



Supplement: Abbreviations and General Terms

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This document is intended as a supplement. It provides a list of abbreviations and a list of general terms used within the ADVENTURE project and particularly in the project's deliverables.



Table of Contents

1	Introduction.....	3
2	List of Abbreviations.....	4
3	List of General Terms.....	6

1 Introduction

This document provides a supplement, for example supporting the project's deliverables. The document contains a list of abbreviations and a list of general terms used within the ADVENTURE project and particularly in the project's deliverables. As new abbreviations and new terms will certainly occur during the project, an online list of abbreviations and a corresponding online glossary is provided on the project's homepage (www.fp7-adventure.eu), which can easily be updated by all partners. Regular updates based on these online lists of abbreviations and general terms will be provided to this supplementary document.

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2 List of Abbreviations

A

ASCC Advanced Supply Chain Collaboration

B

B2B Business to Business

BPC Business Process Compliance

BPMN Business Process Modelling Notation

C

C2K Control2K

CAD Computer Aided Design

CCP Common Configuration Platform

CCRP Customer Complaint Resolution Protocol

CNC Computerised Numerical Control

CTP Capable to Promise

D

DA Distribution Automation

Deliver IT Delivery Information Technology

DOW Description of Work

E

EDI Electronic Data Interchange

EI Enterprise Interoperability

EMS Electronic Manufacturing Service

EPC Event-driven Process Chain

ERP Enterprise Resource Planning

F

FInES Future Internet Enterprise Systems

FoF Factories of the Future

G

GUI Graphical User Interface

I

ICT Information and Communication Technology

IED	Intelligent Electronic Device
IP	Intellectual Property
IPR	Intellectual Property Rights
IT	Information Technology
M	
MES	Manufacturing Execution System
O	
OLE	Object Linking and Embedding
OPC	OLE for Process Control
OTD	On Time Delivery
P	
PCBA	Printed Circuit Board Assembly
PCF	Product Carbon Footprint
PLC	Programmable Logic Controller
S	
SCM	Supply Chain Management
SME	Small and Medium Sized Enterprise
SMS	Short Message Service
SOA	Service-oriented Architecture
SOTA	State of the Art
U	
UI	User Interface
V	
VF	Virtual Factory

3 List of General Terms

Active ADVENTURE Member

Performing ADVENTURE Adoption for a Passive ADVENTURE Member lets the Factory become an Active ADVENTURE Member. Active ADVENTURE Members can be ADVENTURE Brokers and use all of ADVENTURE's possibilities while Passive ADVENTURE Members can only be part of a Smart Process another Active ADVENTURE Member has created.

ADVENTURE Adoption

The process of

1. Setting up the necessary hardware and software to use the ADVENTURE Dashboard and the tools ADVENTURE provides,
2. Integrating the ADVENTURE Platform with the systems used in the factory, e.g. ERP systems, etc.
3. Performing the ADVENTURE Provisioning for the factory

ADVENTURE Broker

1. The person who designs / creates / adapts a process and proposes business opportunities to ADVENTURE Members.
2. The person who watches / supervises the Smart Process while it's in the Execution Phase.

The ADVENTURE Broker will usually be an employee of the factories company and is the person who uses the tools provided by ADVENTURE using the ADVENTURE Dashboard. The subparts 1) and 2) could be different persons with a different set of access rights though.

ADVENTURE Business Environment

All factories that can be part of ADVENTURE Smart Processes (all ADVENTURE Enabled Factories) are called the ADVENTURE Business Environment.

ADVENTURE Business Model

ADVENTURE Business Model is a new business model, established by the virtue of the new possibilities of doing business provided by ADVENTURE.

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ADVENTURE Dashboard

The ADVENTURE Dashboard is the graphical user interface for all ADVENTURE components. The ADVENTURE Dashboard is the entry-point for all ADVENTURE users and roles and gives access to the applications developed in ADVENTURE.

ADVENTURE Facilitator

The person who performs the ADVENTURE Adoption in a real factory. The ADVENTURE Facilitator can be an employee of the factory where ADVENTURE is about to be adopted, or can be an employee of the company that the factory belongs to, or even an employee of a partner company, which is interested in the factories' participation in ADVENTURE.

ADVENTURE Framework

The Framework provided by ADVENTURE consists of the ADVENTURE platform, the ADVENTURE methodology, and the ADVENTURE knowledge base.

ADVENTURE Knowledge Base

The ADVENTURE Knowledge Base is a knowledge and information repository that encompasses patterns, guidelines, best practices, reference models, etc. for the context of ADVENTURE and the ADVENTURE Methodology.

ADVENTURE Member

An ADVENTURE Member is a (real) factory that has become part of the ADVENTURE Business Environment. As long as a factory has only performed ADVENTURE Provisioning, it is called a Passive ADVENTURE Member, when it has additionally performed ADVENTURE Adoption, it is called an Active ADVENTURE Member.

Every Passive ADVENTURE Member and Active ADVENTURE Member can also be referred to as ADVENTURE Members, and the sum of all ADVENTURE Members is called the ADVENTURE Business

ADVENTURE Methodology	Environment. The ADVENTURE Methodology is a guideline to perform ADVENTURE Adoption and for running the states of a Virtual Factory Lifecycle. It includes a reference guideline for the conception, development and run of virtual factories in collaborative environments. This methodology is supported by several tools, including a Business Model framework, a Business Process Catalog, a set of best practices and a technological platform – the ADVENTURE platform.
ADVENTURE Platform	The complete technological and software components of ADVENTURE.
ADVENTURE Process Editor	The ADVENTURE Process Editor is graphical tool integrated in the ADVENTURE Dashboard to design Smart Processes in a BPML kind of language.
ADVENTURE Provisioning	The process of identifying the necessary data about a Factory and its processes, that are needed to take part in Smart Processes, and the formatting of this data in appropriate ways (so the data is compatible with the ADVENTURE Repository) and the process of putting this data into the ADVENTURE Repository. ADVENTURE Provisioning is supported by the ADVENTURE Methodology and a Data Provisioning component accessible through the ADVENTURE Dashboard. Having performed ADVENTURE Provisioning, a real factory becomes a Passive ADVENTURE Member. Using ADVENTURE Adoption, a Passive ADVENTURE Member becomes an Active ADVENTURE Member.
ADVENTURE Repository	A cloud-based storage for all data needed in the ADVENTURE Framework, including the services needed to access the data and provide access control.
Background IP	Intellectual Property possessed by the

Business Model Elements
for Virtual Factories

parties before starting the project.

Describes the elements that have to be considered for the development of the VF business model.

Business Opportunity

This term describes the event or the state that makes the creation of a Virtual Factory seem to be a good idea, because the ADVENTURE Broker expects the Virtual Factory to provide additional value or profits for his company.

For example, the need for a special product is seen in the market, or a customer has a special need that can only be fulfilled with external help, or an ADVENTURE Member itself wants a certain product or service that it cannot find on the market which would be a business opportunity for others. The optimization of an existing process or the supervision of a supply chain that could help minimizing risks or maximizing profit can also be identified as a business opportunity.

Business Process

When talking about Business Processes in the context of ADVENTURE, the process used in a real factory is imagined and this process should be describable through a formalized language, BPML for example.

Definitions: "A process is [...] a specific ordering of work activities across time and place, with a beginning and end, and clearly identified inputs and outputs: a structure for action." (Davenport, 1993) "A business process consists of a set of activities that are performed in coordination in an organizational and technical environment. These activities jointly realize a business goal. Each business process is enacted by a single organization, but it may interact with business processes performed by other organizations." (Weske, 2007)

Business Processes for VFs	Describes the business processes that are needed to create, execute, and dissolve the VF.
Cloud	An information technology system that adheres to the principals of the cloud computing paradigm. This term is used for cloud storage architectures, cloud computing architectures as well as for combinations of both.
Cloud Computing	“Cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction. This cloud model promotes availability and is composed of five essential characteristics (On-demand self-service, Broad network access, Resource pooling, Rapid elasticity, and Measured Service),, three service models (Software as a Service, Platform as a Service, and Infrastructure as a Service), and four deployment models (Private cloud, community cloud, public cloud, and hybrid cloud)”. (Mell & Grance, 2011)
Cloud Storage	A data storage cloud is a distributed system managing a number of storage devices, which effectively provides a very big storage capacity to the user of the cloud storage.
Company	A company is a legal entity, but a company does not have a physical location. It can have one or more factories, which have a physical location.
Component	A component is a part which constitutes an element of a bigger whole. The bigger whole might for example be a software product (→ software component) or a manufactured good or a machine.
Control 2K (C2K)	Control 2K (C2K) is a lead member of TANet (Technology Application Network

	Limited). C2K will be one of the target companies in ADVENTURE's use cases and will provide a corresponding application scenario in this context.
Dashboard	The Dashboard is the graphical user interface for all ADVENTURE components. The Dashboard is the entry-point for all ADVENTURE users and roles and gives access to the applications developed in ADVENTURE.
Data Provisioning & Discovery	The Data Provisioning & Discovery (DPD) component provides a model and tools for description and discovery of key artifacts in the ADVENTURE system, required for the design, management and operation of Virtual Factories.
Design Phase	The Design Phase is a phase in the lifecycle of a Virtual Factory in which initial Partner Finding is done and in which a Smart Process is designed. The Design Phase includes Process Simulation, to refine the process before it is put into the Execution Phase.
Dissolution Phase	The Dissolution Phase is a part of the Lifecycle of a Virtual Factory that occurs when the Virtual Factory is not needed anymore and will be deleted from the ADVENTURE Platform. During the Design and Execution Phases of the Smart Process, Knowledge is gathered about the ADVENTURE Enabled Factories, the used Smart Objects and the involved Processes as well as additional Metadata. Being more than a simple deletion step, during the Dissolution Phase all this Knowledge is formalized and collected in the ADVENTURE Repository, to make future Virtual Factories more efficient.
Execution Phase	The Execution Phase is a part of the Virtual Factory Lifecycle: The Virtual Factory puts its Smart Process into the Execution Phase as soon as the process should be executed and the building of the desired product should begin. The Execution

Phase does not stop the Smart Process from being changed, but the Execution Engine needs to represent both, the process currently in execution and the changed (parts of the) process. Additionally, data from Smart Objects can influence the Smart Process during the Execution Phase.

When the Execution Phase ends, the Dissolution Phase in the Virtual Factory Lifecycle begins.

Factory

The place where the industrial manufacturing of one or more goods takes place, usually by employing laborers and machinery. Thus, within a factory characteristic resources in the form of laborers, capital, and plants are concentrated. A factory has a physical location and belongs to a company, which is the legal entity that owns the factory.

FI-DA (Finland-Distribution Automation)

FI-DA is the name/abbreviation under which ABB Oy Distribution Automation is commonly known.

FISUB

FISUB is a unit of ABB Finland. It manufactures protection relays and offers power supply services to a large amount of different customers.

Forecasting & Simulation

The Forecasting & Simulation component will be an independent service that relies on the Process Execution component. During a forecast the Process Execution is instructed to execute a process in forecast mode. E.g. when an order is executed in forecast mode, the appropriate Gateway used does not trigger the actual order, but instead returns information regarding various execution parameters connected to the invocation of a particular task.

Foreground IP

Intellectual Property created by the parties during (or in connection of) the project.

Foreground IPR

IPR of the Project Results, including in-

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Future Internet

formation, which are generated under the project. Such results include rights related to copyright, design rights, patent rights, plant variety rights, or similar forms of protection.

Over time, the formerly simple and clear internet architecture became a patchwork of new balconies, detours, wormholes, workarounds and bypasses. When designing mechanisms and technology for a future internet, all current and foreseeable demands must be taken into account. The expectation is that there will never be a fixed set of mechanisms and techniques fulfilling all kinds of demands. In consequence, even a newly designed future internet will be subject to on-going evolution. To avoid an architectural patchwork similar to today's Internet, there must be evolutionary principles allowing deliberate extensions and replacement of functionality. Service-oriented architectures define structures of loosely coupled self-contained elements (i.e. services), which are well suited to build secure, dependable, flexible and adaptable software systems. In the evolution towards a future version of the internet, a SOA-based system is expected to be the foundation, because the internet can be considered an inherently distributed software system. (Müller, 2008)

Gateway

Gateways will be developed when communication is needed for specific external systems. This could be Legacy/ERP systems, Value Added Networks (VAN) but also an external Gateway running at an ADVENTURE Member. Thus, some parts of the Gateway are custom made as not all ERP or legacy systems share the same interface.

All the ADVENTURE Gateways share the same architecture and have a common interface to the ADVENTURE Platform. Some sub-components are generic and

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Intellectual Property	<p>will be used for every Gateway but each Gateway will require the implementation of a custom component to implement the specific interfaces to external systems.</p> <p>Legally protected creations of the mind: inventions, literary and artistic works, and symbols, names, images, and designs used in commerce. IP is divided into two categories: Industrial property, which includes inventions (patents), trademarks, industrial designs, and geographic indications of source; and Copyright, which includes literary and artistic works such as novels, poems and plays, films, musical works, artistic works such as drawings, paintings, photographs and sculptures, and architectural designs. Rights related to copyright include those of performing artists in their performances, producers of phonograms in their recordings, and those of broadcasters in their radio and television programs.</p>
Intellectual Property Rights	<p>The rights relating to: literary, artistic, and scientific works; performances of performing artists, phonograms and broadcasts, inventions in all fields of human endeavor; scientific discoveries; industrial designs; trademarks; service marks and commercial names and designations; and all other rights resulting from intellectual activity in the industrial, scientific, literary and artistic.</p>
Management Practices for VFs	<p>Describes the management practices that VF's may use in each of the business processes.</p>
Message Routing	<p>The Message Routing component will take on a central role for the ADVENTURE Platform. It will keep a list of component instances, external systems and users of the platform and route messages and events from the transmitter to the receiver. A holistic messaging protocol and message format is used between the ADVENTURE components and users. For the communication with external systems</p>

Optimization

Gateway will be implemented which will transform the message formats and protocols as necessary for one external system each.

Definition: The term optimization refers to solving a given problem optimally, i.e., finding the best possible solution to a problem from a set of possible solutions. A solution thereby describes an alternative that solves the problem. What makes a solution being best depends on the context of the problem and must be specified before solving the problem.

Optimization in the ADVENTURE context means optimizing the selection of partner factories based on predefined and specified requirements and preferences of the user, i.e., the broker of the virtual factory, including a model of the regarded process as well as a list of candidate factories (ADVENTURE Members) and appropriate attributes as e.g., capacity, price, size, weight, delivery time, Carbon Footprint, etc.

Partner Finding

Partner Finding is an action involving the Data Discovery component accessible through the ADVENTURE Dashboard to find suitable partners for a Virtual Factory, which are ADVENTURE Members that fit the needed criteria. Partner Finding will not only happen during the Design Phase of a Smart Process, but can also happen in the Execution Phase, as the Smart Process can be adapted to changes during Process Execution, which can make the inclusion of other ADVENTURE Members necessary that didn't take part in the Smart Process so far.

Passive ADVENTURE Member

Performing ADVENTURE Adoption for a factory lets the factory become a Passive ADVENTURE Member, as its data is available for Partner Finding, but the factory cannot actively add data to a Virtual Factory and its systems are not integrated with ADVENTURE. Passive

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PLAY Phase	<p>ADVENTURE Members become Active ADVENTURE Members when they additionally perform ADVENTURE Adoption, which is the process of integrating their systems with ADVENTURE.</p> <p>The ADVENTURE Play Phase describes all steps that occur after the Smart Processes have been modeled in the Process Designer while they are being executed. It includes the activities Process Monitoring, Optimization and Adaption.</p>
PLUG Phase	<p>The ADVENTURE Plug phase describes the time period in which the potential project partners have been defined, but the production has not yet started. It includes the steps Forecasting and Simulation and the design of Smart Processes.</p>
Process Designer	<p>The Process Designer is graphical tool integrated in the ADVENTURE Dashboard to design Smart Processes in a BPML kind of language.</p> <p>The Process Designer component realizes the use cases for interactive Smart Process formalization into a format that is executable by the Process Execution component and reusable by the Process Designer itself. It provides companies with the functionalities needed in order to define, design and orchestrate manufacturing processes, comprising production steps, partner services and manufacturing resources. The standard process design routines will be further enhanced by ADVENTURE tools and services for recommendations for suppliers and favorites list, as well as process and activities annotation assistance. In addition, the Process Designer shall integrate with the Forecasting & Simulation component to get design support by means of computing risks and key performance indicators with different partner assignments and constraints. Those functional dependencies define the dependencies to the components that provide them.</p>

Process Execution	The Process Execution component will be at the heart of ADVENTURE, as it will orchestrate all interaction in a Virtual Factory. Its purpose is to execute processes (so called Smart Processes) modeled in the Process Designer.
Process Monitoring	The Process Monitoring component will be an independent service that relies on the events provided by the Process Execution component and indirectly by the Dashboard and by external systems via the Gateway and Smart Objects.
Project Results	All knowledge, methodologies, software, documentation and any other material generated in the course of or as a result of the Project as described in the Description of Work (DOW ADVENTURE (285220) 2011-08-29.pdf) or otherwise agreed to in writing by all Consortium Members.
Provisioning Phase	The Provisioning Phase is the time it needs to perform the ADVENTURE Provisioning. It is a part of the ADVENTURE Adoption (and NOT a part of the Virtual Factory Lifecycle).
Service	A service is an IT representation of self-contained business functionality. It therefore either provides or encapsulates software (systems) and provides an interface for (multiple) messages. I.e., in other words, a service is a software running on hardware that can take an input of data and provides a specific output of data or triggers an action in a software system.
Service-oriented Architecture	Service-oriented Architecture (SOA) is an IT paradigm based on three major concepts: service, interoperability, and loose coupling (cf. Josuttis, N.: SOA in Practice. Beijing, Cambridge, Farnham, Cologne, Paris, Sebastopol, Taipei, Tokyo, O'Reilly,

Service-oriented Computing

2007).

Service-oriented computing implies leveraging SOA concepts regarding modelling, operating and maintaining IT architectures and systems and therewith supporting Business-IT-alignment. E.g., assembling application components into a network of services that can be loosely coupled to (create and) support flexible, dynamic business processes. (cf., e.g., Liang-Jie Zhang. EIC Editorial: Introduction to the Knowledge Areas of Services Computing. IEEE Transactions on Services Computing, 1(2):62–74, 2008.; Thomas Erl. Service-Oriented Architecture: Concepts, Technology, and Design. Prentice Hall PTR, Upper Saddle River, NJ, USA, 2005.)

Simulation

Definition: “Simulation is the imitation of some real thing, state of affairs, or process. The act of simulating something generally entails representing certain key characteristics or behaviours of a selected physical or abstract system. [...] A computer simulation (or ‘sim’) is an attempt to model a real-life or hypothetical situation on a computer so that it can be studied to see how the system works. By changing variables, predictions may be made about the behaviour of the system. It is a tool to create a virtual environment of the real time system.” (Wikipedia, 2011)

Simulation in the ADVENTURE context is the phase where an ADVENTURE process is simulated in a software system, either to make a forecast about the results or to optimize the ADVENTURE process.

Forecast describes the process of deriving statements and assumptions about states/facts/conditions/circumstances/data in the future based on information available at present. In my opinion, forecast is part of Simulation

Smart Object

In ADVENTURE, Smart Objects are being

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defined as physical devices enriched with identification, sensor and communication technologies. Smart Objects will be considered and utilized in ADVENTURE in order to provide valuable information about current status of production and delivery. For this, information from sensors and other Smart Object technologies will be fed to ADVENTURE's Cloud Storage, pre-processed, and integrated into Smart Processes. The component that is responsible for the integration of such Smart Objects is Smart Object Integration

Smart Object Integration

The Smart Objects Integration component has the role to seamlessly integrate physical devices (e.g. WSN , smart devices, etc.) as IT services in the cross-organizational collaborative processes, which is one of the key differentiators for the project. In the project Glossary such type of service providers are referred to as Smart Objects.

Smart Process

In a Virtual Factory, several steps and sub-processes need to be executed to produce the desired product. In the ADVENTURE context, this combined process is called Smart Process, as it can be adapted to changes at runtime. The goal of a Virtual Factory is to create such a Smart Process, to optimize it and to put it into the Execution Phase.

Sub Component

The lowest level of granulation for the ADVENTURE project results that can have separate/independent life in terms of Exploitation and Intellectual Property Rights (IPR).

TANet (Technology Application Network)

TANet acts as a legal entity and a not for profit company, which focuses on enhancing the collaborative capabilities of SMEs through the deployment of a range of products and services. TANet typically operates in the field of IT interoperability and collaboration. A lead member of TA-

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Transformation Service

Net is Control 2K.

The Transformation Service is a complementary service to the ADVENTURE Platform. It performs pre-defined transformations from one message format to the other. These transformations could be needed when connecting external systems or VANs to the ADVENTURE Platform. The messages of the external systems might not be in the holistic ADVENTURE message format so they need to be transformed in order to be processed by other ADVENTURE components.

Ubiquitous Computing

Ubiquitous Computing describes information processing integrated into everyday objects and activities. Thanks to ubiquitous computing discrete everyday objects in the real world can become “smart”.

Virtual Factory

A temporary or permanent alliance of ADVENTURE Members, facilitated by an ADVENTURE Broker. The Virtual Factory is managed by a distributed, integrated, computer-based system, the ADVENTURE Platform that interfaces with all systems necessary to make design and production of a product and its delivery to the customers possible.

The core of the Virtual Factory is a Smart Process, which integrates reusable smaller processes and other metadata from the ADVENTURE Repository, defined by the ADVENTURE Members that take part in the Smart Process.

Virtual Factory Lifecycle

The ADVENTURE Virtual Factory lifecycle refers to the process that takes place when the ADVENTURE Framework is used to exploit a new business opportunity. The lifecycle encompasses six main stages: Collaborative process analysis, virtual factory design, execution, adaptation, improvement and dissolution. There

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will be an entire lifecycle for each business opportunity.