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Industrial automation systems and integration — Manufacturing Automation Programming Environment (MAPLE) —

Part 2:
Services and interfaces

Systèmes d'automatisation industrielle et intégration — Environnement de programmation d'automatisation de fabrication (MAPLE) —

Partie 2: Services et interfaces

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this part of ISO 13281 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 13281-2 was prepared by Technical Committee ISO/TC 184, *Industrial automation systems and integration*, Subcommittee SC 5, *Architecture, communications and integration frameworks*.

ISO 13281 consists of the following parts, under the general title *Industrial automation systems and integration — Manufacturing Automation Programming Environment (MAPLE)*:

— *Part 1: Functional architecture*

— *Part 2: Services and interfaces*

Annex A forms a normative part of this part of ISO 13281.

Introduction

Over the recent past, manufacturing systems have become considerably more flexible and have acquired greater functionality. The numbers and types of component devices of manufacturing systems, such as NC machines, robots, automated guided vehicles, programmable controllers and manufacturing cells have increased. Manufacturing engineers are thus required to develop and update programs not only for many kinds of individual devices but also for combinations of devices. Due to this fact, the difficulty of integrating and programming the control of manufacturing operations has increased.

Manufacturing programs have an intense need for a large variety of manufacturing data, including product oriented data, process oriented data, operation oriented data and management oriented data. This diversity means that manufacturing data has a much more complicated and varied schema than the processing data encountered in other systems, e.g., business systems. Therefore, the use and management of manufacturing databases requires a manufacturing oriented approach. The concept of MAPLE is intended to provide assistance to address this need.

MAPLE assists program developers, planners and operators in a manufacturing automation environment to generate programs and prepare them for their execution.

MAPLE will assist in the following activities:

a) generation of programs to control devices, cells, shop floors and factories, either manually or with computer assisted tools;

b) manufacturing and process planning;

c) checking and preparation of resources;

d) preparation of manufacturing data sets for execution (e.g., post processing).

The outcomes of these activities are:

a) manufacturing data sets (e.g., geometry, tools, technology, sequence of operations, setups, measuring, testing, handling);

b) cell, shop floor and factory monitoring and control programs.

This standard for MAPLE services and interfaces builds upon the functional architecture as specified in ISO 13281-1. The functional architecture provides a manufacturing data dictionary and a manufacturing software dictionary that facilitate the separation of the underlying data sources and I/O requirements, in whatever format, from the executing manufacturing task. Hence, MAPLE provides a mechanism by which a number of diverse data sources and software tools can be integrated seamlessly.

ISO 13281-1 and 13281-2 are intended to guide software developers of MAPLE environments as well as system integrators and software tool developers. The standard for MAPLE services and interfaces relies on ISO/IEC DIS 14750 for the interface description language, and ISO/IEC 10746 for presenting Open Distributed Processing (ODP) view points.

Other relevant work such as aspects of STEP (ISO 10303, Product data representation and exchange) data and the content of data files used in the NC machining environment for example, will be addressed in a potential new work item on the MAPLE data dictionary and software program dictionary.

ISO 13281-1 provides an overview of the MAPLE functional architecture in order to aid in the understanding of how MAPLE services might be provided through a number of functional components within MAPLE, and their internal and external interfaces.

MAPLE is a building block that can be applied at any level within a manufacturing enterprise. Separate MAPLE implementations can be configured and connected within an enterprise as required.