

Overview of Optiflow-Le Operations Execution System

Optiflow-Le's proprietary constraint based detailed scheduling & sequencing engine forms the core of OE system.

Unlike traditional scheduling systems, Optiflow-Le's Just-in-Time-Sequencing provides tightly coordinated operational sequences by default. [Raw materials, parts, components and completed assembly](#) are pulled into production on a 'sequenced just-in-time' basis. This initiative helps you to reduce waste and lower inventory across production, supply & distribution chains.

In-bound & out-bound sequencing of material flow is tightly coupled with Kanban-Loop quantities. Enables you to [Receive-to-Sequence](#), [Assemble-to-Sequence](#), [Manufacture-to-Sequence](#) and [Ship-to-Sequence](#) with little or no effort.

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Constraint based detailed Scheduling & Sequencing System

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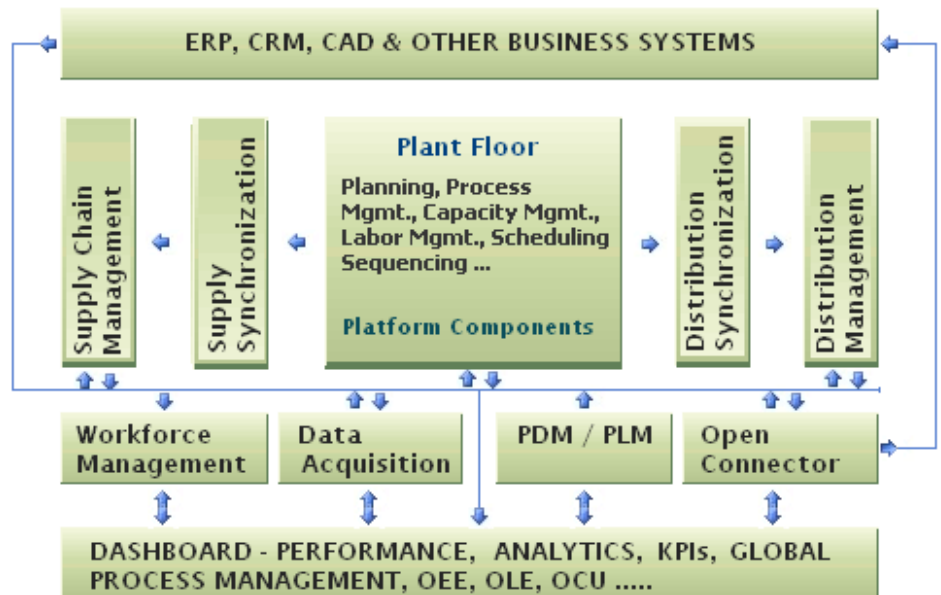
Architecture

Optiflow-Le is more of an Operations Execution system than an MES as it seamlessly integrates enterprise systems to manufacturing operations.

Provides end-to-end integration of supply chain operations, production, maintenance, distribution and labor mgmt.

Enables rapid response to changes in the entire value-chain.

Optiflow-Le Operations Execution Model



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Process Based Platform

Processes form the core of any Operations Execution solution. Get your processes and sequencing right and everything else falls in-line.

Processes can be defined and updated easily enabling rapid response to changes. Information is readily available to planners and managers.

Operating practices can be defined globally, validated once and adopted locally to reduce variability, increase compliance and standardize procedures resulting in increased productivity, cost-efficiency and optimized use of operating facilities.

The screenshot shows the 'Job Definition' window in Optiflow-Le. The window title is 'Optiflow-Le Job Definition'. The main area displays a table with columns: Srt, Part Code, Operation, Resource, Hours Per 1000 Units, Mins. Per 1000 Units, Strls Per 1000 Units, Qty-Ratio to Job-Qty, and No of Operators. The table contains 7 rows of data for 'LOW VOLTAGE CABLE'.

| Srt | Part Code | Operation | Resource | Hours Per 1000 Units | Mins. Per 1000 Units | Strls Per 1000 Units | Qty-Ratio to Job-Qty | No of Operators |
|-----|-------------------|--------------------|----------------|----------------------|----------------------|----------------------|----------------------|-----------------|
| 1 | PN-AL-VN-05 | Drawing | MM-05 Cu | | | 30.00 | 28.055 | |
| 2 | PN-AL-05-BUNCH | Bunching/Stranding | DT-1250 | | 11 | 06.00 | 4.000 | |
| 3 | PN-AL-05-PVC-INS | Insulation | NexTrom LP-120 | | 09 | 00.00 | 4.000 | |
| 4 | PN-AL-05-ASMBLD | Assembly | ST-1800 | | 36 | 00.00 | | |
| 5 | PN-AL-05-FILLED | Filling | NexTrom LP-150 | | 32 | 42.00 | | |
| 6 | PN-AL-05-ARMOURED | Armouring | ST-1800 | | 01 | 50 | 48.00 | |
| 7 | PN-AL-05-SHEETED | Sheathing | NexTrom LP-150 | | | 40 | 00.00 | |
| 8 | | | | | | | | |
| 9 | | | | | 03 | 60 | 06.00 | |
| 10 | | | | | | | | |
| 11 | | | | | | | | |

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Seamless adoption of Lean Methodologies

Optiflow-Le comes with built-in support for Lean Methodologies. Lean practices are enforced by default.

Supports Unit Processing, Batch Processing and Kanban Processing (any quantity in-between unit and batch known as Kanban Loop Quantity ; Toyota Production System).

Value Stream Maps (VSM) are presented in real time as Kanban Replenishment Sequence, Material Replenishment Sequence and Finished Goods Pull Sequence.

| Srl | Current Operation | Change-Over / Cooling Time (hh:mm format) | Kanban / Loop | Next (successor) Operation |
|-----|--------------------|---|---------------|----------------------------|
| 1 | Drawing | | 56130 | Bunching/Stranding |
| 2 | Bunching/Stranding | | 8000 | Insulation |
| 3 | Insulation | | 8000 | Assembly |
| 4 | Assembly | | 2000 | Filling |
| 5 | Filling | | 2000 | Armouring |
| 6 | Armouring | | 2000 | Sheathing |
| 7 | Sheathing | | 2000 | EndOfProcess |

Please refer 'Overview of Lean Planning & Operations' for a detailed discussion.

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Supply Chain Optimization & Synchronization

Material Replenishment Sequence provides date, time and quantity of material requirement at the plant floor.

Optiflow-Lelc provides the mechanism to automatically update this information across the supply chain and other related systems.

Changed plans are brought to the notice of all concerned as a part of the early-warning-system.

| Srl | Date | Order / Job | Operation | Rep. Date-Time | Rep. Qty. | UoM | Start To-Date |
|-----|------------|-------------------------------|----------------------------|----------------------|-----------|-------|---------------|
| | | PVC INSULATION 01 | INS-PVC-01 | | | | |
| 2 | 27/11/2009 | LOW VOLTAGE CABLE JOB ID. ONE | Insulation PN-AL85-PVC-INS | 27/11/2009 - 11 : 59 | 8,800.00 | Mtrs. | 8,800.00 |
| | | STEEL SHEETING CABLE TYPE ONE | CAB-SH-01 | | | | |
| 3 | 24/11/2009 | MED VOLTAGE CABLE JOB ID. TWO | Sheathing PN-AL105-SHEETED | 24/11/2009 - 08 : 28 | 13.20 | Nos. | 13.20 |
| 4 | 30/11/2009 | LOW VOLTAGE CABLE JOB ID. ONE | Sheathing PN-AL85-SHEETED | 30/11/2009 - 10 : 39 | 8.80 | Nos. | 22.00 |
| 5 | | | Sheathing PN-AL85-SHEETED | 30/11/2009 - 11 : 59 | 0.00 | Nos. | 22.01 |
| | | Filling Gel | Filling Gel | | | | |
| 6 | 28/11/2009 | LOW VOLTAGE CABLE JOB ID. ONE | Filling PN-AL85-FILLED | 28/11/2009 - 09 : 53 | 2.20 | Kgs. | 5.50 |
| | | Armour Tape 4 | AD T 4 | | | | |

This information can be effectively used for optimizing and synchronizing material / component / part supplies. At the same time, is also effective in eliminating 'stock-outs'.

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Optimization of Warehousing & Shipping Operations

Finished Goods Pull Sequence provides information on quantities available for dispatch at given intervals.

To synchronize inventory buffers, all you need to do is to supply the required kanban loop quantity to the last process and schedule with backward allocation.

Required inventory buffers can be always maintained.

| Srf | Date | Order / Job | Operation | Time hh:mm | Finished Buffer | Remarks |
|-----|------------|------------------------------------|-------------------------------|------------|-----------------|---------------|
| 1 | 24/11/2009 | MED VOLTAGE CABLE JOB ID. TWO | Sheathing PN-AL105-SHEETED | 12 : 28 | 4,317.00 | |
| 2 | | | | 16 : 28 | 8,633.00 | |
| 3 | | | | 20 : 28 | 12,950.00 | |
| 4 | 25/11/2009 | | | 00 : 30 | 17,266.00 | |
| 5 | | | | 04 : 30 | 21,583.00 | |
| 6 | | | | 08 : 30 | 25,899.00 | |
| 7 | | | | 12 : 18 | 30,000.00 | |
| 8 | 30/11/2009 | LOW VOLTAGE CABLE JOB ID. ONE | Sheathing PN-AL85-SHEETED | 14 : 39 | 6,000.00 | |
| 9 | | | | 18 : 39 | 12,000.00 | |
| 10 | | | | 22 : 39 | 18,000.00 | |
| 11 | | | | 23 : 59 | 20,000.00 | |
| 12 | 09/01/2010 | Single Core Cable Job Id. Three | Coiling PN-D-MH-85-AL | 06 : 00 | 9,203.00 | Extra Time of |

Process of dispatching can be taken beyond maintenance of inventory buffers. Packing, Shipping and Transportation can be added as processes. In this case, transportation becomes the last process. By scheduling with backward allocation and in conjunction with Finished Goods Pull sequence, your entire delivery operations can be optimized and synchronized with the plant floor. Please refer Optiflow-Le documentation for details.

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Constraint based detailed Scheduling & Sequencing System

Optiflow-Le comes with its own proprietary Constraint based detailed Scheduling & Sequencing engine. We are proud to state that, this engine is quite powerful and allows you to do all sorts of things.

You can schedule for Finite Capacity or Open Capacity with forward or backward allocation, for a given shift or all shifts, or any combination thereof.

Facilitates scheduling for Unit Processing or Batch Processing or Kanban Loops (TPS). Sequencing system is quite flexible and you can have one-to-one, one-to-many and many-to-one operational sequences and routings. Many-to-many is also possible in a round-about manner.

You can have as many overlapping shifts as you like.

| Order | Job / W.O.No. | Start Date | Prio rty | Mac Set-Up | Finish Date | Enable F C S | Enable B W S | Assign to Shift | Ignore W I P | Ignore W-H | Ignore O-H |
|-------------------|---------------|------------------|----------|------------|------------------|-------------------------------------|-------------------------------------|-----------------|--------------|------------|------------|
| LOW VOLTAGE CABLE | JOB ID. ONE | 8/11/2009 00:01 | 1 | N | 30/11/2009 23:59 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | | | | |
| MED VOLTAGE CABLE | JOB ID. TWO | 8/11/2009 00:01 | 2 | N | 30/11/2009 23:59 | <input checked="" type="checkbox"/> | | | | | |
| Single Core Cable | Job Id. Three | 20/11/2009 22:00 | 3 | N | 8/1/2010 06:00 | <input checked="" type="checkbox"/> | | Third | | | |

You can assign orders to specific shifts, including split shifts (shifts that span two days) or 'ALL' shifts.

You have six constraint handlers. Combinations of these handlers allows you to handle most constraints.

You can specify 'set-up' time per operation / per job / per sequence.

Optiflow-Le also includes a powerful Workforce Planning, Scheduling and Tracking system.

Here again, you can have as many Categories, Divisions and Shifts as you need.

Also facilitates selective workforce substitutions.

It just takes a single click to assign operators.

Includes a powerful tracking system.

| Srl | Operation | Operator | Resource | Srl | Schedule |
|-----|--------------------|--|----------------|-----|--|
| 1 | Drawing | S1 Operator - 13 | MM-85 Cu | 1 | S1 27/11/2009 08:40 - 27/11/2009 13:20 |
| 2 | Bunching/Stranding | S1 Operator-19 S2 Assistant - 8 S3 Assistant - 3 | DT-1250 | 1 | S1 27/11/2009 08:10 - 27/11/2009 14:00 S2 27/11/2009 14:00 - 27/11/2009 22:00 S3 27/11/2009 22:00 - 27/11/2009 23:58 |
| 3 | Insulation | S1 Operator - 14 S2 Assistant - 5 S3 Operator - 11 | NexTron LP-120 | 1 | S1 27/11/2009 11:59 - 27/11/2009 14:00 S2 27/11/2009 14:00 - 27/11/2009 22:00 S3 27/11/2009 22:00 - 27/11/2009 23:59 |
| 4 | Assembly | S1 Operator - 12 S3 Assistant - 2 | ST-1600 | 1 | S1 28/11/2009 06:00 - 28/11/2009 10:59 S3 27/11/2009 22:58 - 28/11/2009 06:00 |
| 5 | Filing | S1 Operator - 13 S2 Operator - 16 | NexTron LP-150 | 1 | S1 28/11/2009 09:53 - 28/11/2009 14:00 S2 28/11/2009 14:00 - 28/11/2009 20:47 |
| 6 | Annouring | S1 Operator-19 S2 Operator-24 S3 Operator - 1 | ST-1600 | 1 | S1 30/11/2009 11:00 - 30/11/2009 14:00 S2 30/11/2009 14:00 - 30/11/2009 22:00 S3 30/11/2009 22:00 - 30/11/2009 23:58 |
| 7 | Sheathing | S1 Assistant - 9 S2 Assistant - 6 S3 Operator - 11 | NexTron LP-150 | 1 | S1 30/11/2009 10:39 - 30/11/2009 14:00 S2 30/11/2009 14:00 - 30/11/2009 22:00 S3 30/11/2009 22:00 - 30/11/2009 23:59 |

Please refer 'Overview of Planning & Operations' for a detailed view of the scheduling engine, constraint handlers and workforce scheduling & tracking.

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Asset Management

In any manufacturing facility, preventive maintenance is important, at times, critical.

Our maintenance management module provides an easy-to-use interface to plan, schedule, track, manage and report maintenance tasks. Includes equipment, fleet and facility maintenance.

An equipment can be any resource; machinery, fleet of vehicles, buildings, estates any asset.

Comes with separate modules for maintenance tracking and breakdown reporting.

Optiflow-Le :: Maintenance Scheduling

Buttons: Check, Schedule, Exit, Reset, Abort

Options: Select ALL, Repeat Mac Serials, Repeat Start-Finish Time, Ignore Holidays

Equipment: CCV Line

Date From: 23/11/2009, Date To: 30/11/2009

| Day | Date | Select | Serial From | Serial To | Start Time (HH:MM) | Finish Time (HH:MM) | Serials Not Available |
|-----|------------|-------------------------------------|-------------|-----------|--------------------|---------------------|-----------------------|
| Mon | 23/11/2009 | <input checked="" type="checkbox"/> | 1 | 1 | 01:55 | 02:45 | 1 |
| Tue | 24/11/2009 | <input checked="" type="checkbox"/> | 1 | 1 | 01:55 | 02:45 | 1 |
| Wed | 25/11/2009 | | | | | | |
| Thu | 26/11/2009 | <input checked="" type="checkbox"/> | 1 | 1 | 01:55 | 02:45 | 1 |
| Fri | 27/11/2009 | <input checked="" type="checkbox"/> | 1 | 1 | 01:55 | 02:45 | 1 |
| Sat | 28/11/2009 | <input checked="" type="checkbox"/> | 1 | 1 | 01:55 | 02:45 | 1 |
| Sun | 29/11/2009 | | | | | | |
| Mon | 30/11/2009 | <input checked="" type="checkbox"/> | 1 | 1 | 01:55 | 02:45 | 1 |

Summary: 23/11/2009 Srl : 1 Overlaps with MnTn #2
 24/11/2009 Srl : 1 Overlaps with MnTn #2
 26/11/2009 Srl : 1 Overlaps with MnTn #2
 27/11/2009 Srl : 1 Overlaps with MnTn #2

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Performance Tracking

Performance tracking includes OEE, OLE, Overall Capacity Utilization, Overall Performance, Quality, Rejects & Reworks, Planned down time, Un-planned downtime, Set-Up time and Capacity Utilization ... and many more.

All these and other performance metrics can be tracked for a given period of time.

Optiflow-Le :: Factory Intelligence :: Evaluation

Menu: File, Processes, Schedules, Equipment, Capacities, Workforce, Kanban, WIP, Costing, Asset Mgmt, PDM, Forecast, User, SetUp, Servers, History, Help

Buttons: Prod. Schedule, Planning Board, Variance, Kanban Full Seq., Mat. Rep. Seq., Fin. Goods, Full Seq., OEE, OLE, OCU

| Equipment Effectiveness | 81.22% |
|---------------------------------|--------|
| Labor Effectiveness | 86.00% |
| Performance | 90.00% |
| Quality | 95.00% |
| Rejects and Reworks | 9.00% |
| Capacity Utilization - Forecast | 10.72% |
| Planned Down Time | 0.44% |
| Un-Planned Down Time | 0.44% |
| Set Up Time | 3.39% |
| Capacity Utilization | 32.17% |

| Sl. | Order / Job | Job Qty. Del. Date | Status Shift | Work-in Progress | Rejects Reworked | Q.C | Start - Finish |
|-----|---|--------------------|---------------|------------------|------------------|--------|--|
| 1 | LOW VOLTAGE CABLE JOB ID. ONE PN-ALB5-SHEETED | 30,000 31/12/2009 | (Shift - ALL) | Sheathing 15,000 | 899 720 | 17,101 | 26/11/2009 - 00:11 26/11/2009 - 14:01 |
| 2 | MED VOLTAGE CABLE JOB ID. TWO PN-ALL5-SHEETED | 30,000 31/12/2009 | (Shift - ALL) | Sheathing 27,000 | 1,351 1,060 | 25,649 | 11/12/2009 - 18:58 14/12/2009 - 00:30 |
| 3 | Single Core Cable Job Id. Three PN-D-RH-05-AL | 10,000 31/12/2009 | (Shift - ALL) | Coiling 8,999 | 451 356 | 8,540 | 03/12/2009 - 02:53 03/12/2009 - 16:11 |

Refresh Interval: 1 mts. Metrics Date Range: 23/11/2009 - 25/11/2009. Last Refresh at 21:23 Hrs.

Optiflow-Le is the first and only MES/OES solution to provide Overall Labor Effectiveness.

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Product Data Management

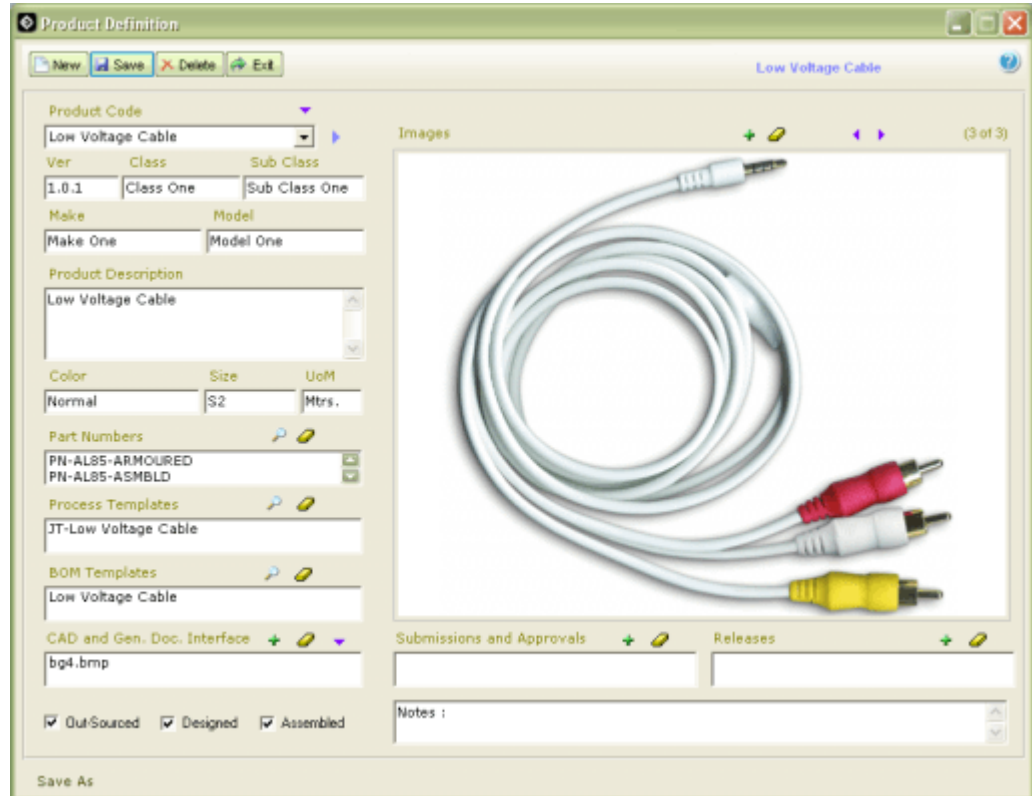
Optiflow-Le comes with a simple, yet powerful tool to manage product data and lifecycle.

Includes part definitions, process definitions, material definitions and material requirement.

Provides an interface to link to CAD/CAM applications.

Also provides links to handle submissions, approvals and releases.

Comes with user management functions and visibility management at the document level.



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Real-time Factory Intelligence

Apart from KPI's as mentioned above, factory intelligence includes :

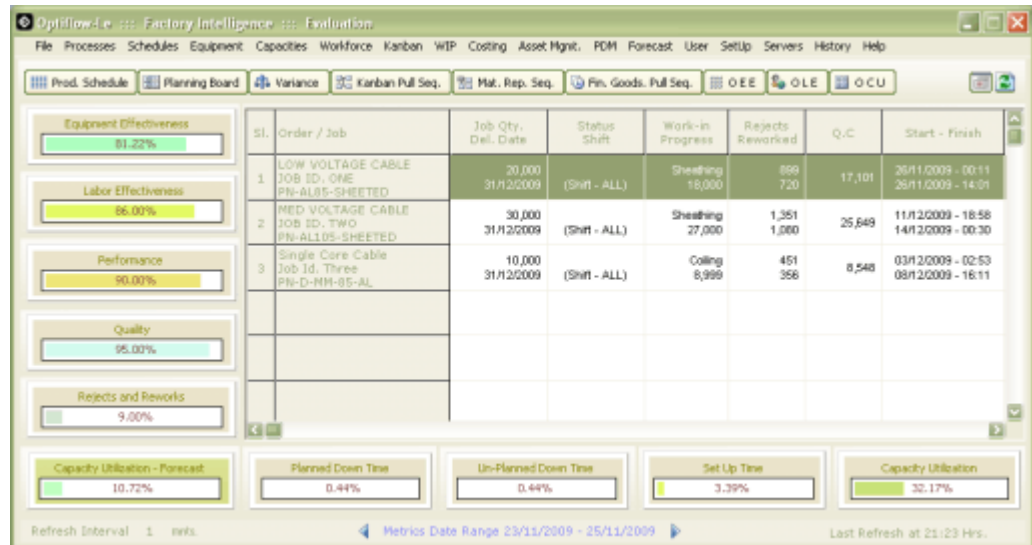
In-depth Labor performance tracking

Equipment tracking

Work-in-Progress tracking

Material & kanban tracking

Capacity utilization tracking ... and many more.



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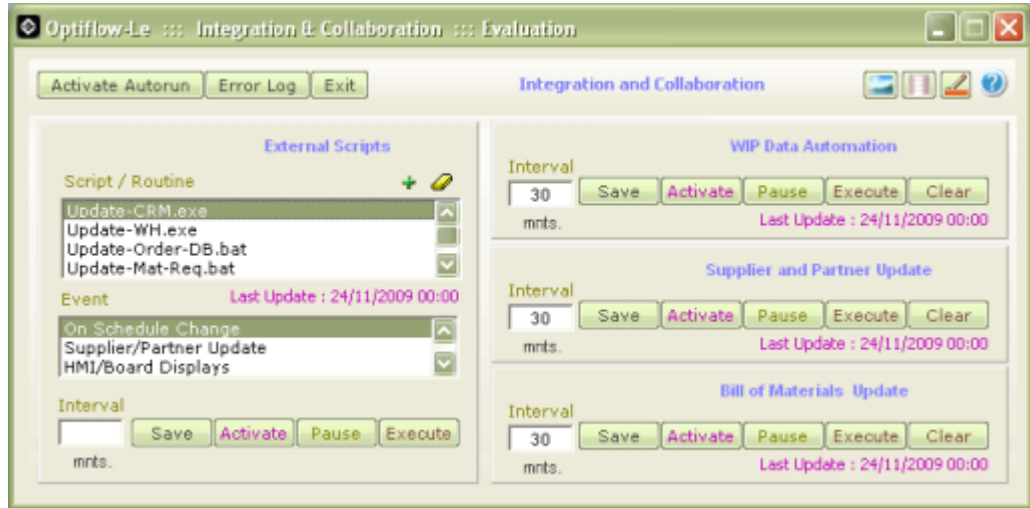
Data Acquisition

WIP data can be manually updated through Optiflow-LeDA - a separate module.

Data acquisition through platform components such as OPC controls and SCADA can be automated.

Updates from SCM / CRM and collaborating partners can also be automated.

All you need are a few scripts added to 'external scripts'.



Please refer Optiflow-LeIc documentation wherein procedures are explained in detail.

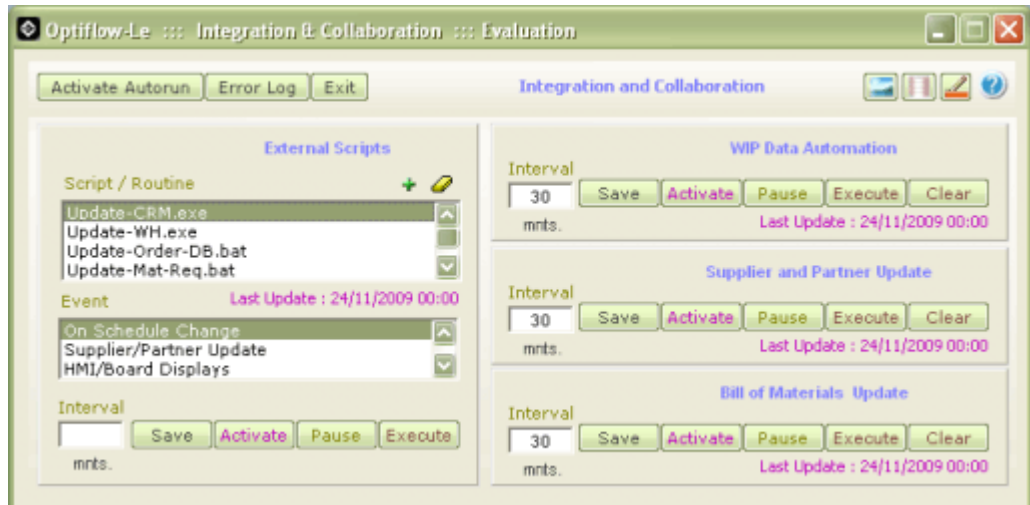
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Plant-to-Enterprise Integration

Optiflow-LeIc provides the mechanism to integrate plant-floor with rest of the world.

It is as easy as adding simple routines and / or executables to 'external scripts' and providing a triggering event and a time interval.

Standards and compliances won't apply here as we have a layer in between.



Please refer Optiflow-LeIc documentation for details.

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