ROS PackML Package

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Agenda

• Introduction
• What is PackML?
• Open Source PLC Concept
• PackML Advantages
• Industrial Applications
• ROS PackML Implementation
Introduction

• 3M
  – 88,000 employees
  – 250 manufacturing facilities world wide
  – 60,000+ products

• 3M ROS Team
  – Schoen Schuknecht - sponsor
  – Lex Tinker-Sackett – does a lot of talking
  – Brett Hemes – ROS contributor
  – Tom Strey – PLC/PackML developer
What is PackML?

• The official standard
  – ISA-TR88.00.02 – PackML 2008

• PLC programming guideline

• Allows multiple vendors to program to an industry standard
  – Standard interface improves integration
  – Allows modularity
  – Let vendors specialize
What Isn’t PackML

• For packaging only
  – Generally best practice for discrete automation
  – Great guideline
  – Will make your implementation better

• Similar to ROS
  – Can do more than robots
  – Great “Design Patterns” implementation
  – Best practices
Open Source PLC Concept

• Organization for Machine Automation and Control
  – OMAC
  – Organizing body for PackML
  – Maintains resources for PackML implementation
  – Proctor & Gamble (P&G) provided a guide
    • “PackML Implementation Guide”
    • Available from OMAC website (must register [worth it])
    • Rockwell (AB) example – full PackML template
    • Closest thing to Open Source in industrial PLC
PackML Advantages

• Standard Interface
  – Loosely coupled with well defined interfaces
  – Vendor agnostic

• Standard State Machine
  – No surprise states
  – Multiple modes available

• Standard “Tag” Naming Convention
  – Required for OPC communication
    • Did I mention OPC?
Industrial Applications

• Industry uses PLCs
  – PCs are discouraged in major factory implementations
    • Upgrade cycles
    • Virus concerns
    • Operators surfing the web...
  – PLCs work
    • Sensors and actuators – make things move
    • Programmable by electrical engineers
    • Maintainable by technicians
  – PLCs are everywhere
    • ROS-I will benefit from clean integration with PLCs
ROS PackML Implementation

- Early discussion stage
  - Shaun Edwards recommends
    - PackML Library
    - Self contained (similar to Descartes)
  - Implement the state machine
    - Publish states
    - Consume states
    - Conform to PackML variable (tag) naming conventions
  - Consider OPC UA implementation
    - Currently underway in EU?
• PackML official standard
  – ISA-TR88.00.02
  – ISA.org

• PackML organizing body
  – OMAC.org
    • PackML Implementation Guide is here
    • Best resource for developers (PLC)

• PackML state diagram
Questions

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