

MTCONNECT

VERSION 2.0

POWERED BY  **AMT**

MTCONNECT OVERVIEW

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MTConnect standardizes factory device data

The MTConnect standard (ANSI/MTC1.4-2018) is a normative vocabulary for manufacturing equipment. Without it, every machine uses its own terminology and information model.

Data standards dramatically reduce integration cost and are required for large-scale industrial information systems.

MTConnect Institute

a 501(c)(6) not-for profit org

Subsidiary of AMT – The Association For
Manufacturing Technology

Facilitates development of the MTConnect
standard

It's free! www.mtconnect.org/join

ADOPTION



150,000+
GLOBAL INSTALLS
AS OF 2022



160+
MTCONNECT
INSTITUTE
MEMBERS



80,000+
DEVELOPMENT
MAN HOURS

CONTENT



300+
DATA
DEFINITIONS



1000+ TYPES, SUBTYPES, & OTHER
CONTEXTUAL QUALIFIERS

Liaisons

Some of the organizations we work with...

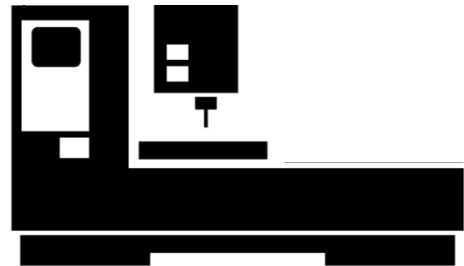
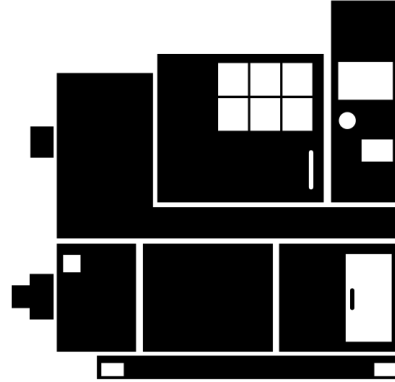


TC184/SC4
ISO 10303



Why?

*Factories always end up with a **variety** of equipment types and brands.*



The industry required a common language to communicate information

What can you do with standardized data that you can't without standards? Achieve facility- or enterprise-wide scale. MTConnect releases Industrial IoT projects from pilot purgatory.

MTConnect Enables

- job scheduling
- predictive maintenance
- process analytics
- machine monitoring
- lights-out manufacturing
- digital twin and digital thread
- digital product passport

MTConnect Is **NOT**

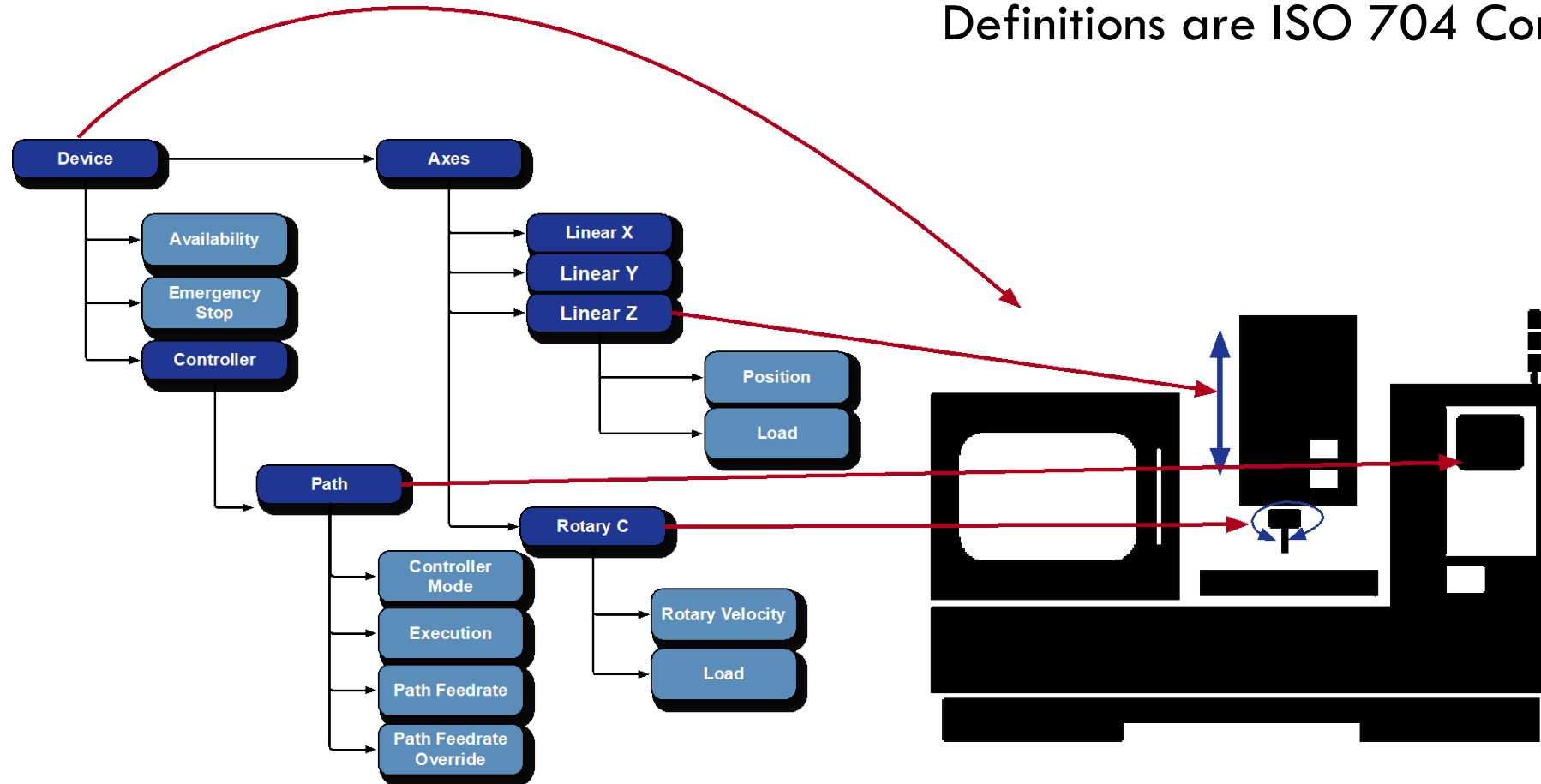
- A Communications Protocol
- A Document Format or Representation
- ERP, MES, PLM, System of Record, Quality Report, Analytics
- An application
- **It does not compete with OPC/UA, Sparkplug B, QIF, STEP, ISA-95, or MQTT – it works with them**

MTConnect IS

- A **Model** of a **Device** and its **Observations** – SysML model is **Normative**
- Everything is from the **Device's Viewpoint**
- Defines the terms for all the Device's parts (**Components**) and things the Device can Observe (**Data Items**)
- Models things that are **Used** in the **Manufacturing Process (Assets)** like Cutting Tools, Raw Materials, Files, and Inspection Reports
- Describes the Device's capabilities, kinematics, and geometry (**Configuration** and **Specifications**)
- **Free. Open-Source** Community and SDO

Defines each part of the machine

Definitions are ISO 704 Compliant



Example Components and Assets

- Components

- Auxiliaries
- Axes
- Controller
- Interfaces
- Parts
- Processes
- Resources
- Structures
- Systems

- Assets

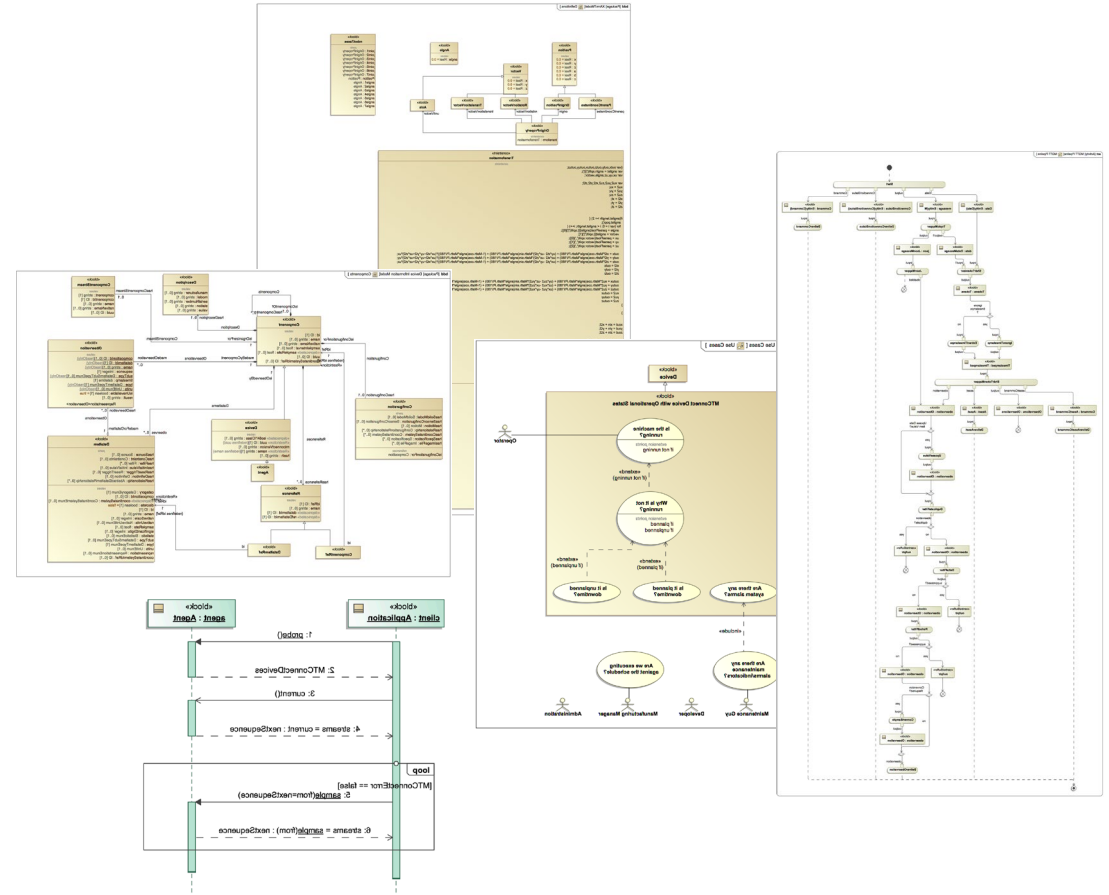
- Cutting Tools
- Raw Material
- Configuration Parameters
- Files
- QIF Documents

Observations

- ~230 top level observation types and ~110 sub-types
- All semantically typed
 - Two level hierarchy
 - Type – Base semantic type – Position, Controller Mode, Load, Velocity, etc
 - Sub Type – Remaining, Actual, Commanded, Programmed, etc...
 - Units and Controlled Vocabulary prescribed by Type
- Definitions are composable and follow ISO 704

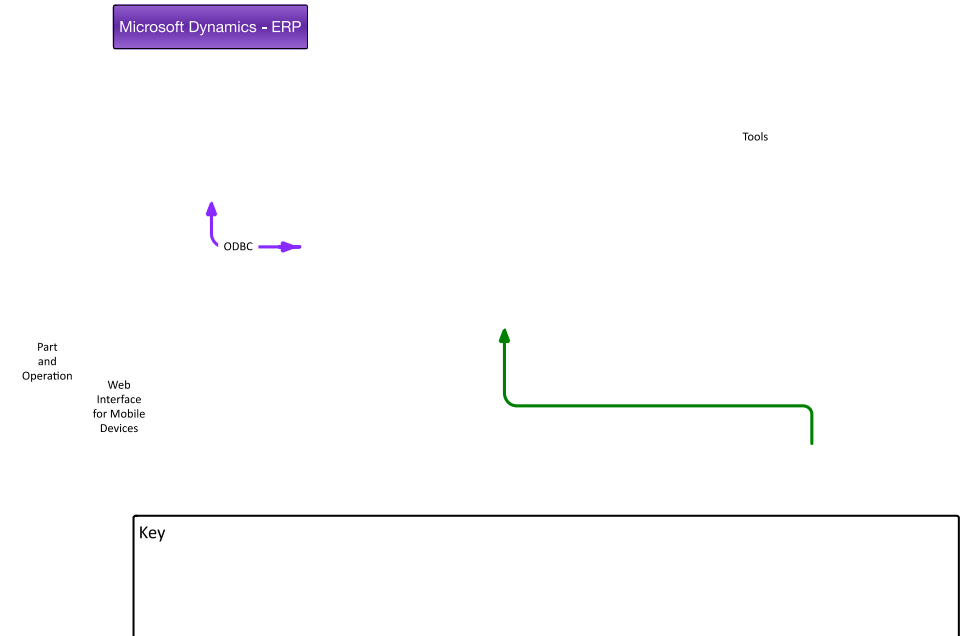
Why Model-Based

- Agility – Timeboxed 6-month releases
 - Faster and more accurate review process
- Machine readable standard
- Integration with other standards
- Beyond information:
 - Behavior
 - Relationships
 - Constraints
 - Use Cases and Requirements



Additions Since Last Year: Parts and Process Models

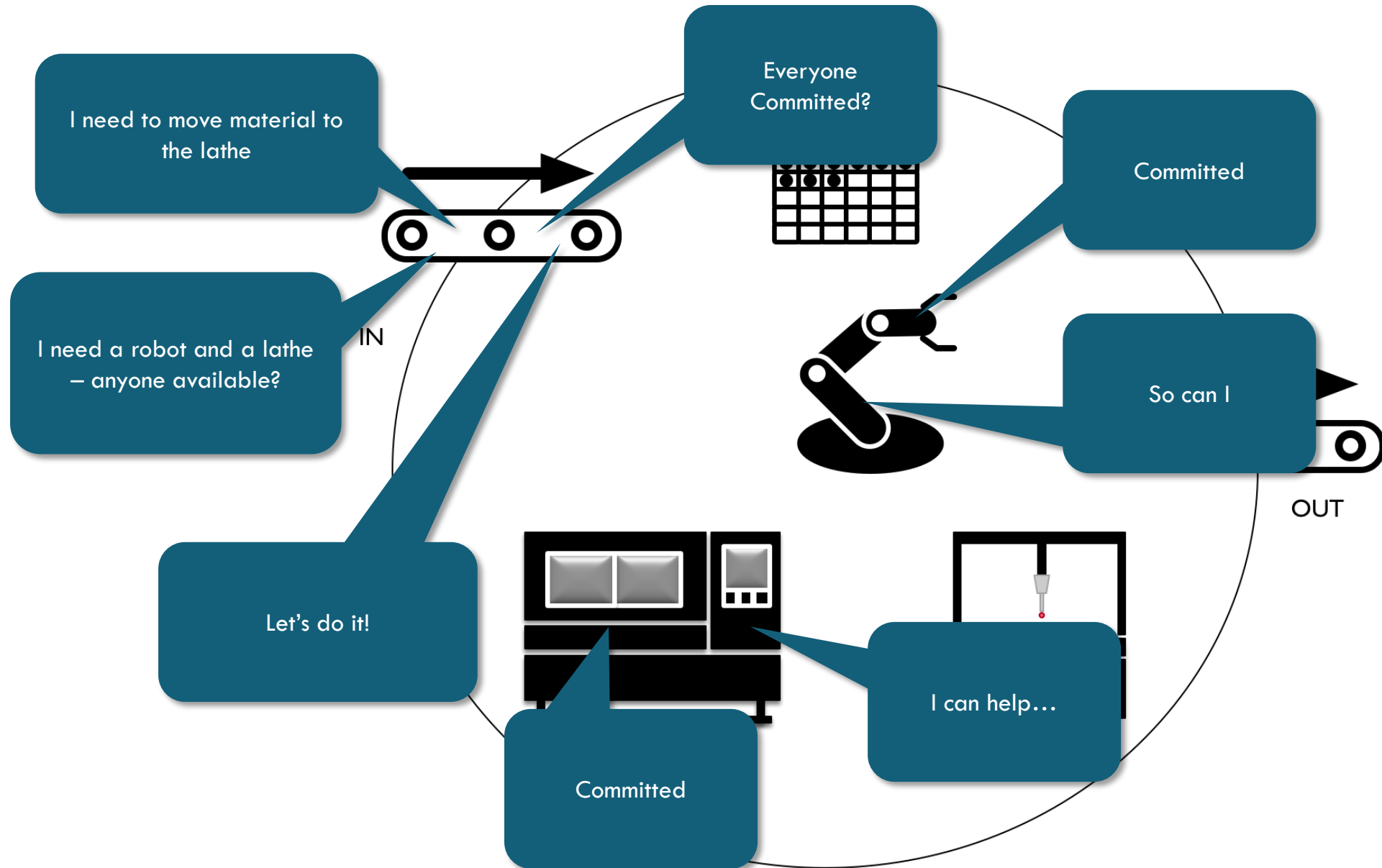
- SPEC-OPS DMDII-15-03-02 (now MxD): PARC and MTConnect Institute
- High-level Definitions of part w/ multiple manufacturing process steps
- Performed a harmonization of terms with ISA-95
- Focus: Discrete manufacturing



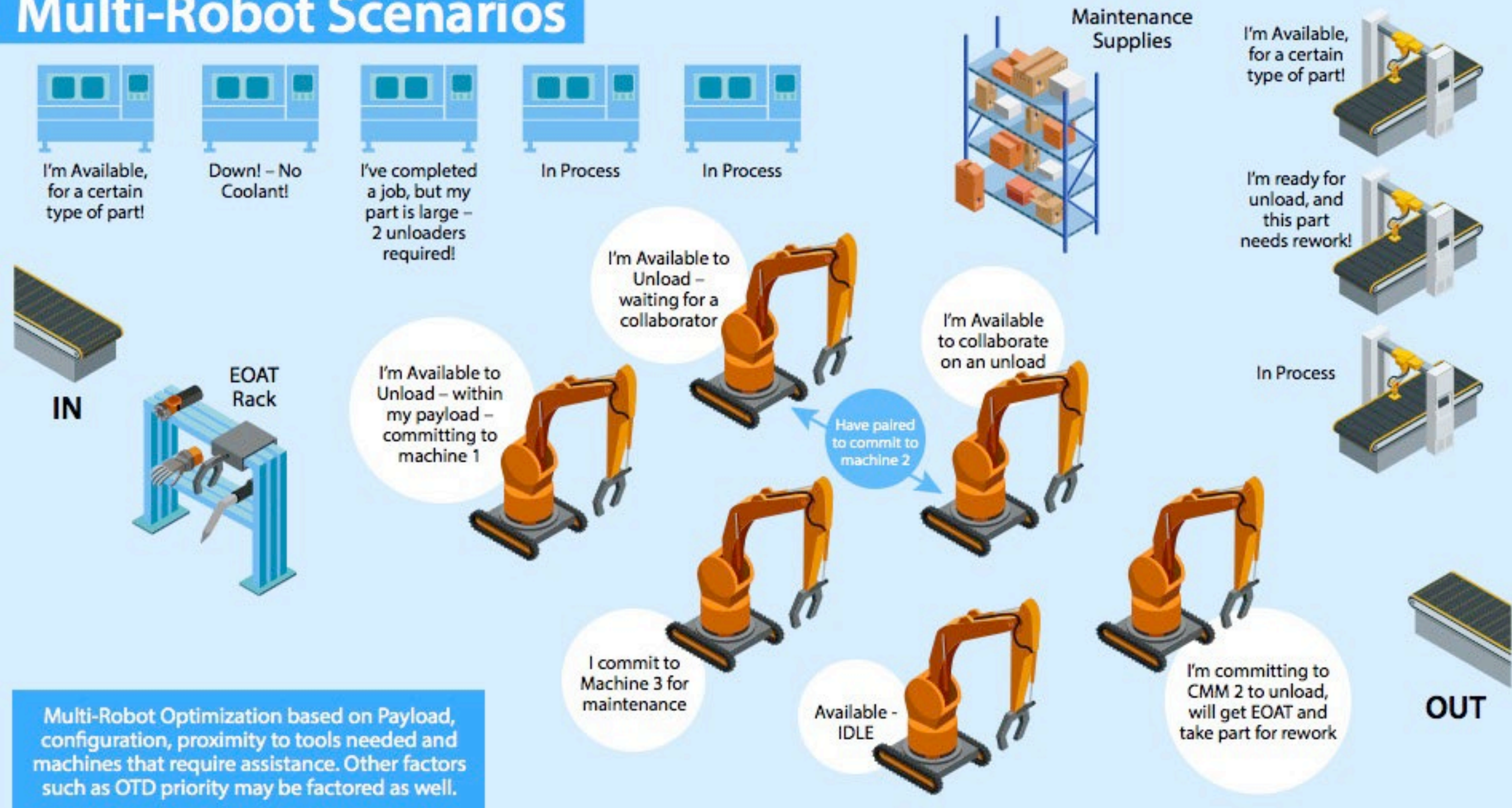
Tasks

- Taken from NIST Sponsored ROS/MTConnect Project lead by SwRI and the MTConnect Institute
- Provides a “Choreography” collaboration model with no centralized controller system
 - Reduces brittleness of the system
 - Allows devices to participate as they are available
 - Provides foundation for dynamic rerouting and process changes
 - Allows for substitution of humans and machines

Task Oriented Intelligent Devices



Multi-Robot Scenarios



Modular Manufacturing Capabilities

- Modular manufacturing capabilities
- Transportable processes
- Fully digital manufacturing
- Real-time monitoring and process tracing
- Cloud based engineering
- Fully Automated

