

Introduction to Robotic Technology Component (RTC-1.1) Specification

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The Robot Technology Component standard

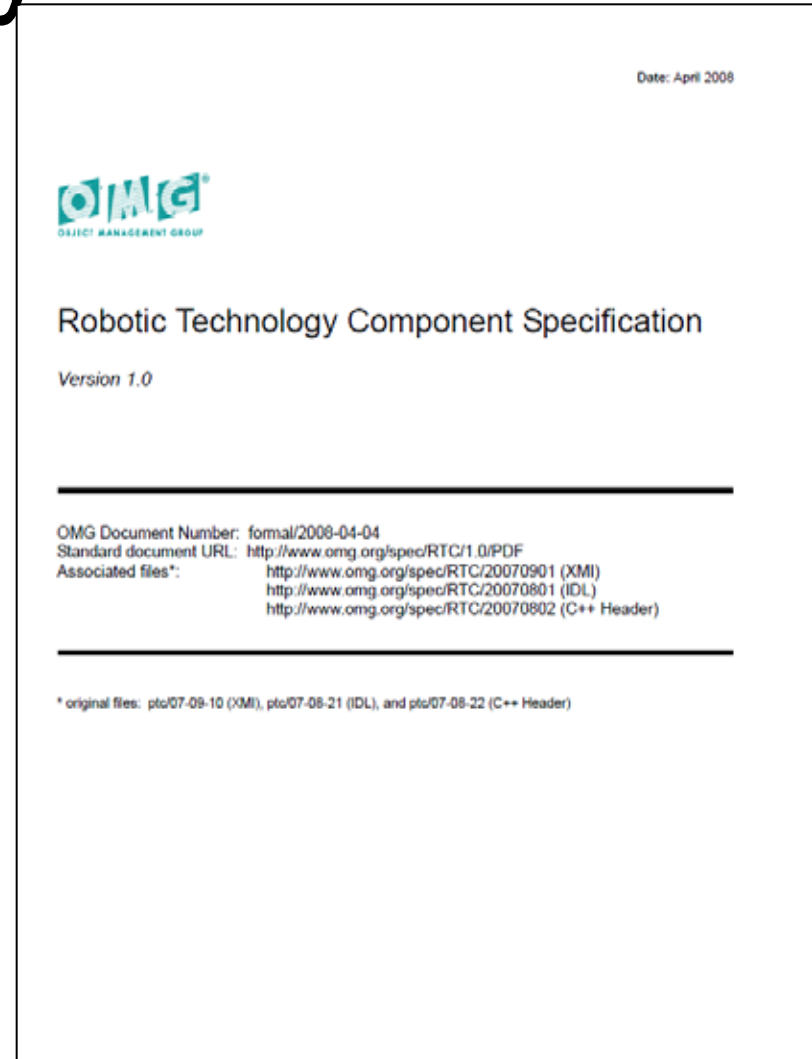
- OMG specification for component-based robot software.
- Aims for greater compatibility and reusability amongst vendors of robot software.
 - Not just the software itself but also the tools.
- An open specification that anyone can implement.

Benefits of the OMG RTC standard

- Manage the lifecycle of all components in a uniform way.
- Provides the data structures necessary to specify components and the related objects for a complete system.
- Separates functional specification and execution control.
 - Supports a variety of execution patterns.
- Static and dynamic component networks.

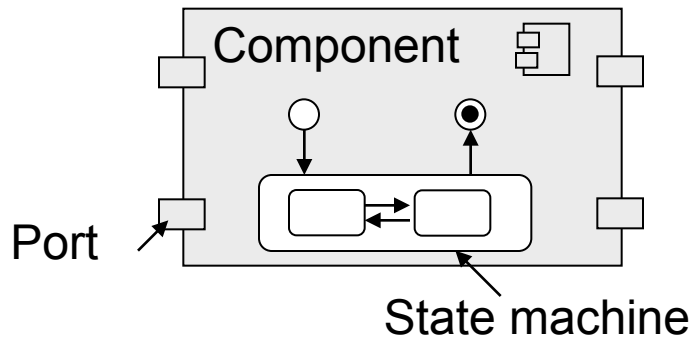
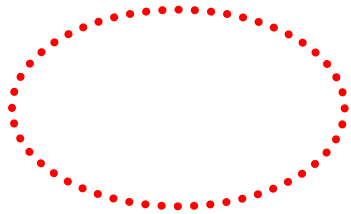
OMG RTC standardisation history

- September, 2005
RFP: Robot Technology Components (RTCs) publication.
- February, 2006
Initial Response : PIM and PSM for RTComponent submissions from AIST (Japan), RTI (America)
- April, 2006
Merged submission
- September, 2009
Accepted by the architecture board.
Finalisation begins.
- August, 2007
Finalisation completed
- September, 2007
Finalisation result passed by the AB.
- April, 2008
OMG RTC standard 1.0 published
- September, 2012
OMG RTC standard 1.1 published

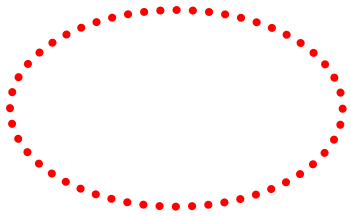


Package 1: Lightweight RTC

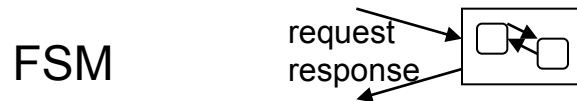
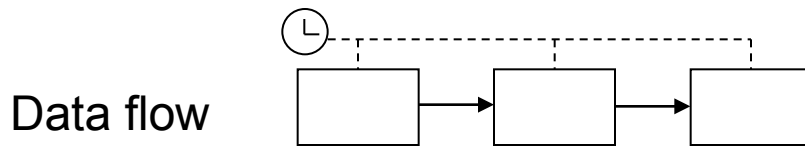
- Lightweight RTC
 - Stereotypes for components, ports, connectors, etc.
 - Component lifecycle
 - Execution contexts
 - Does not include the introspection functionality
 - For static component networks



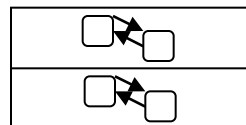
Package 2: Execution Semantics



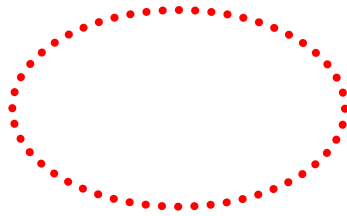
- Execution Semantics
 - Provides execution patterns commonly used in robotics
 - 1. Synchronous execution processing data (data-flow type)
 - 2. Stimulus-response or event-driven (FSM type)
 - 3. Mixture of execution methods (multi-modal type)



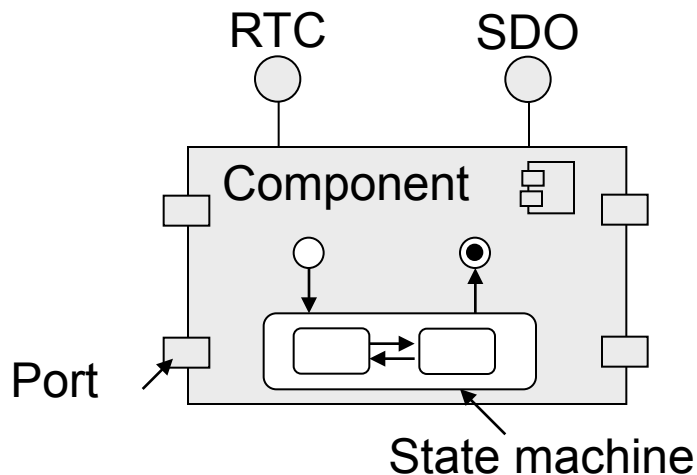
Multi Modal



Package 3: Introspection



- Introspection
 - Interfaces for acquiring component information
 - Based on the OMG Super Distributed Object standard
 - Dynamic component networks



OMG RTC family

Name	Vendor	Feature
OpenRTM-aist	AIST	C++, Python, Java
OpenRTM.NET	SEC	.NET (C#,VB,C++/CLI, F#, etc..)
miniRTC, microRTC	SEC	CAN・ZigBee
Dependable RTM	SEC/AIST	Functional safety (IEC61508) capable and certified
RTC CANOpen	SIT, CiA	CANOpen CiA (Can in automation) based RTC standard
PALRO	Fuji Soft	C++ implementation for small humanoids
OPRoS	ETRI	Korean national project
GostaiRTC	GOSTAI, THALES	C++ implementation for the URBI robot language
Honda RTM	Honda	C++ implementation



RTC RTF 1.1 overview

- Published September, 2012
- Fixed 8 issues and deferred 9
- Resolved changes were correcting the specification
 - Diagram fixes
 - Grammatical corrections
- Minor comments received from AB review
 - Missing #pragmas in IDL, XMI bugs