease of use
- Implementing safe process automation and secure data exchange

1 *The Manufacturing Service Bus connects cyber-physical manufacturing systems to digital services via encrypted channels.*