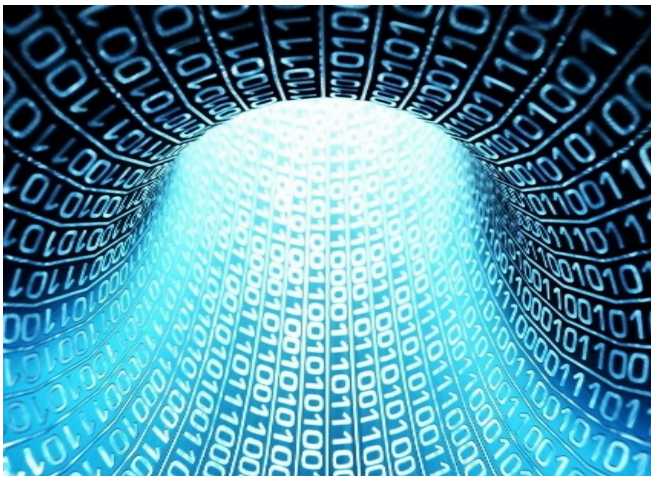
OPEN MANUFACTURING LANGUAGE

Powering the Internet of Manufacturing
Industry 4.0 I Smart Factory 1.0



What is OML?

OML is an open Internet of Manufacturing (IoM) standard that defines the interconnectivity of PCB assembly production processes, including SMT machines, automated inspection, test, repair, and assembly, re-work. It is used for solutions in warehouse, engineering, quality control, business intelligence, and company / corporate / enterprise IT systems and computerization. The specification and availability of the OML standard, is available free of charge to community members; you can join at http://www.omlcommunity.com.

Why OML?

OML answers industry needs, creating a new standard to replace proprietary and legacy protocols that support industry initiatives such as Industry 4.0 and Smart Factory 1.0 across the whole shop-floor.

Why adopt Open Manufacturing Language (OML)?

OML is based on many years of PCB assembly shop-floor communication experience, where information exchange between production processes in real time applied to real-world manufacturing shop-floor solutions such as finite production planning, lean material management, quality management and full materials and production traceability. Any creator or consumer of OML data requires just one interface, significantly reducing development cost and lead-times for PCB assembly computerization projects, removing the key barrier for entry for many companies.

Closed-loop feedback systems
Quality, productivity, performance

Opportunity to utilize live shop-floor data in "big data" applications
Asset utilization, productivity, performance, quality management

Accurate and live material consumption and spoilage
Full traceability Inventory accuracy, Just In Time (JIT) logistics

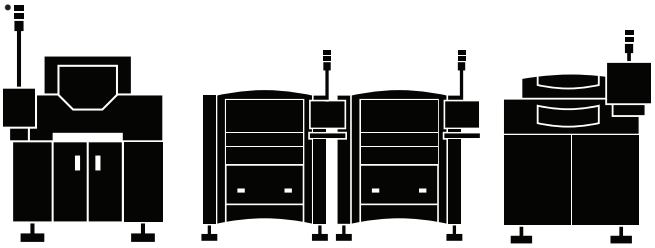
Precise control and visibility for planning and resource management
Management and automated decisions based on facts

Process level conformance, compliance and traceability
Automated, accurate, timely and precise, poka-yoke control

The Standard for Internet of Manufacturing Computerization

How OML Fits into a Modern Factory:

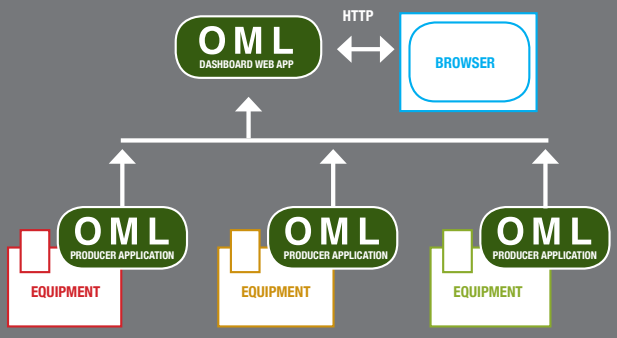
- Simplifies integration of IT systems with factory equipment and processes, allowing use of a rich variety of reliable, real-time data.
- Allows real-time control of factory equipment and production lines.
- Enables high performance transfer of production data from the factory floor to any network based OML consumer, such as site or enterprise data warehouses and cloud storage.
- Defines a common language and terminology between teams, companies, suppliers etc., helping operational management.
- Integrates applications or equipment into existing OML based systems with low risk of interruption to production.
- Provides a flexible standard for solutions which must use in-house proprietary data formats or sensitive data.



Based on more than 15 years of shop-floor communications experience

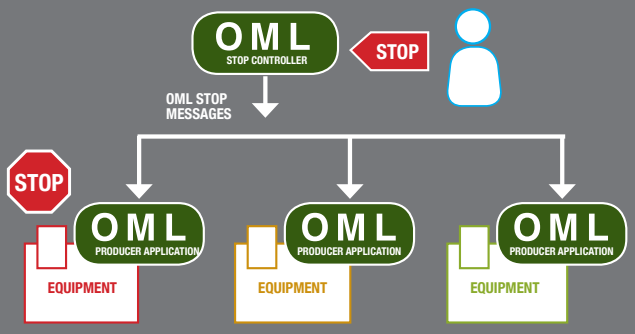
Example solutions built with OML

1. DASHBOARDS



Real time KPI dashboards can be built using OML data.

2. POKA-YOKE CONTROL

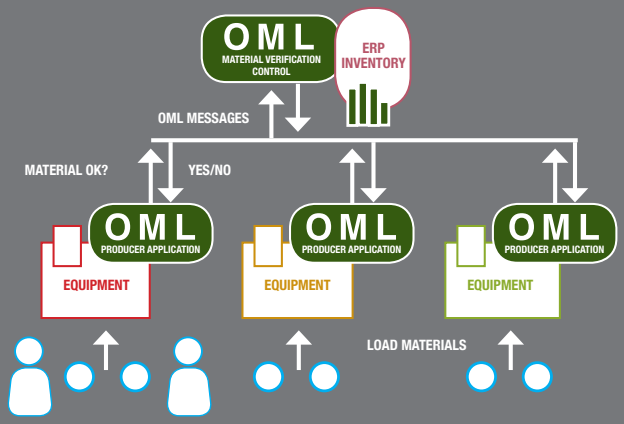


A production line or individual processes can be stopped immediately using OML

The Standard for Internet of Manufacturing Computerization

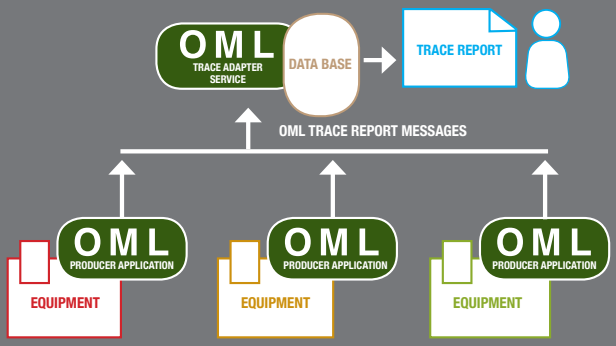
Example solutions built with OML

3. SUPPLY CHAIN MANAGEMENT



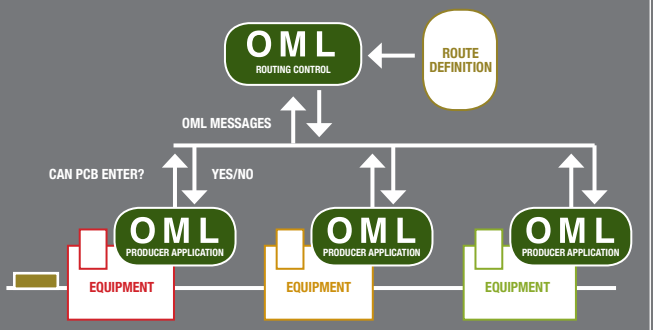
Material may be verified by factory applications, before use, followed by the collection of consumption and spoilage data

4. TRACEABILITY



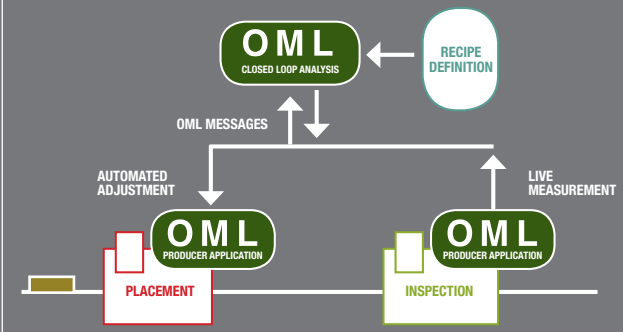
OML allows material and process traceability data to be easily transferred from all processes to a central database

5. ROUTING CONTROL



A PCB-A may be scanned and checked to ensure correct routing

6. CLOSED LOOP LINE CONTROL



For example, automated adjustment of placements according to measurement of drift and variation by inspection processes