



Compiere MFG + SCM

Concepts for Manufacturing Excellence

Andre Charles Legendre

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Compiere MFG + SCM

Compiere MFG + SCM is a web-based open solution for manufacturing and supply chain operations.

It is specialized and optimised for management of warehouses and manufactures and uses «Lean production» concepts for its entire operation.

It aim to be simple to use at every levels by small to large companies and cross industries.



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« Origins. »

Lean Thinking :

- Lean production takes its origins from large automotive industry.
- But systemic principles are transferable.



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« Goals. »

Lean Production goals for manufacturing and supply chain:

- High productivity
- Efficiency at low volumes
- Production flexibility
- Rapid, efficient development cycle
- Product mix diversity



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«Muda.»

Lean Production muda (waste) principle :

- The elimination of "waste" is one of the fundamental tenets of "Lean thinking".
- "Waste" may be defined as "any action, process or activity that consumes resources and does not directly add value for a stakeholder".



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«Waste in Production Operations»

The Lean Production System identify seven basic categories of waste:

- **Waiting:** A production operation waiting for maintenance, for material/parts from previous operation, tooling, operator readiness, etc., or production parts waiting in a queue.
- **Transportation:** Excessive movement of materials/tools between production operations, between facilities, or to and from storage.
- **Over-Processing:** Using oversized equipment or equipment not designed for the task at hand; using equipment that has not been properly maintained.
- **Excessive Inventory:** Oversized stocks of raw materials; or stocks of finished goods; or stocks of work in progress as buffers between un-synchronized production operations.
- **Unnecessary Motion:** Human actions/motions beyond the minimum required to achieve the task at hand, i.e. tasks which, in themselves, do not add value.
- **Defective Products:** Parts, materials, sub-assemblies or products that do not meet specifications and which must be scrapped or reworked to bring into conformance.
- **Overproduction:** Producing more than is required or producing before required; any work performed which is not "pulled" by the next stakeholder in the value stream.



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«Information Wastes»

Waste also occurs outside production operations. An important enterprise element in which significant waste can occur is the information system of the enterprise :

- Waiting: Idle time due to unavailable information.
- Transportation (unnecessary movement): (In the case of information, this waste category is the same as Excess Processing, below.)
- Excess Processing: Processing information beyond requirements, e.g. unneeded precision.
- Inventory: Information that is unused or is "work in progress".
- Unnecessary Motion: Any human movement necessitated by poor Information System design.
- Defects: Any element of data, information or intelligence that is erroneous.
- Overproduction: Producing and distributing more information to more people than is needed.



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«Enterprise Level Wastes»

More broadly, waste occurs at the enterprise level in a wide variety of contexts :

- **Waiting/Delays:** Idle time due to late decisions, cumbersome and excessive approvals, and unsynchronized enterprise processes.
- **Transportation:** Unnecessary movement of paperwork; multiple approvals and handoffs.
- **Processing :** Effort expended which does not increase value to any of the enterprise's stakeholders.
- **Inventory:** Unnecessary levels of any enterprise resource: capacity, space, workforce, suppliers.
- **Excessive Motion:** Any human effort that does not increase stakeholder value.
- **Defects/Rework:** Erroneous results from enterprise processes and decisions.
- **Overproduction:** Any creation of enterprise outputs which does not increase stakeholder value.
- **Structural Inefficiencies:** Inappropriate organizational structure, policies or business model.
- **Opportunity Costs:** Lost opportunities, e.g., untapped talent in the workforce.



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•«Enterprise Monuments»

- Womack defines a "monument" as any machine or process which is too large to be moved to accommodate dynamic reconfigurations as the value stream changes and whose scale requires operating in a batch and queue mode.
- A "right-sized tool", on the other hand, is a "design, scheduling or production device that can be fitted directly into the flow of products within a product family so that production no longer requires unnecessary transport, storage and waiting."
- Open source standards give warranty of maintainability : Open give you control, standard give you access to multiple resources.



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«Antidote»

Antidote to Muda, Lean Thinking :

- Pull system : good scheduling, good work coordination, synchronisation when required, dynamic affectation of resources, standardisation of processes,
- Flexibility : Distributed modular architecture, good integration with business system, good configuration control, good process interfaces.
- Quality : product validation at each step, www compliant “who when why”, production statistics monitoring.
- Trust : adequate preventive maintenance, quality of service management monitoring, worker participation in problem solving, security management, fault tolerance, alarm management.
- Innovation : easy access to informations on a pull basis, simple user interfaces, one and only one storage for each required information, online access, mobile access.
- Continuous improvement : up to date policies and procedures immediately available, no redundant activities, clear chain of command, clear chain for approvals, no unnecessary movement of paperwork; no multiple approvals and handoffs.



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«Pull»

Letting the Customer Pull Value from the Enterprise :

- Don't make anything until it is needed.
- Then make it good and as quick as possible.
- Let the consumer pull product from as needed and make it if possible
- Let the consumer pull product from as needed and pick it and produce it in kanban if on demand production is not possible.
- Let the consumer produce it's forecast if batch is required



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«Improvement»

Lean Production keys :

- Kaikaku- radical improvement
- Kaizen- continuous incremental improvement



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«Implementation»

Compiere MFG + SCM objectives has been designed to help companies to implement Lean principles for manufacturing and supply chain :

- Pull and muda principles
- Kaikaku- radical improvement and Kaizen- continuous incremental improvement

Compiere MFG + SCM developed exclusive technologies to reach them :

- Double C pull : Customers pull and Capacities pull which radically improve processes.
- Quality management to help to eliminate wastes.
- WWW principle : who when what which collect process informations required for incremental improvement.
- Open source to avoid “monuments”.



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Benefits of implementing

- No idle items waiting to be processed.
- No idle workers and equipment waiting for items to process.
- Reduced levels of in-process inventories, purchased goods, and finished goods.
- Reduced space requirements.
- Increased product quality and reduced scrap and rework.
- Reduced manufacturing lead times.



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Benefits of implementing

- Greater flexibility in changing the production mix.
- Smoother production flow with fewer disruptions.
- Worker participation in problem solving.
- Pressure to build good relationships with vendors.
- Increased productivity levels and utilisation of equipment.
- Reduction in the need for certain indirect labour



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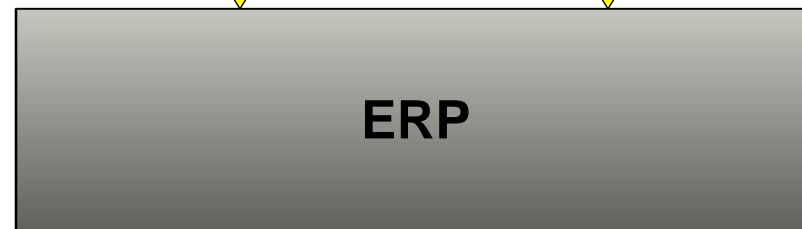
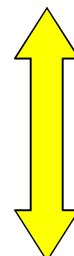
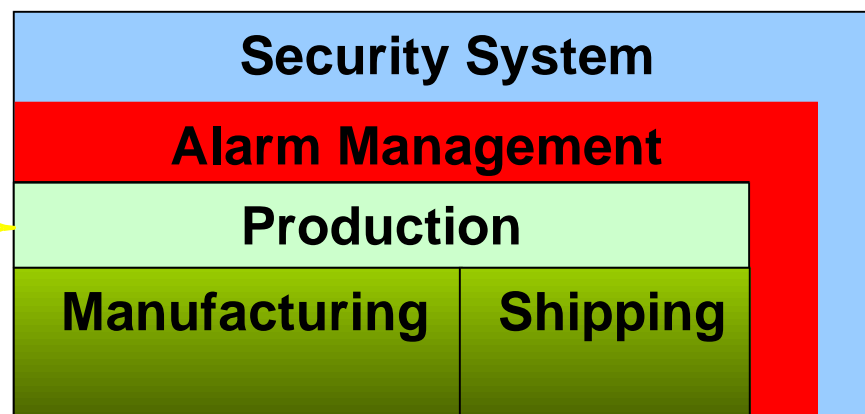
ON DEMAND

KANBAN

ROTATE

BATCH

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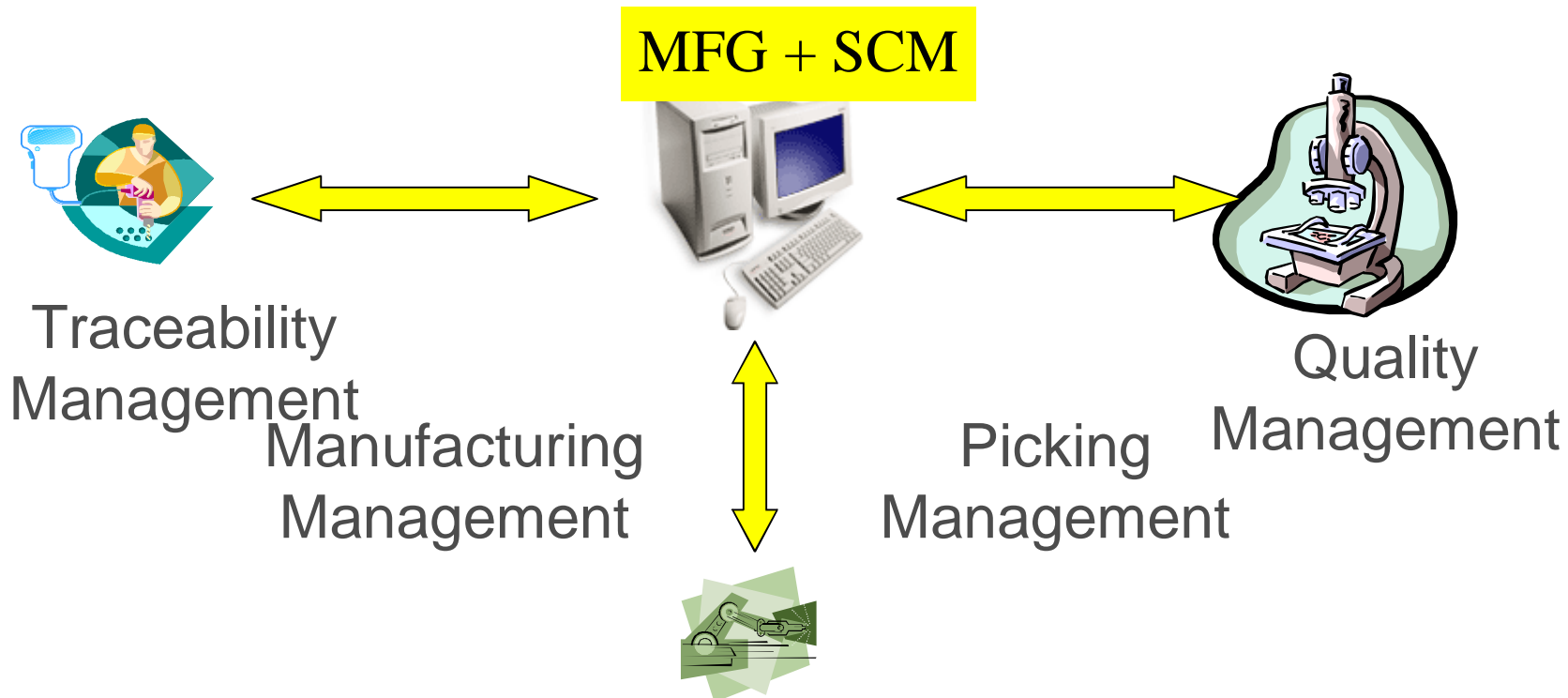




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Exchanges

Compiere MFG + SCM provides a highly programmable communication layer to communicate with SCADA Systems and with ERP to perform specific tasks.



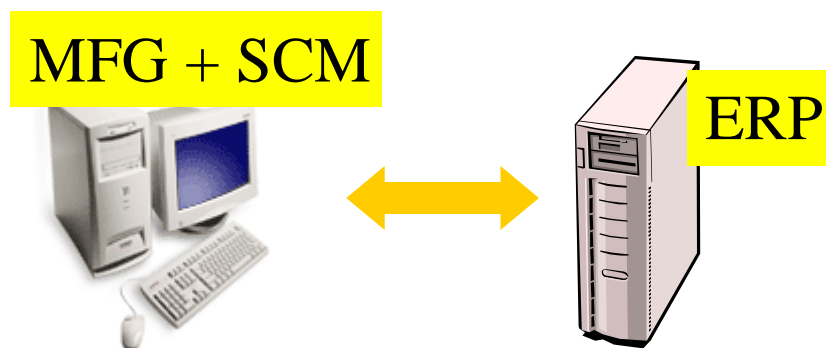


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Compiere MFG + SCM ↔ ERP

Compiere MFG + SCM Manufacturing Execution System (MES) Inventory Management System (IMS) and Supply Chain Management (SCM) functions are designed to complete and not to replace ERP functions.

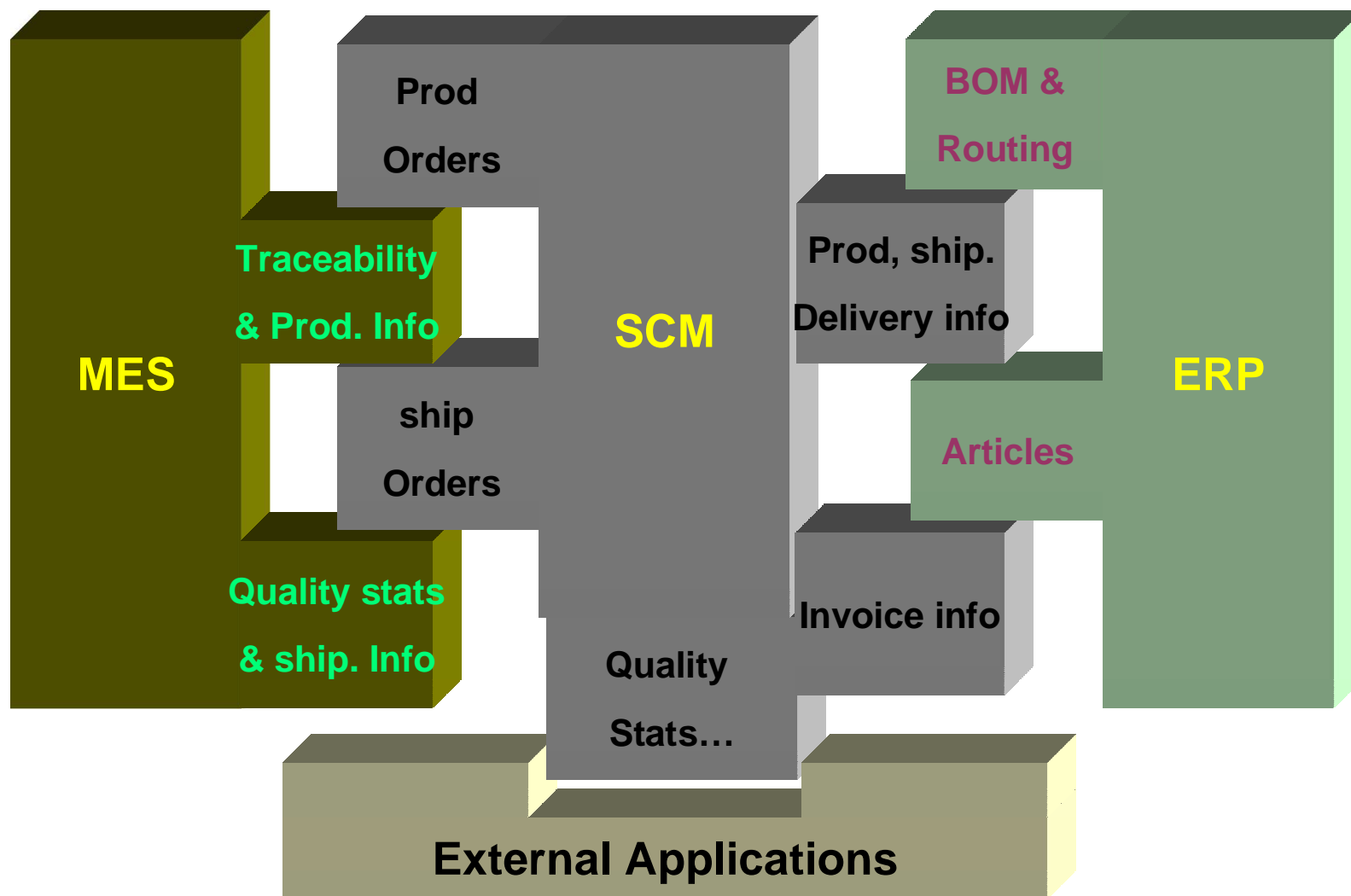
Compiere MFG + SCM collaborates with ERP to : "...deliver what the customer wants, including design changes, when wanted, where wanted, at reasonable cost, with no quality glitches and no environmental degradation" (Dr. Robert Hall-- Association for Manufacturing Excellence)





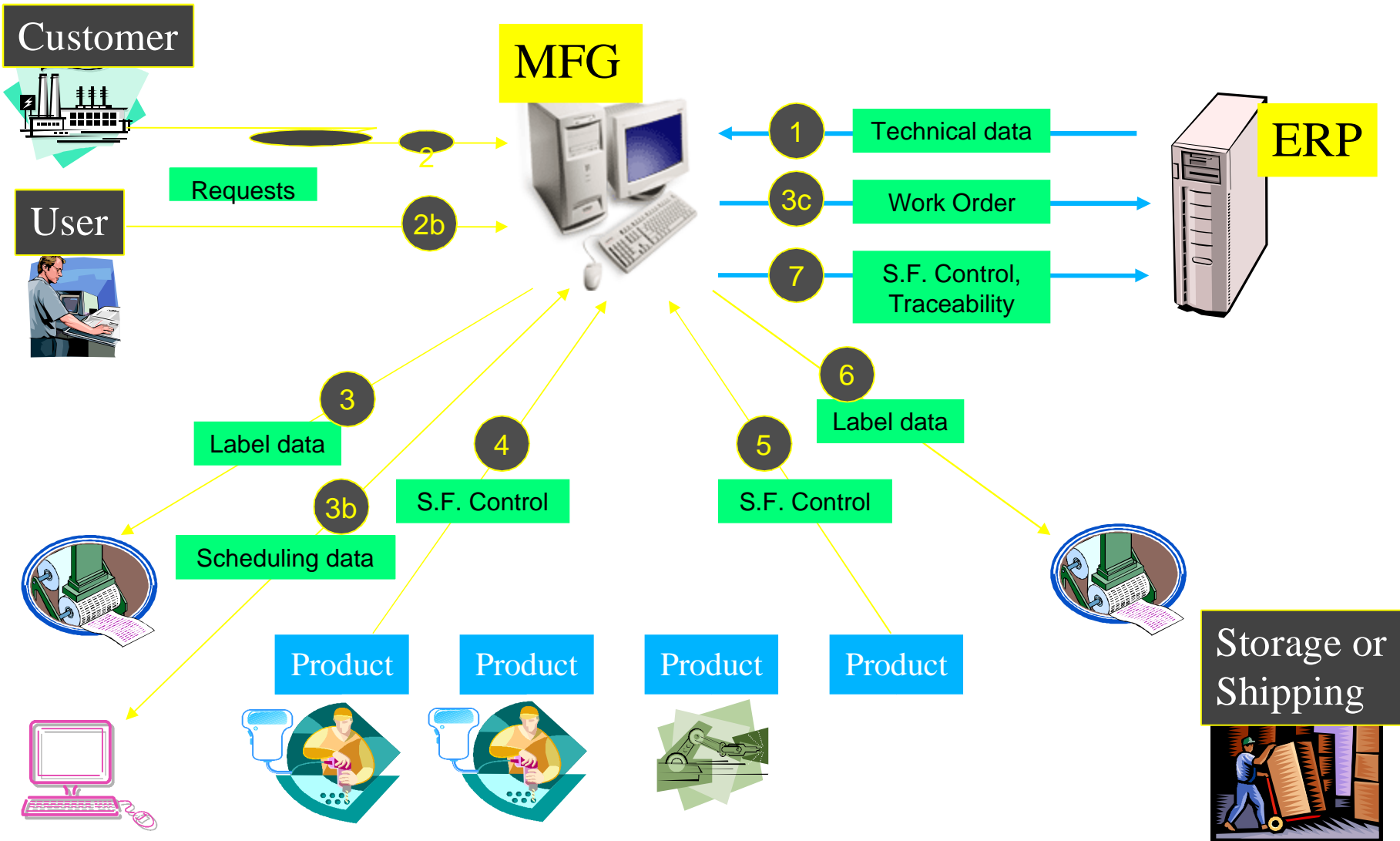
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COMPIERE MFG + SCM ↔ ↗ ↶ ERP



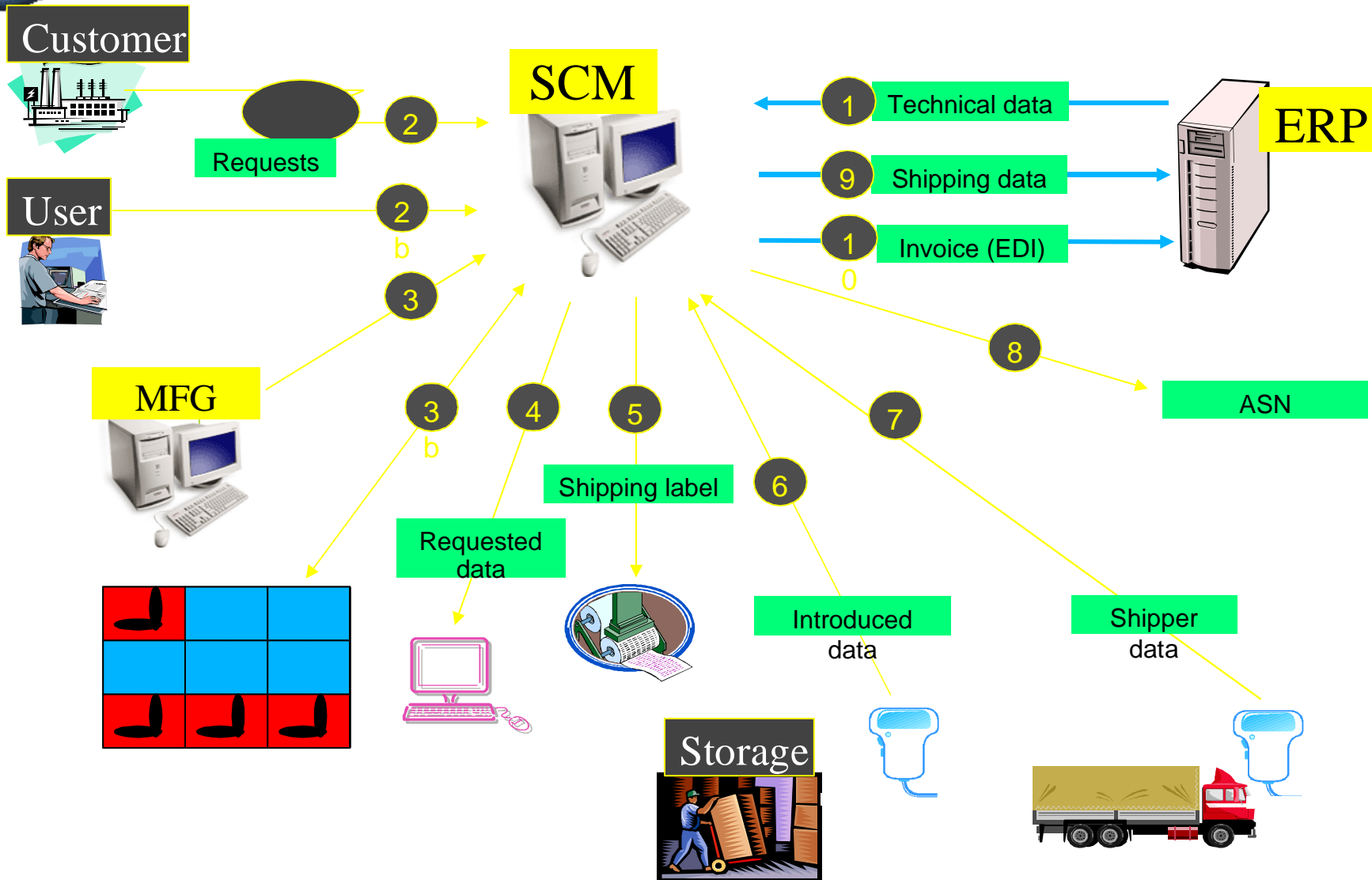


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- **“Compiere MFG + SCM industrialized Roll out”**
 - **Provide simple tools for each stage of Roll out**
 - **Project Academy includes training for those tools**
 - **Local Teams can rely on tools for :**
 - **step by step methodology for local roll out**
 - **help to prioritize project tasks efficiently**
 - **experience capitalization between sites**
 - **providing clear indicators to Central Team (on project status & risk monitoring)**



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- **References”**

- **“Integrating the Lean Enterprise”**

- **By: Joe Mize and Alexis Stanke** © Massachusetts Institute of Technology

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- **“Fundamentals of Lean”**

- **By: Professor Deborah Nightingale** © Massachusetts Institute of Technology

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- **“Lean Enterprise Principles and Practices**

- **By: Professor Deborah Nightingale** © Massachusetts Institute of Technology