

Pulse

IBM SolutionsConnect 2013

Planning & Scheduling

Today and Tomorrow

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Agenda

- How it all started?
- Client involvement during the development phase
- Key capabilities
- Best practices
- Upcoming release





Customer Demand

- Maximo customers want the ability to visualize work schedules and related demand on resources (material, tools, labor, asset, location etc..)
- Historically, customers have used Project, Primavera or even Excel to do work and labor scheduling
- These tools are appropriate for some customers, yet these planning tools are sometimes viewed as too heavy, and require extra work to integrate, to synchronize, and to maintain with Maximo.
- The request for a visual scheduler has continued to increase over the years



View Work Schedules

The screenshot displays the IBM Work Schedules interface. The top section shows a Gantt chart for schedule SCH231, with a task list on the left. The task list includes items like 'Chute and trolley system', 'System engineering', 'Detail drawings', 'Operating and maintenance manual', 'Installation procedures', 'Design completion', 'Fuel handling tools', 'Engineering and layout drawings', 'Install latches and dowels', 'Install turntable', 'Install transfer table', 'Build out-bay work platform', 'Install tool rack', 'Install task drawers', and 'Install inspection telescope'. The Gantt chart shows the duration of these tasks from June 17, 2013, to June 18, 2013.

The bottom section shows a resource load chart for 'Schedule: 231' under the 'Crafts' category. The chart displays the load for four resources: Electrician (orange), Machinist (light blue), Mechanic (dark blue), and Carpenter (yellow). The load is highest on June 17, 2013, and lowest on June 18, 2013.

Two callout boxes provide additional information:

- Work Orders/Tasks**: A blue box pointing to the task list.
- Modify**: A blue box listing: - Schedule Dates, - Duration, - Work Order Dependencies.
- Craft Requirements**: A blue box pointing to the resource load chart.
- View Craft load Compare load vs availability**: A blue box pointing to the resource load chart.



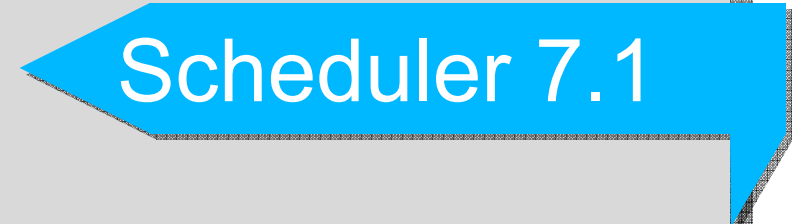
Scheduler then...

Gantt View to visualize work orders and tasks

- *Drag & drop work orders & tasks*
- *Manage dependencies*
- *Perform CPM*
- *View resource load and availability*

Work Orders

- *Date constraints*
- *Task dependencies*

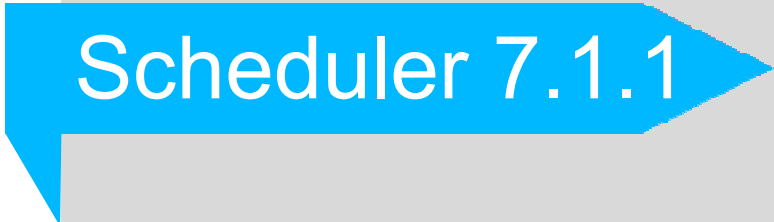


Gantt View to visualize PM forecasts

- *View and manage future PMs and Work Orders*
- *View resource load and availability for both future PMs and Work Orders*

Work Orders

- *Bulk Reschedule*
- *Assignment Manager tab in Work Order application*

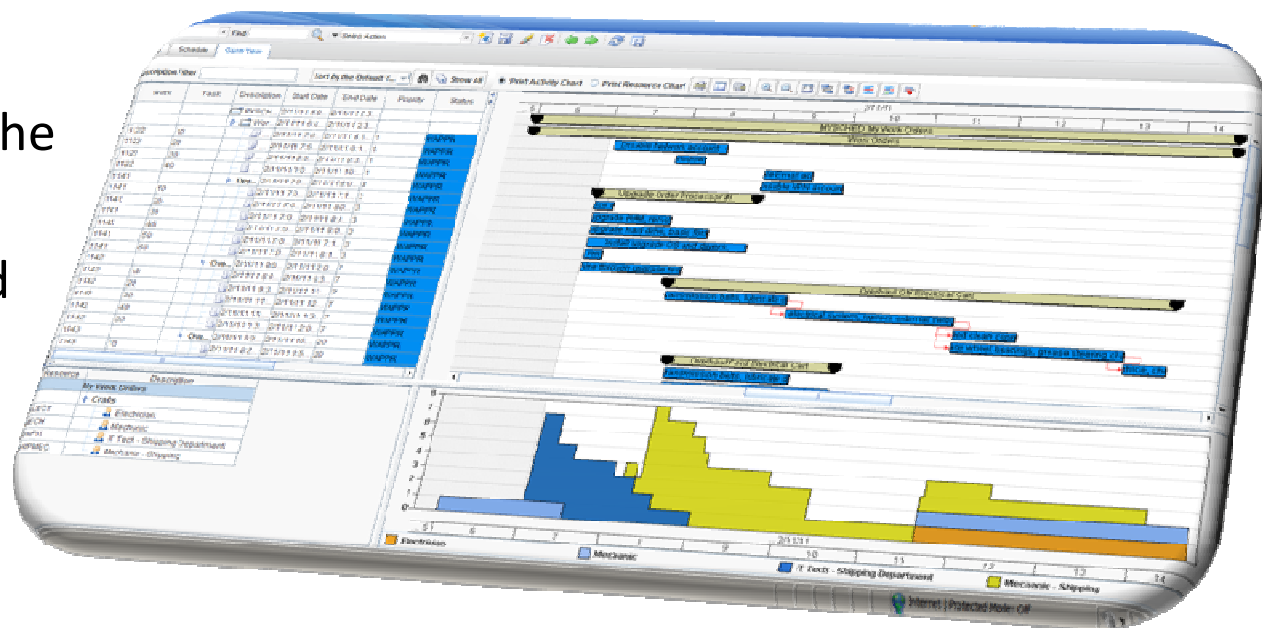




A Revised Approach to Work Management

Scheduler is not just a planning & scheduling tool !

- It is also a labor assignment tool where supervisors can view labor availability (vacation, previous assignments, overtime etc..) and make assignments
- It is a Dispatching application where the location of Crews and Labor, and the progress of work can all be monitored
- It is Maximo Everyplace applications designed to make the job of the field technician all that much easier





Focus Areas

Planning

Scheduling

Assignment

Dispatching

**Real-time
Communication**

**Forecast Work
Identify Resource
Gaps**

**Availability:
Assets
Location
Material
Tools
Labor/Crews**

**Graphical UI
Labor and Crews**

**Graphical UI
Public Map
Control
Labor and Crews**

**Assign
Emergency Work
Communication
To Field
Technicians**

Schedule Compliance



Target Markets

Our strength has always been in organizations seeking a single product to maintain their assets across all asset classes!

- Utilities
- Manufacturing
- Facilities
- Federal, State, & Municipal gov'ts
- Oil & Gas
- Service Providers

These same organizations desire a single product to create:

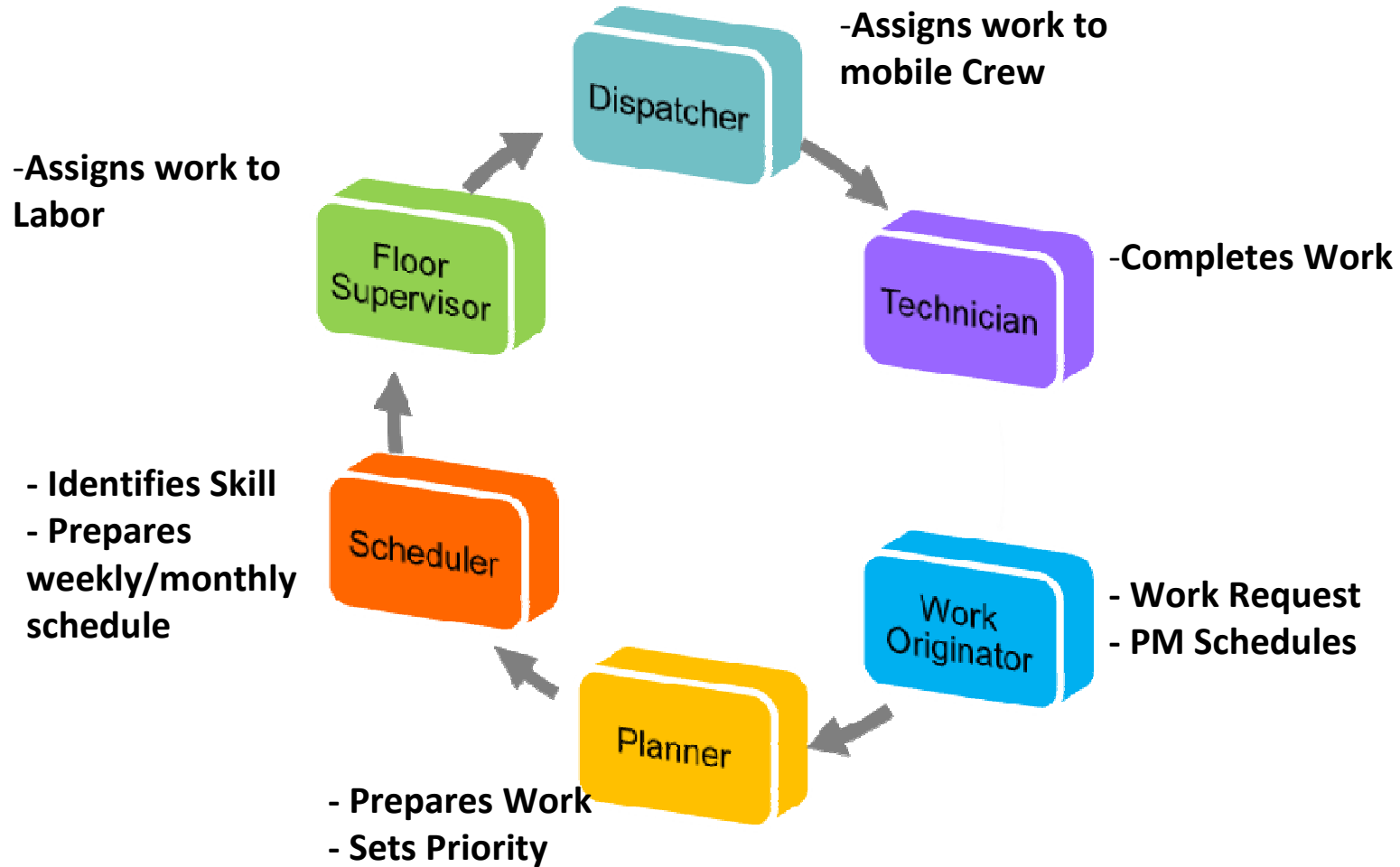
- an optimal schedule that is meaningful and achievable
- Quick, easy to perform, and reliable labor assignments
- Be aware of Crew and Labor location, sequenced dispatched work, and be able to effectively deal with new incoming work
- Provide field technicians with a dynamic route of daily work, directions to work locations, a view of nearby work and co-workers, and a means to manage their work, all on a mobile device



Functionality, Use Cases and Value by role



Work Order Lifecycle & User Roles



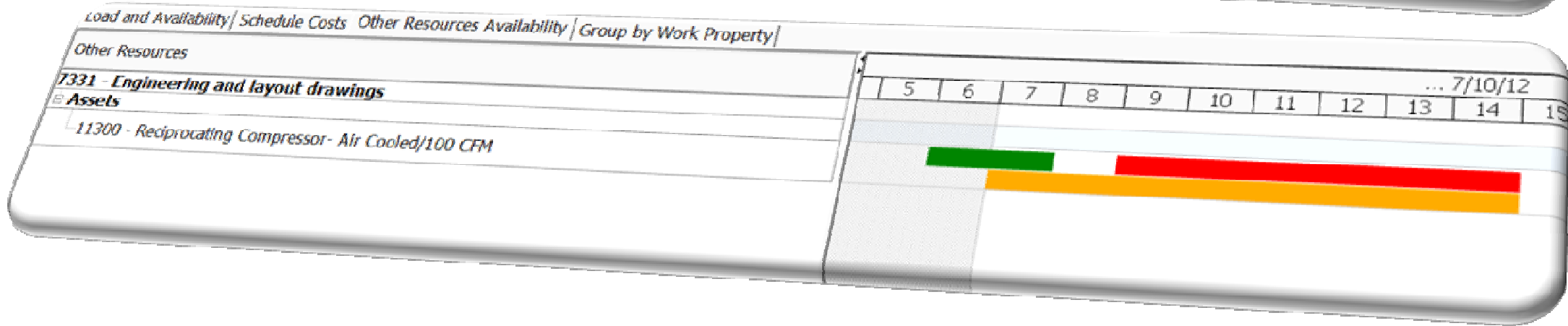
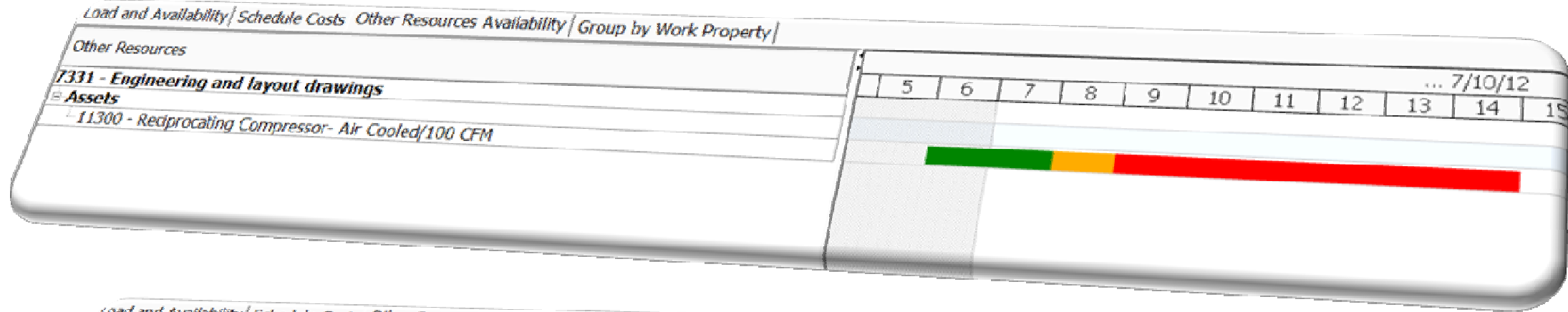


Planners and Schedulers





Asset & Location Availability

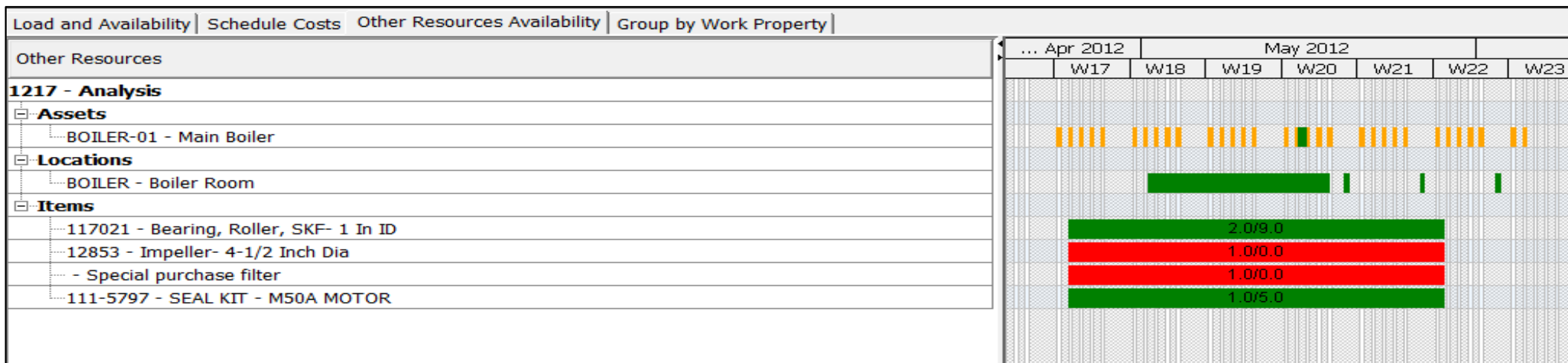




Material Availability

Other Resource Availability tab shows:

- Maintenance/Operational/Calendar availability of Asset and Location
- Material Availability for planned materials
 - Shows required quantity vs available quantity
 - Green bar shows materials are available, red bar shows materials are unavailable
- Planners & Schedulers know when not to schedule work based on material availability

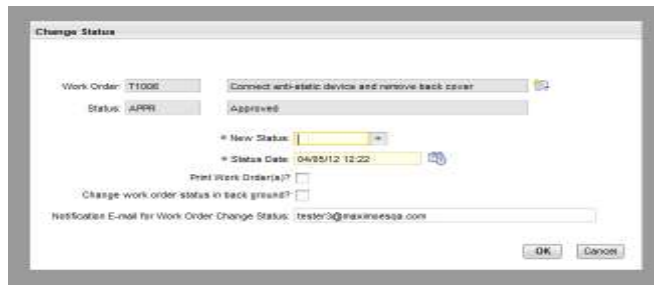




Work Order Actions

Work Order Actions

- Allow status changes on multiple work orders/tasks



Additional Toolbar Buttons



- Zoom to Week
- Go To Day
- Constrain horizontal scrolling to the date range containing work
- Filter resources based on selected work orders
- Show/Hide Compliance
- Full Screen

List | Schedule | **Gantt View** | Cost | Compliance

Description Filter: [] Sort by the Default V... [] Show All [] Activity Chart []

Work	Task	Description	Start Date	End Date
		MYSCHED My Work Orders	5/5/10 ...	3/4/12 ...
		Work Orders	5/5/10 ...	3/4/12 ...
1141		Processor #1	2/11/11...	2/11/11...
1141		device and remove back cover	2/11/11...	2/11/11...
1141		1, remove dust	2/11/11...	2/11/11...
1141		drive, basic formatting	2/11/11...	2/11/11...
1141		and drivers	2/11/11...	2/11/11...
1141		and remove anti-static device	2/11/11...	2/11/11...
1141		gh upgrade testing cycle	2/11/11...	2/11/11...
1142		ical Cart	2/11/11...	2/11/11...
1142		n belts, lubricate drive chain	2/11/11...	2/11/11...
1142		n, replace external switches	2/11/11...	2/11/11...
1142		clean connecting terminals	2/11/11...	2/11/11...
1142		ngs, grease steering chassis	2/11/11...	2/11/11...
1142		le, check safety points	2/11/11...	2/11/11...
1143		Overhaul	2/11/11...	2/11/11...
1143		n belts, lubricate drive chain	2/11/11...	2/11/11...
1143		n, replace external switches	2/11/11...	2/11/11...
1143		clean connecting terminals	2/11/11...	2/11/11...
1143		ngs, grease steering chassis	2/11/11...	2/11/11...
1143		le, check safety points	2/11/11...	2/11/11...
1150		12345	2/11/11...	2/11/11...
1157		15	2/11/11	2/11/11

Context menu for 1141:

- Change Status
- Initiate Workflow
- Modify Work Details
- Select Owner
- Create Communication
- View Item Availability
- Create Work Order
- Create Job Plan
- Assign to New Parent
- Create SR
- Create Incident
- Create Problem
- Create Change
- Create Release
- Go To Quick Reporting
- Go To Work Order Tracking
- Go To Everyplace Technician (Tablet)



Schedule Cost

Calculate costs within schedule by week, month and year

- Illustrate Tools, a
- Allows b

Services and

Week Month Year

Work Cost Filter 1 - 4 of 4

Year	Week	Saved Est. Labor	Actual Labor	Saved Est.
2005	6	0.00	0.00	
2011	7	532.40	175.00	
2011	8	119.25	0.00	
2011	10	0.00	0.00	

Details

Year: 2011

Total Cost

Committed Est. Total: 0.00

Saved Est. Total: 169.68

Actual Total: 5,498.00

Service Cost

Committed Est. Service: 0.00

Saved Est. Service: 0.00

Actual Service: 5,222.00

Scheduler

Week Month Year

Work Cost Filter 1 - 4 of 4

Year	Week	Saved Est. Labor
2005	6	0.00
2011	7	532.40
2011	8	119.25
2011	10	0.00

Details

Year: 2011

Total Cost

Committed Est. Total: 0.00

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Committed Est. Service: 0.00

Saved Est. Service: 0.00

Actual Service: 5,222.00

Committed Est. Total: 0.00

Saved Est. Total: 169.68

Actual Total: 5,498.00

Committed Est. Service: 0.00

Saved Est. Service: 0.00

Actual Service: 5,222.00

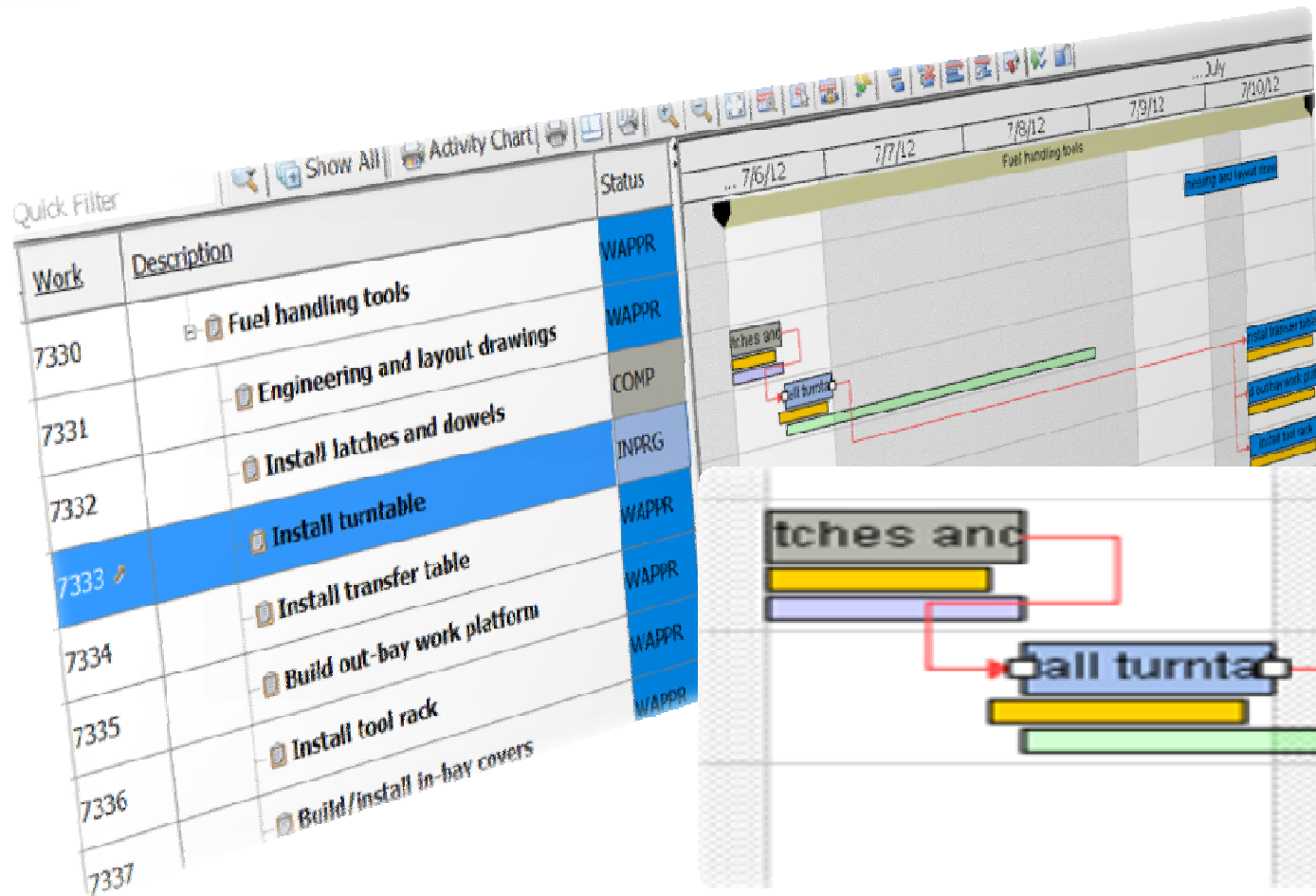
Committed Est. Material: 0.00

Saved Est. Material: 50.43

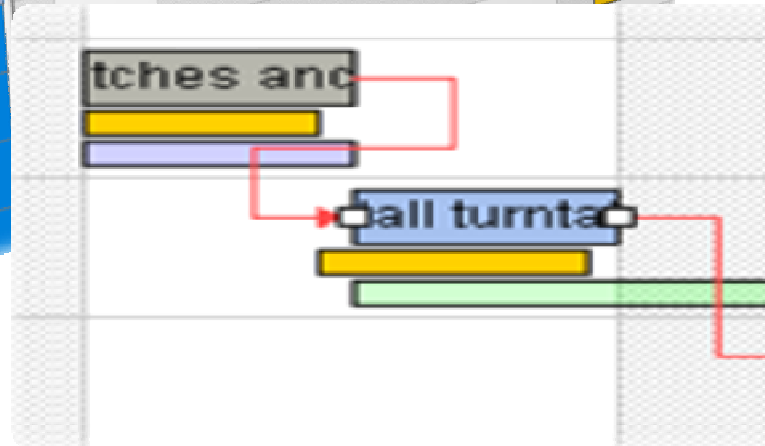
Actual Material: 276.98



Schedule Compliance



Allows Planners & Schedulers to get a view of how work is progressing, and the effect of the progress on related work



- Target
- Scheduled
- In Progress
- Completed



Shop Floor Planners





Graphical Assignment

New application aimed at the process of assigning work to people

- Similar UI to Scheduler Gantt view for consistency
- Helps the Planner & Scheduler see non work time for a resource, as well as assignments made by

The screenshot displays the 'Graphical Assignment' application interface. The top section features a 'Quick Filter' and a 'Gantt View' tab. Below this is a table listing tasks with columns for Work, Task, Description, Start Date, End Date, Priority, Status, Asset, Location, and Resources. The tasks listed include LONB1159 through LONB1173, all with a status of 'APPR' and a start date of 29/05/12.

Work	Task	Descript...	Start Date	End Date	Priority	Status	Asset	Location	Interrupti...	Resources
LONB1159		...	29/05/12 ...	29/05/12 ...	9	APPR	LON104	LON104	N	
LONB1161		...	29/05/12 ...	29/05/12 ...	12	APPR	LON105	LON105	N	
LONB1162		...	29/05/12 ...	29/05/12 ...	6	APPR	LON106	LON106	N	
LONB1163		...	29/05/12 ...	29/05/12 ...	2	APPR	LON107	LON107	N	
LONB1164		...	29/05/12 ...	29/05/12 ...	8	APPR	LON122	LON122	N	
LONB1165		...	29/05/12 ...	29/05/12 ...	1	APPR	LON108	LON108	N	
LONB1167		...	29/05/12 ...	29/05/12 ...	2	APPR	LON117	LON117	N	
LONB1170		...	29/05/12 ...	29/05/12 ...	7	APPR	LON119	LON119	N	
LONB1172		...	29/05/12 ...	29/05/12 ...	3	APPR	LON109	LON109	N	
LONB1173		...	29/05/12 ...	29/05/12 ...	4	APPR	LON120	LON120	N	

The bottom section of the interface shows a 'Resource Schedule' for 'Other Resources Availability'. It lists resources such as CARP (Carpenter), MECH (Mechanic), and ELECT (Electrician) with their respective descriptions, default shifts, and vendors. To the right of this list are two Gantt charts for the date 'Tue May 29, 2012', showing task assignments and resource availability over a 24-hour period.



Graphical Assignment

New application aimed at the process of assigning work to people

- Similar UI to Scheduler Gantt view for consistency
- Helps the Planner & Scheduler see non work time for a resource, as well as assignments made by

The screenshot displays the 'Graphical Assignment' application interface. The main window shows a Gantt chart with various tasks and resources. The tasks are represented by colored bars (green, yellow, grey) and labels like 'NB11', 'Lond', 'for London', and 'Lond'. The resource list on the left includes 'Create London SLRs', 'Crafts', 'Carpenter', 'Mechanic', and 'Electrician'. The interface also features a 'Quick Filter' and 'Show All' buttons, and a 'Resource Schedule' section at the bottom.

Work	Task	Descripti...	Start Date	End Date
LONB1159			29/05/12 ...	29/05/12 ...
LONB1161			29/05/12 ...	29/05/12 ...
LONB1162			29/05/12 ...	29/05/12 ...
LONB1163			29/05/12 ...	29/05/12 ...
LONB1164			29/05/12 ...	29/05/12 ...
LONB1165			29/05/12 ...	29/05/12 ...
LONB1167			29/05/12 ...	29/05/12 ...
LONB1170			29/05/12 ...	29/05/12 ...
LONB1172			29/05/12 ...	29/05/12 ...
LONB1173			29/05/12 ...	29/05/12 ...

Resource	Description
Create London SLRs	
Crafts	
CARP	Carpenter
LONLIBER	Diane Lit
MECH	Mechanic
LONHENRY	Earl He
LONSTAN	Fred Stan
ELECT	Electrician
LONFORD	Jerry F.



Making an Assignment

Allows the Foreman to:

- Split Work According to Shifts, might be used if extending duration of the assignment across an end of shift
- Split Work, once split can drag second assignment to add a time gap
- Split Work into Three Records, creates two additional assignments

The screenshot shows the 'Graphical Assignment' software interface. The top part displays a table with columns for Work, Task, Description, Start Date, End Date, and Priority. Below this is a Gantt chart showing assignments for 'Tue 08' and 'Wed 09'. The bottom part shows a 'Resource Schedule' table with columns for Resource, Description, Default S..., Shift, and Default vendor.

Work	Task	Description	Start Date	End Date	Priority
		TEST01 Next Week Schedule	08/05/12	29/05/12	...
		Work Orders	08/05/12	09/05/12	...
1205	Test 01	Assignment	08/05/12	08/05/12	...
		Test 01(MECH)	08/05/12	08/05/12	...
		Test 01(ELECT)	08/05/12	08/05/12	...
1206	Test 02	Assignment	09/05/12	09/05/12	...

Resource	Description	Default S...	Shift	Default vendor
	Next Week Schedule			
	Crafts			
	Mechanic			
JEFF...	Andrew Jeffery	FIRSTCLA...	DAY	EMI
JOS	Joe Torry	SECONDC...	DAY	
ELECT	Electrician			
BALL	Allan Ball	FIRSTCLA...	DAY	
POTTER	Dom Potter	FIRSTCLA...	DAY	CMC

The screenshot shows the 'Graphical Assignment' software interface with a different view. The top part displays a table with columns for Work, Task, Description, Start Date, End Date, and Priority. Below this is a Gantt chart showing assignments for 'Tue 08' and 'Wed 09'. The bottom part shows a 'Resource Schedule' table with columns for Description, Default S..., Shift, Default vendor, and Res....

Work	Task	Description	Start Date	End Date	Priority
		TEST01 Next Week Sch...	08/05/12	29/05/12	...
		Work Orders	08/05/12	09/05/12	...
1205	Test 01	Assignment	08/05/12	08/05/12	...
		Test 01(MECH)	08/05/12	08/05/12	...
		Test 01(ELECT)	08/05/12	08/05/12	...
1206	Test 02	Assignment	09/05/12	09/05/12	...

Description	Default S...	Shift	Default vendor	Res...
Next Week Schedule				
Crafts				
Mechanic				MECH
Andrew Jeffery	FIRSTCLA...	DAY	EMI	JEFF...
Joe Torry	SECONDC...	DAY		JOS
Electrician				ELECT
Allan Ball	FIRSTCLA...	DAY		BALL
Dom Potter	FIRSTCLA...	DAY	CMC	POTT...



Dispatchers



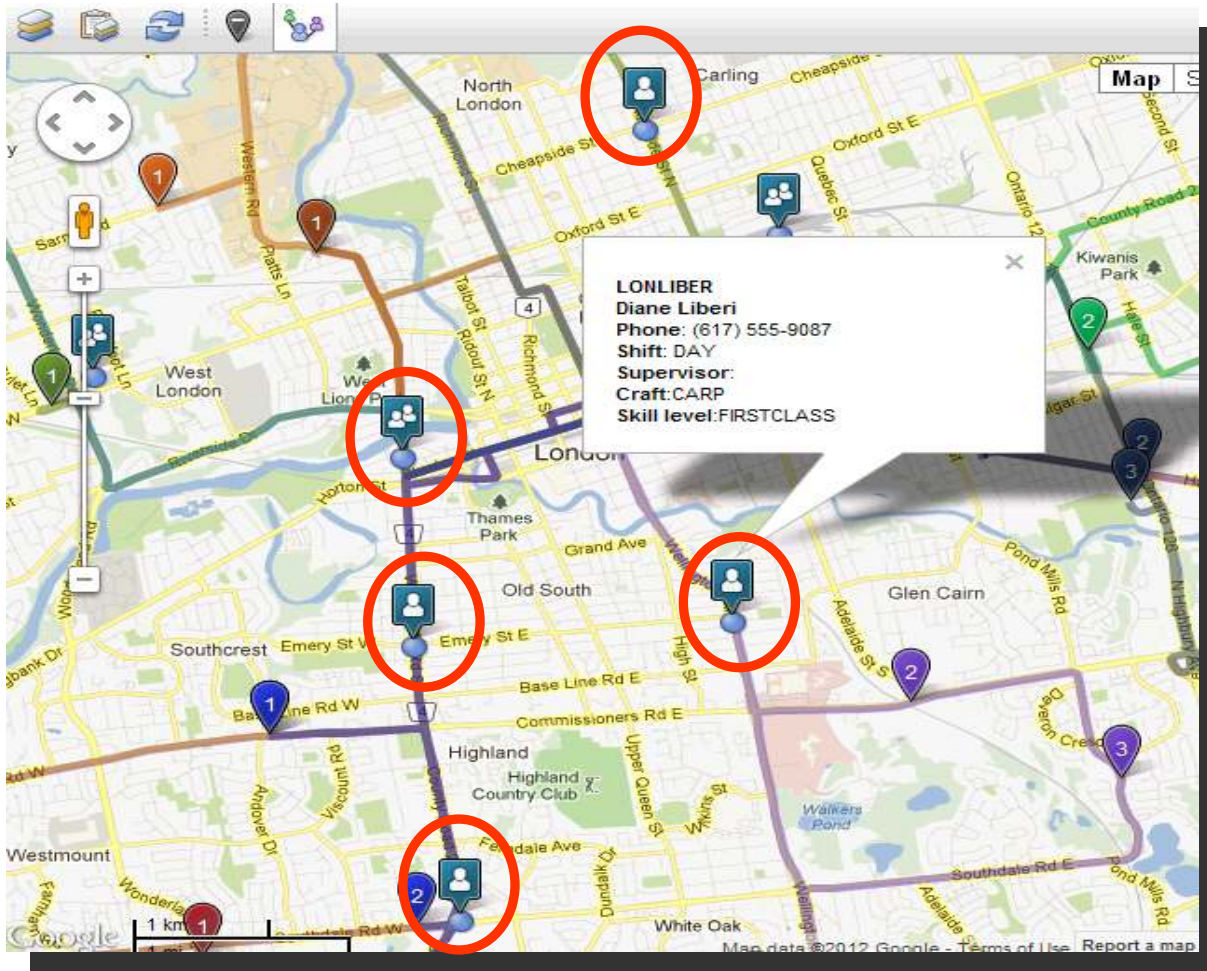


Dispatch View

The screenshot displays the 'Dispatch View' interface. On the left, a Gantt chart titled 'Labor and Crews' for 'Mon Aug 20, 2012' shows the schedules for various crews (e.g., LONFORD, LONHENRY, LONMINT, LONLIZB, LONCHL1, LONCHL2, LONCHL3, LONCHL4, LONCHL5, LONNDWI, LONSTAN, LONWAT1, LONWAT2, LONWLSO) across days 6 through 15. Each crew's schedule is represented by colored bars indicating their assigned tasks. On the right, a map of London shows the geographic distribution of these tasks, with colored lines and pins connecting different locations across the city, such as Epsom, Harefield, and various parts of London.

Create Street-Level Routes for your mobile field workforce to view work on the Dispatch View tab in Graphical Assignment.

Current location of the crew



Shows Labor and Crews that have been set up to share their Geo-Location information

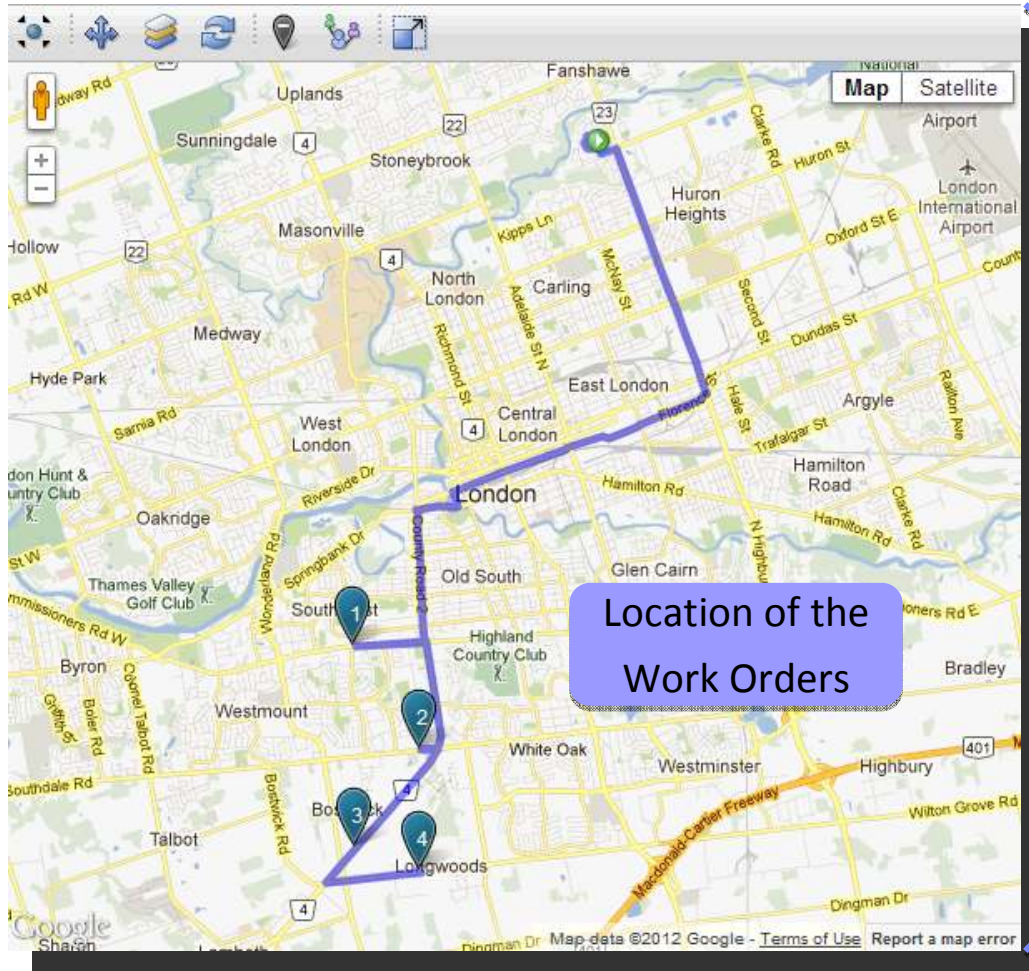


Technicians





Technicians View



Work Orders

Work Code	Description
LONA1167	Install Tool Rack
LONA1158	Electrical and Mechanical Installation
LONA1156	Build set-back work platforms
LONA1214	Electrical Installation

Map View

Item	Description	Store/room	Quantity
01128	Valve, Needle, 1/4 in	CENTRAL	1.00
10112	Fire Extinguisher, Quad, Argon	CENTRAL	1.00
20149	Stair Platform	CENTRAL	2.00
4-2100	Washer, 1/2 in	CENTRAL	5.00
900.00	Tubing, Copper-Flux, 1/2 in Wall	CENTRAL	0.00
YS-40	Valve Stem	CENTRAL	2.00

Tool	Description	Store/room	Quantity
DRILL	ROCKWELL DRILL PRESS		2.00
GAUGE	TIMING GAUGE		1.00
METER	SIMPSON VOLT/Ohm/METER		1.00
SCOPE	TEKTRONIXSCOPE		1.00



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What's Next...

Past

Work Orders in a Gantt
PM Forecasts
View Labor Load/Avail.

Present

Work Orders in a Gantt
PM Forecasts
View Labor Load/Avail.

Asset, Location, Tools &
Item Avail.
Graphical Assignment
Dispatching
Schedule Compliance

Future

Work Orders in a Gantt
PM Forecasts
View Labor Load/Avail.

Asset, Location, Tools &
Item Avail.
Graphical Assignment
Dispatching
Schedule Compliance

Crew Assignment
Optimization
Capacity Planning, Resource
Leveling, Labor Assignment &
Spatial Scheduling
Scenario Management



Why Optimization?



Current Approach
Scheduler 7.5.1

Planner / Scheduler manually creates an optimal schedule

Manually leverage the benefits of Scheduler 7.5.1

Supervisor manually performs assignments for all work orders and tasks within the schedule

Manually leverages the benefits of Graphical Assignments appl. in Scheduler 7.5.1

Dispatcher monitors current and incoming work & assigns based on many org specific criteria. Manually adjusts resource schedules affected by new assignments

Manually manages a dynamic Resource and Crew schedule in the Dispatching appl. in Scheduler 7.5.1



Our intent
with the new approach

Schedule automatically created

Capacity planning and resource leveling models based on asset/location availability, resource constraints

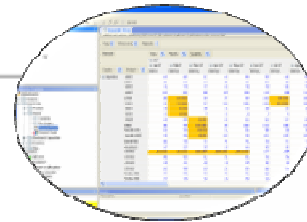
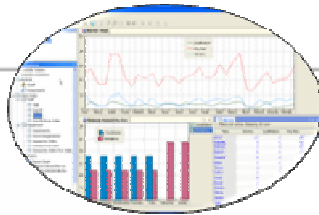
Labor and/or Crews automatically assigned to schedules

Assignment optimization model uses Craft, Skill and Crew Type and vacation data to optimally assign Resources or Crews

Incoming work automatically assigned to Labor or Crews based on organizational priorities

Uses Dynamic Scheduling optimization model to accommodate incoming work respecting organizational priorities to optimize routes, assignments, and productivity

Streamlines the entire work management process!



What-If Analysis



INPUTS

Demand to be Met

Resources Available

Costs, Yields & Recipes

Operational Constraints
& Customer Preferences

Business Goals

MATHEMATICAL MODEL(S)

Using one or many

OPTIMIZATION ENGINE(S)



Minimized
Costs

Specific
Resource
Assignments

SCHEDULE OR PLAN WITH METRICS

Maximized
Yields

Best Possible
Timing of
Activities



Optimization Use Cases

(1) Long/Medium Term Planning

A set of work orders that need to be completed within a certain time period

Adjusts craft, skill and crew type availability to execute as best as possible the work as required (overutilization and underutilization periods are possible). Gaps are identified.

Capacity Planning

Craft, skill and crew type availability

(2) Medium/Short Term Planning

A set of work orders that need to be completed within a fixed time period

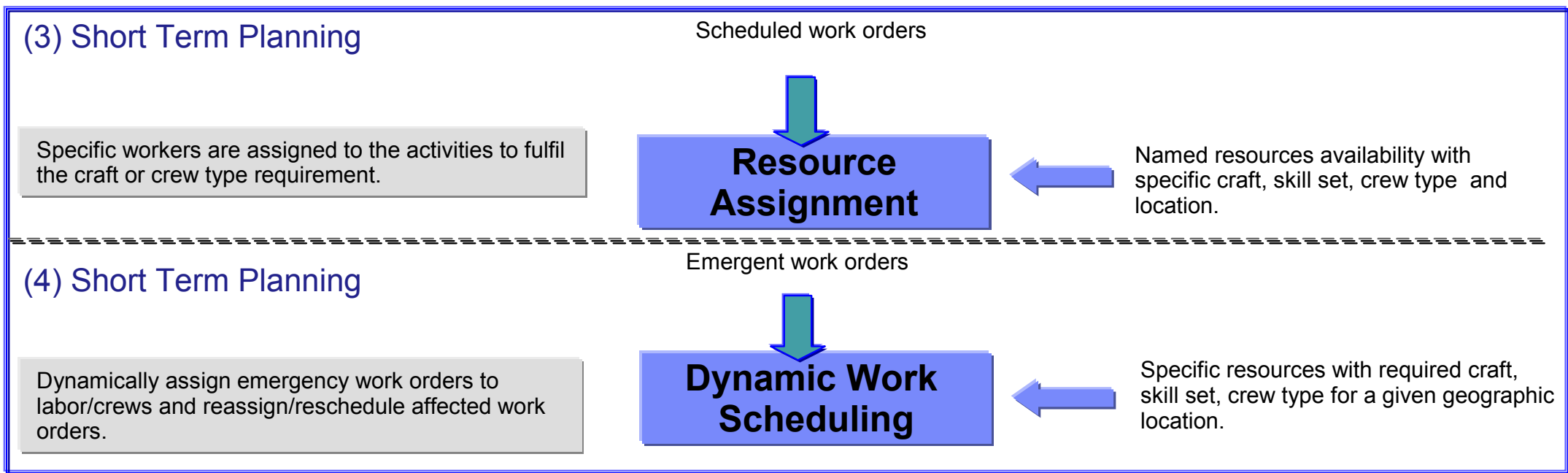
Work orders are scheduled within their allowed time window to minimize overutilization and underutilization.

Resource Levelling

Craft, skill and crew type availability

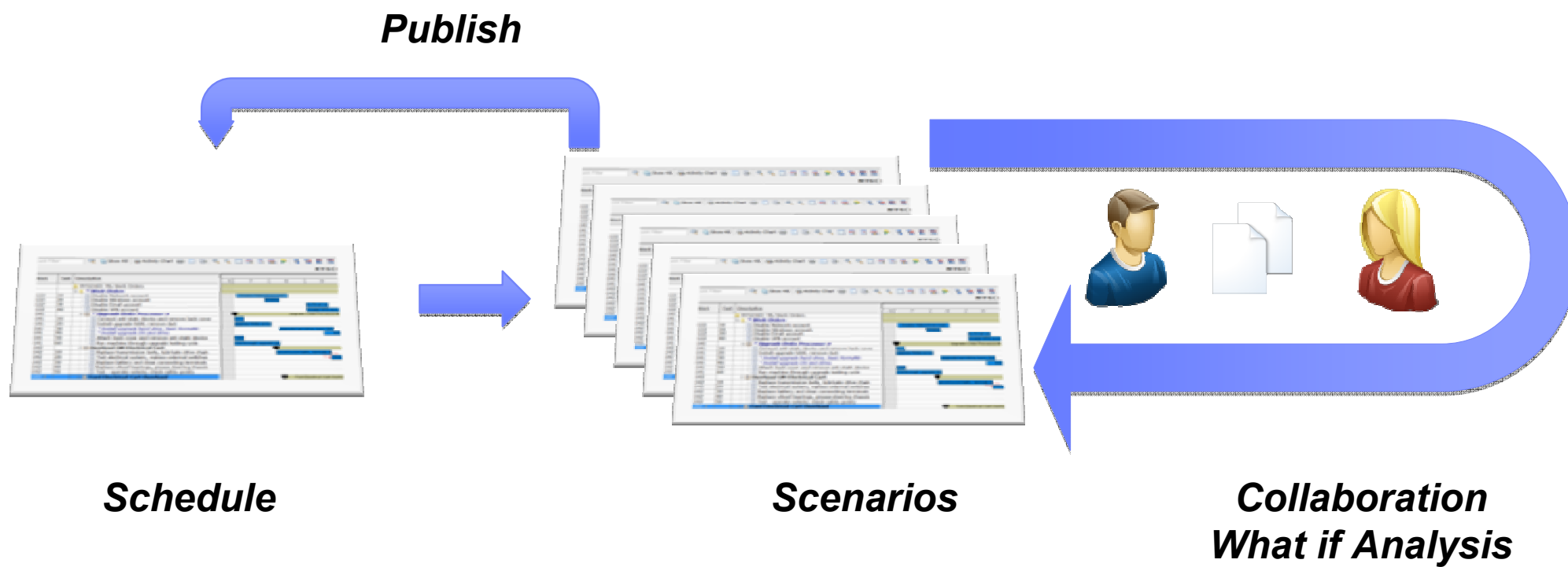


Optimization Use Cases





Scenario





When?



Q4 of 2013