OMAC Packaging Working Group

How to implement PackML / TR88 ?

Sept. 28, 2015

Carl Bostrom, Principal Engineer

Bosch Rexroth

OMAC
The Organization for Machine Automation and Control

PackML
an OMAC standard
OMAC.org

PackML Template Options

GAT PackML

- Special case of our Generic Application Template (“GAT”)
- Wizard-driven
- Automatic code generation
- Modular
- Extremely powerful, but structured text only

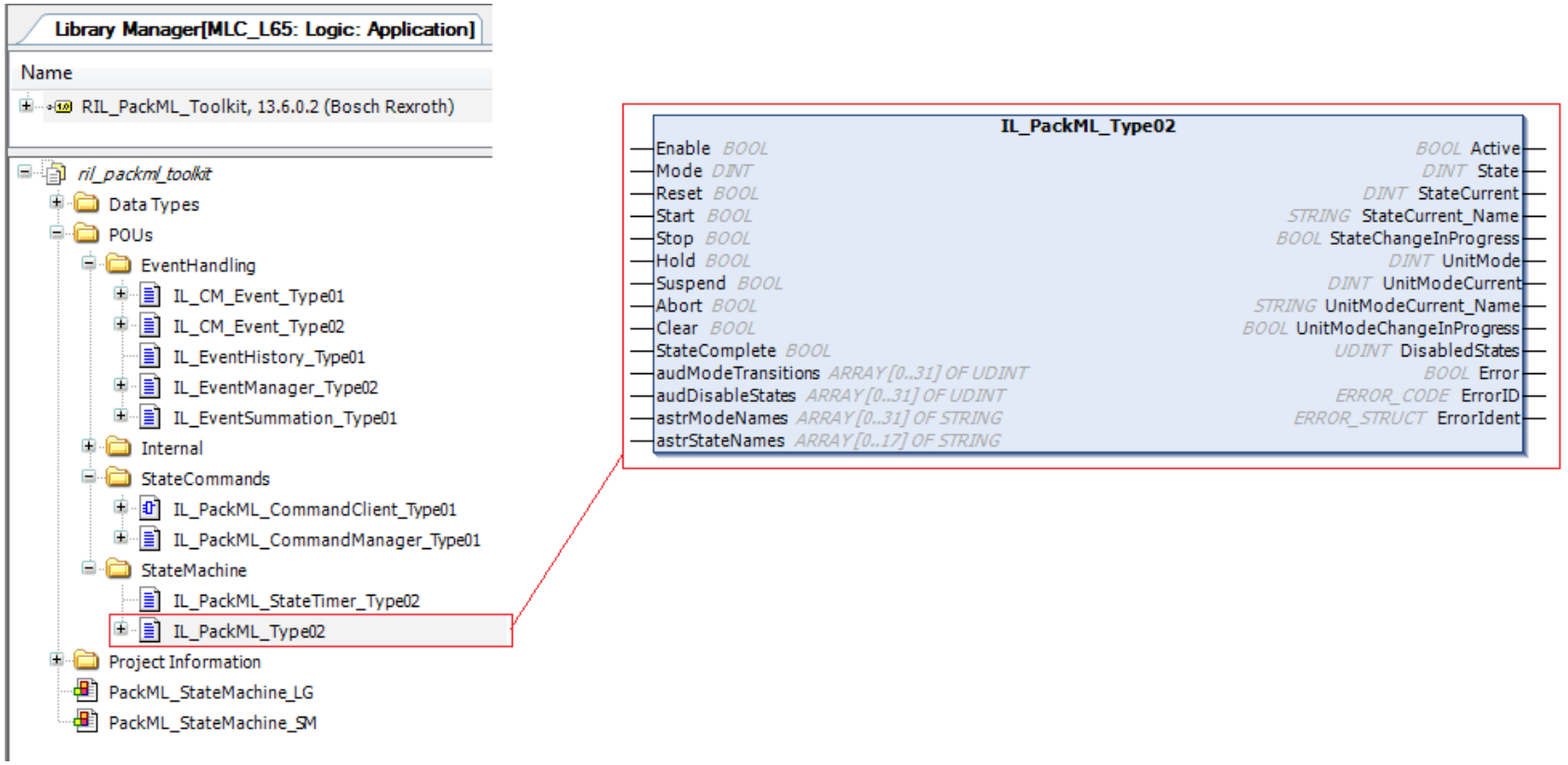
OMAC Implementation

- RIL_PackML_Toolkit compiled library
- Closely follows OMAC Implementation Guide
- ISA88 Hierarchy
- Modular, self-registering
- Self-registering event handling
- Supports LD, FBD, ST, etc.

OMAC
The Organization for Machine Automation and Control

PackML
an OMAC standard
OMAC.org

PackML Toolkit: OMAC Implementation Guide

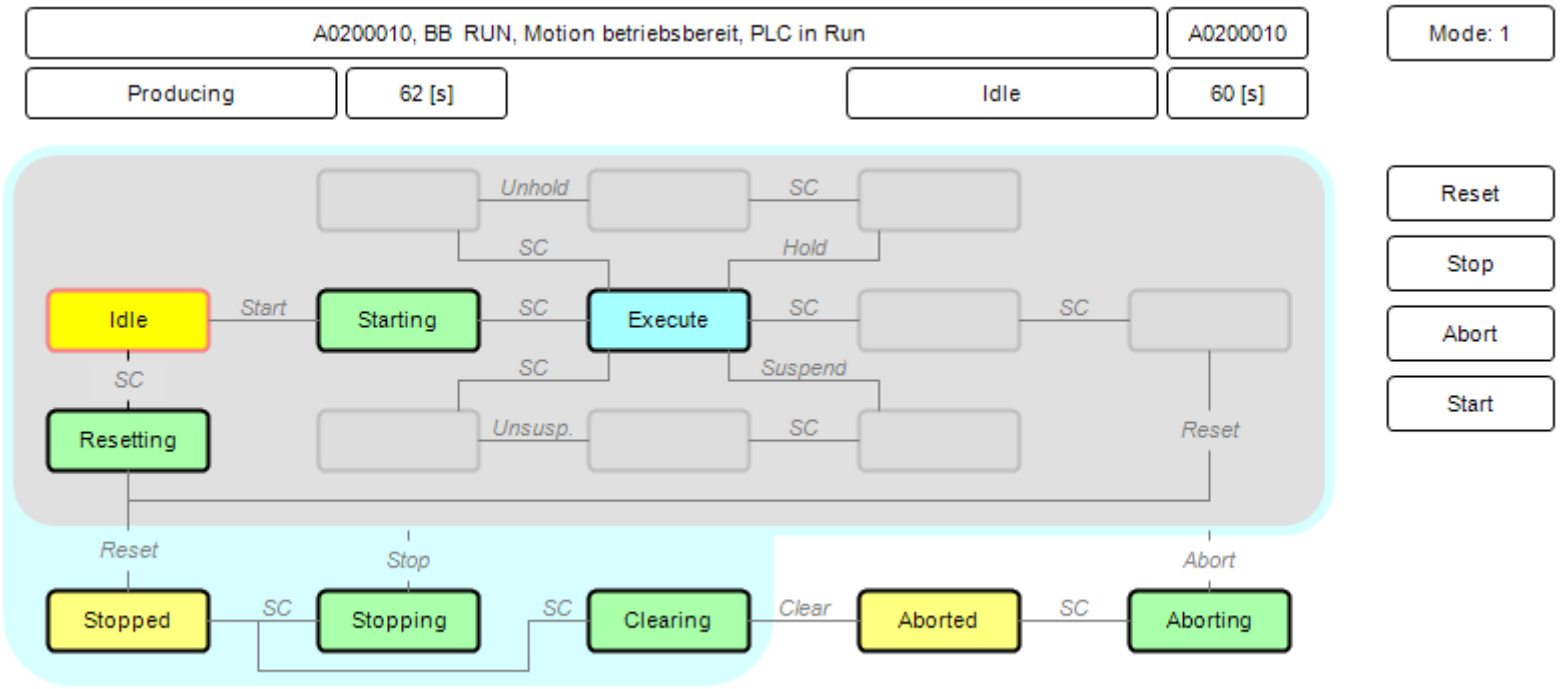


Library functions have OMAC “look and feel.”

OMAC
The Organization for Machine Automation and Control

PackML
an OMAC standard
OMAC.org

RIL_PackML_Toolkit: State Handling



- Full support for all PackML states.
- States may be enabled or disabled by configuring state handler.

OMAC
The Organization for Machine Automation and Control

PackML
an OMAC standard
OMAC.org

RIL_PackML_Toolkit: Mode Management

- Mode management is handled by IL_PackML_Type02

- A mode transition is allowed in a given state provided the bit associated to this state is true for both audModeTransitions[*current mode]* and audModeTransitions*[target mode].*

Example: If the machine is currently in mode 1, state 9 (aborted), then we may change to mode 3 provided:

audModeTransitions[1] = bxxxx xx1x xxxx xxxx,
audModeTransitions[3] = bxxxx xx1x xxxx xxxx

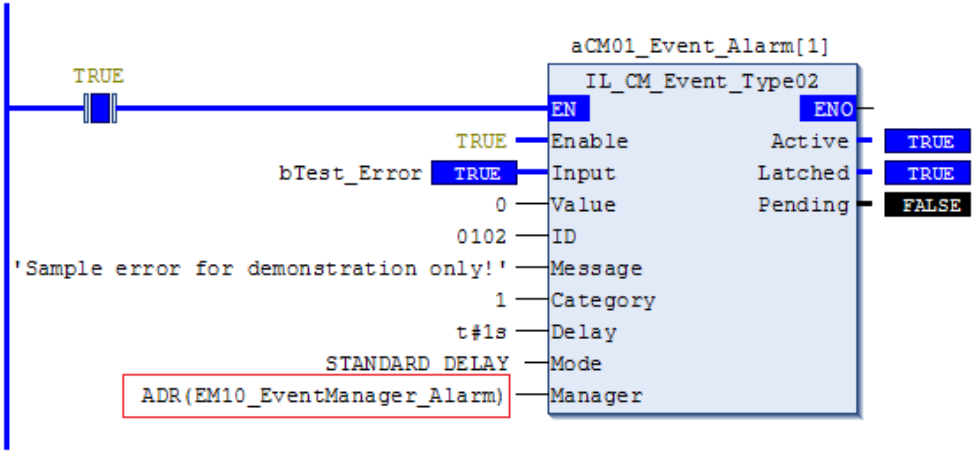
OMAC
The Organization for Machine Automation and Control

PackML
an OMAC standard
OMAC.org

RIL_PackML_Toolkit: Event Handling

Visu_AlarmHistory[MLC_L65: Logic: Application]

	ID	Message	TimeEvent	TimeAck	Category
0	102	EM10:Sample error for demonstration only!	DT#2013-9-19-17:24:50	DT#2013-9-19-17:25:18	1

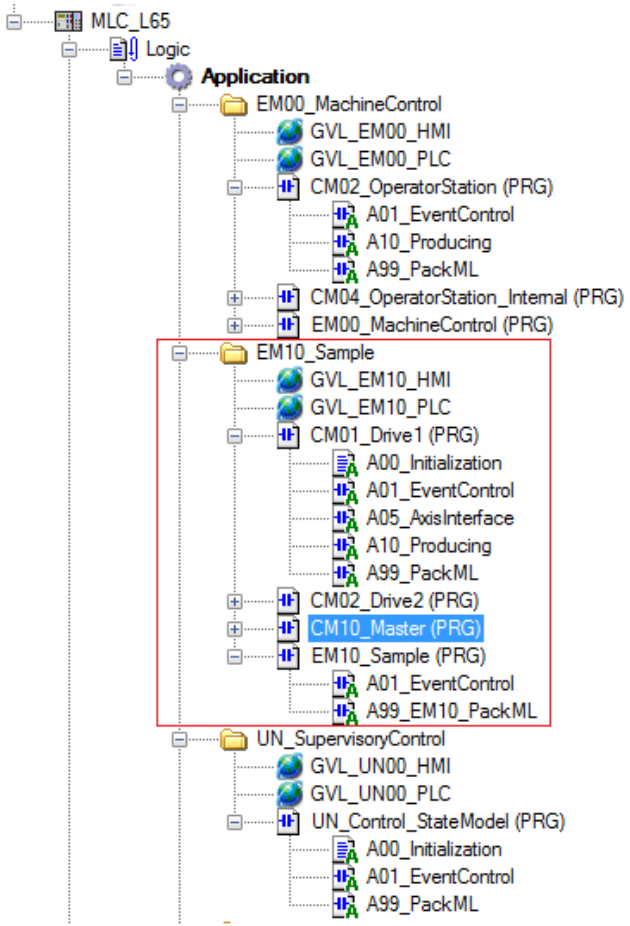


- Events automatically register themselves with their respective manager! Library handles Alarm and AlarmHistory structures.

OMAC
The Organization for Machine Automation and Control

PackML
an OMAC standard
OMAC.org

ISA88 Physical Hierarchy



ISA88 modularity is strictly followed:

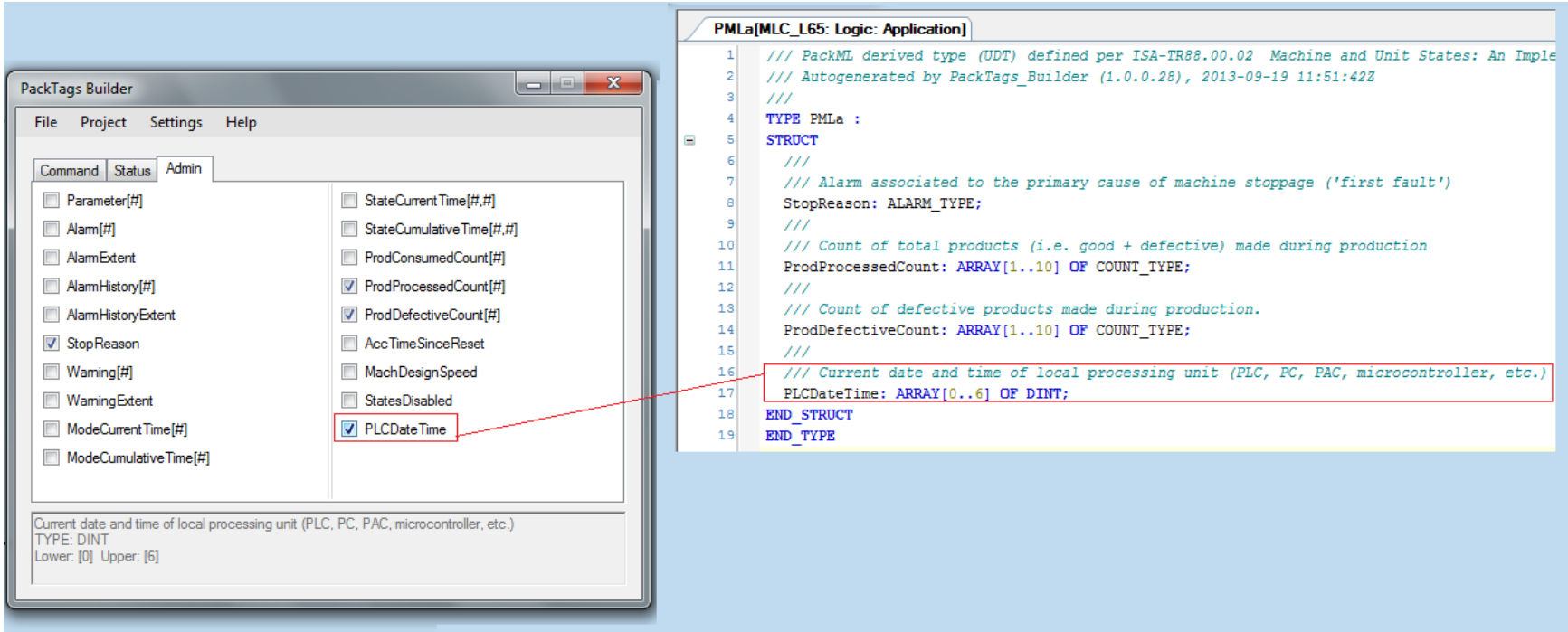
- Equipment modules manage their own global/interface variables.

- Equipment modules ***register themselves*** with the unit machine. No code is required at the global level to add an EM to a project!

OMAC
The Organization for Machine Automation and Control

PackML
an OMAC standard
OMAC.org

PackTags: PackTags_Builder 2.0



- Free software tool to facilitate implementation of PackTags. Revised per ISA-TR88.00.02-2015!

OMAC
The Organization for Machine Automation and Control

PackML
an OMAC standard
OMAC.org

Implementation tips

- The interface is the priority. PackTags, especially the minimal set required for compliance, can be implemented easily.

- Details are critical. Data are only useful if they can be interpreted correctly.

- Leverage expertise from the technology provider.

OMAC
The Organization for Machine Automation and Control

PackML
an OMAC standard
OMAC.org

Thanks for your attention!

OMAC
The Organization for Machine Automation and Control

PackML
an OMAC standard
OMAC.org