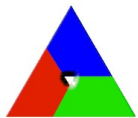


POEM

Management and Optimization



Mathematical Language

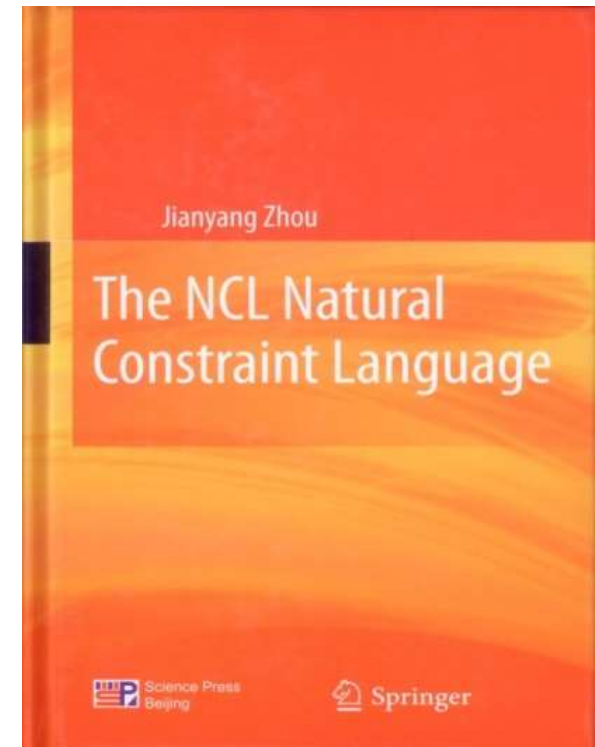
► Mathematics Recognition + Operations Research

$$\begin{array}{lll} T_{i1} \in [150.0, 240.0], & T_{o1} \in [250.0, 490.0], & T_{i2} \in [150.0, 190.0], \\ T_{o2} \in [210.0, 340.0], & FE1 \in [2.941, 10.0], & FE2 \in [3.158, 10.0], \\ F_{i1} \geq 0.0, F_{i2} \geq 0.0, & FB12 \geq 0.0, FB21 \geq 0.0, & F_{o1} \geq 0.0, F_{o2} \geq 0.0, \end{array}$$

$$\begin{array}{lll} T_{11} = 500.0 - T_{o1}, & T_{12} = 250.0 - T_{i1}, & T_{21} = 350.0 - T_{o2}, \\ T_{22} = 200.0 - T_{i2}, & F_{i1} + F_{i2} = 10.0, & F_{o2} + FB12 = FE2, \\ F_{o1} + FB21 = FE1, & F_{i1} + FB12 = FE1, & F_{i2} + FB21 = FE2, \end{array}$$

$$\begin{array}{ll} FE2 \times (T_{o2} - T_{i2}) = 600.0, & 150.0 \times F_{i1} + T_{o2} \times FB12 - T_{i1} \times FE1 = 0.0, \\ FE1 \times (T_{o1} - T_{i1}) = 1000.0, & 150.0 \times F_{i2} + T_{o1} \times FB21 - T_{i2} \times FE2 = 0.0, \end{array}$$

$$\begin{array}{l} \min \quad 1300 \times \exp(0.6 \times \log(20000 \times 6 / (4 \times \sqrt{T_{11} \times T_{12}} + (T_{11} + T_{12})))) + \\ \quad 1300 \times \exp(0.6 \times \log(12000 \times 6 / (4 \times \sqrt{T_{21} \times T_{22}} + (T_{21} + T_{22})))) . \end{array}$$



► Publications

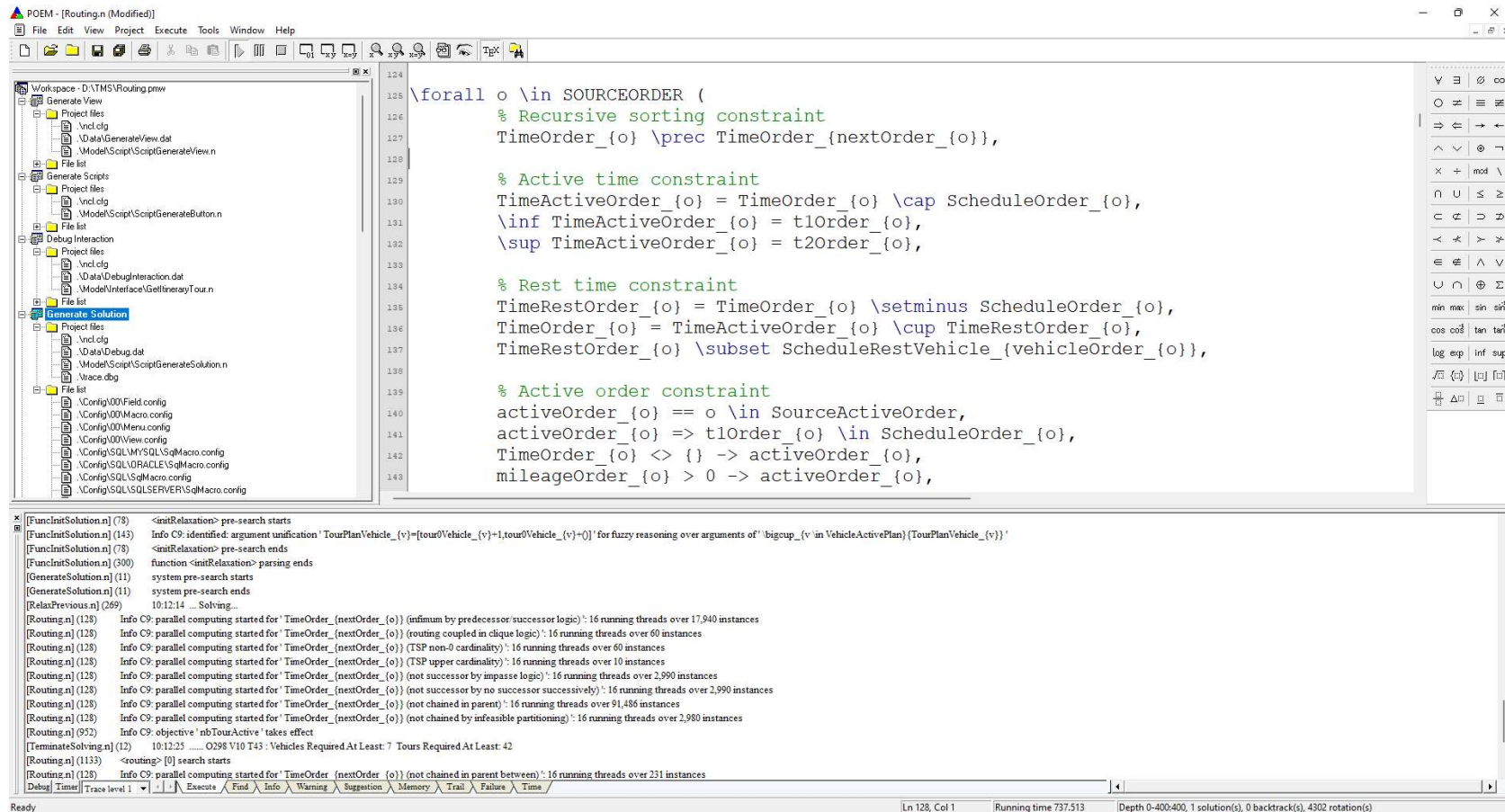
J. Zhou: The NCL Natural Constraint Language. Springer, ISBN 978-3-642-23844-4 (2012)

J. Zhou: Introduction to the constraint language NCL - Journal of Logic Programming. 45 (1-3): 71-103 (2000)

The POEM Platform

► POEM : Development Tool for The NCL Language

Products



The POEM Platform

► PoemServer : Multi-Task Server / Parallelism for Each Task

Products

TMS.pms (http://127.0.0.1:89) - Poem Http Server

Server View Help

File	Folder	#Visit	Last visit	URL	Message	Host	Request type
GenerateTableOrderProduct.n	D:\TMS\Model\Interaction\View\Table	1	2023-04-27 21:19:10	/TableOrder_0	Success, state(2)	127.0.0.1	Ncl
SELECT idAS IDTOUR, idResource AS IDVEHICLE, tourResource AS TOURVEHICLE FROM OPT_TO	SQL\	3	2023-04-27 21:19:19	/TOUR2	Success	127.0.0.1	SqlQuery
SELECT idAS IDPRODUCT, name AS NAMEPRODUCT FROM OPT_PRODUCT ORDER BY id	SQL\	3	2023-04-27 21:19:18	/PRODUCT2	Success	127.0.0.1	SqlQuery
SELECT o.id AS ID, o.idClient AS CLIENT, IIF(o.priority IS NULL, 0, o.priority) AS PRIORITY, s.id+ '' +	SQL\	3	2023-04-27 21:19:18	/ORDER	Success	127.0.0.1	SqlQuery
TableOrder000.view	D:\TMS\View\00\	3	2023-04-27 21:19:17	/View//00//TableOrder000.view		127.0.0.1	Get
SELECT dp.idClub, (SELECT name FROM OPT_CLUB WHERE id=dp.idClub) AS NAMECLUB, dp.idDepot AS IDDEPOT	SQL\	4	2023-04-27 21:18:46	/DEPOT_PRODUCT	Success	127.0.0.1	SqlQuery
TableDepotProduct000.view	D:\TMS\View\00\	2	2023-04-27 21:18:46	/View//00//TableDepotProduct000.view		127.0.0.1	Get
SELECT s.idAS IDSITE, s.name AS NAMESITE, s.id+ '' + s.nameAS IDNAMESITE FROM OPT_SIT	SQL\	5	2023-04-27 21:19:18	/SITE2	Success	127.0.0.1	SqlQuery
SELECT d.idClub AS IDCLUB, (SELECT cb.name FROM OPT_CLUB cb WHERE cb.id=d.idClub) AS NAMECLUB, d.id	SQL\	2	2023-04-27 21:18:45	/DEPOT	Success	127.0.0.1	SqlQuery
TableDepot_TableDepotProduct.view	D:\TMS\View\00\	2	2023-04-27 21:18:45	/View//00//TableDepot_TableDepotProduct.view		127.0.0.1	Get
GenerateTableVehicleProductVehicle.n	D:\TMS\Model\Interaction\View\Table	1	2023-04-27 21:18:35	/TableVehicleProduct_0	Success, state(2)	127.0.0.1	Ncl
SELECT vp.idClub, (SELECT name FROM OPT_CLUB WHERE id=vp.idClub) AS NAMECLUB, vp.idResource AS IDVEHI	SQL\	3	2023-04-27 21:18:43	/VEHICLE_PRODUCT	Success	127.0.0.1	SqlQuery
TableVehicleProduct000.view	D:\TMS\View\00\	3	2023-04-27 21:18:43	/View//00//TableVehicleProduct000.view		127.0.0.1	Get
TableVehicle_TableVehicleProduct.view	D:\TMS\View\00\	2	2023-04-27 21:18:41	/View//00//TableVehicle_TableVehicleProduct.view		127.0.0.1	Get
GenerateTableTypeVehicleProductTypeVehicle.n	D:\TMS\Model\Interaction\View\Table	1	2023-04-27 21:18:24	/TableTypeVehicleProduct_0	Success, state(2)	127.0.0.1	Ncl
SELECT tp.idClub, (SELECT cb.name FROM OPT_CLUB cb WHERE cb.id=tp.idClub) AS NAMECLUB, tp.idType	SQL\	5	2023-04-27 21:18:27	/TYPEVEHICLE_PRODUCT	Success	127.0.0.1	SqlQuery
TableTypeVehicleProduct000.view	D:\TMS\View\00\	3	2023-04-27 21:18:27	/View//00//TableTypeVehicleProduct000.view		127.0.0.1	Get
TableTypeVehicle_TableTypeVehicleProduct.view	D:\TMS\View\00\	2	2023-04-27 21:18:21	/View//00//TableTypeVehicle_TableTypeVehicleProduct.view		127.0.0.1	Get
SELECT pr.id AS IDPRODUCT, pr.name AS NAMEPRODUCT, pr.type AS TYPE, (255 255 255) AS LINERGB FROM O	SQL\	4	2023-04-27 21:19:17	/PRODUCT	Success	127.0.0.1	SqlQuery
TableProduct_TableOrder.view	D:\TMS\View\00\	4	2023-04-27 21:19:17	/View//00//TableProduct_TableOrder.view		127.0.0.1	Get
SELECT '00' AS IDCLUB, '000' AS IDUSER, ss.idSite1+ '' + IIF(s1.name IS NULL, '', s1.name) AS IDSITE1, s	SQL\	1	2023-04-27 21:17:57	/SITE SITE	Success	127.0.0.1	SqlQuery
TableSiteSite000.view	D:\TMS\View\00\	1	2023-04-27 21:17:57	/View//00//TableSiteSite000.view		127.0.0.1	Get
TableSite_TableSiteSite.view	D:\TMS\View\00\	1	2023-04-27 21:17:57	/View//00//TableSite_TableSiteSite.view		127.0.0.1	Get
SELECT idAS ZONEID FROM OPT_ZONE WHERE idicon< >'' ORDER BY id	SQL\	1	2023-04-27 20:52:42	/ZONE2	Success	127.0.0.1	SqlQuery

Task	ID	Client	Request time	NCL start time	NCL end time	Directory	Program	State	Message	Reply	Reply state	Termination state
4	LAPTOP-HCPMDCTFZHOU-Order Table(TableOrder:35)20230427-21191070	127.0.0.1	2023-04-27 21:19:10.73	2023-04-27 21:19:10.76	2023-04-27 21:19:11.44	D:\TMS\	D:\TMS\Model\Interaction\View\Table\GenerateTableOrderProduct.n	Success	all solutions found	Not requested	Finished at 2023-04-27 21:19:11.44	
3	LAPTOP-HCPMDCTFZHOU-Vehicle-Product Table(TableVehicleProduct:43)...	127.0.0.1	2023-04-27 21:18:35.18	2023-04-27 21:18:35.21		D:\TMS\	D:\TMS\Model\Interaction\View\Table\GenerateTableVehicleProductVehicle.n	Success	all solutions found	Not requested	Finished at 2023-04-27 21:18:35.21	
2	LAPTOP-HCPMDCTFZHOU-Vehicle-Type-Product Table(TableTypeVehiclePr...	127.0.0.1	2023-04-27 21:18:24.48	2023-04-27 21:18:24.50	2023-04-27 21:18:25.33	D:\TMS\	D:\TMS\Model\Interaction\View\Table\GenerateTableTypeVehicleProductTypeVehicle.n	Success	all solutions found	Not requested	Finished at 2023-04-27 21:18:25.35	
1	LAPTOP-HCPMDCTFZHOU-Fresh View(GenerateView:6)20230427-20512...	127.0.0.1	2023-04-27 20:51:22.53	2023-04-27 20:51:22.56	2023-04-27 20:51:28.82	D:\TMS\	D:\TMS\Model\Script\ScriptGenerateView.n	Success	all solutions found	Not requested	Finished at 2023-04-27 20:51:28.82	
0	LAPTOP-HCPMDCTFZHOU-Login(Login)20230427-20510673	127.0.0.1	2023-04-27 20:51:06.76	2023-04-27 20:51:06.76	2023-04-27 20:51:07.49	D:\TMS\	D:\TMS\Model\Interface\Login.n	Success	all solutions found	Not requested	Finished at 2023-04-27 20:51:07.49	

Server settings

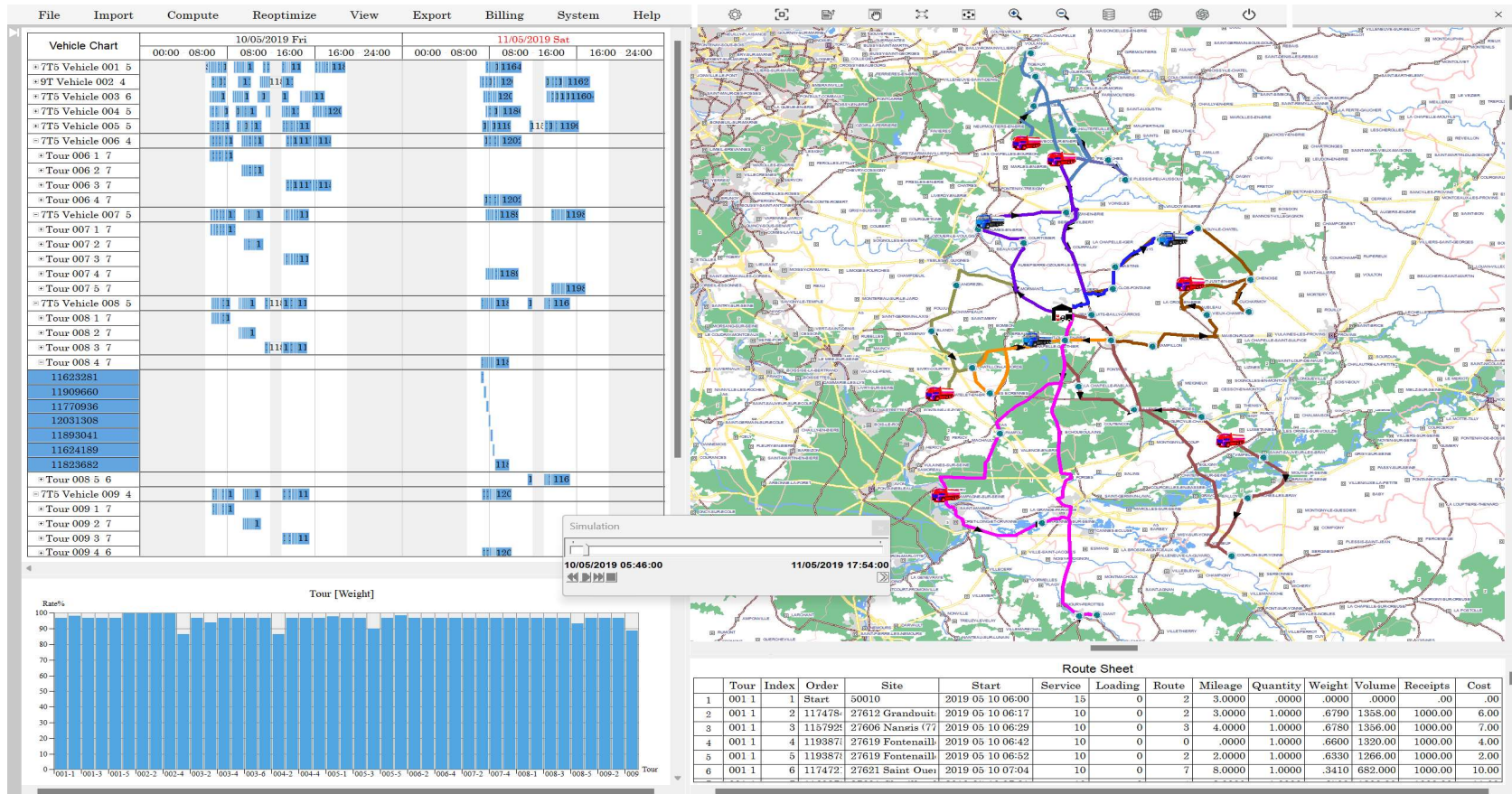
Parameter	Value
Max parallel thread number	64
Max parallel instance number	10000000
Max reference number	50000
Min string number	100000
Max string number	6000000
Max string length	3000000
Max matrix size	6000
Max argument number	1000000
Max array size (cells)	1000000000
Max array size (bytes)	10000000000
Min data heap size	1000000
Min stack size	100000000

Uptime: 00:32

The POEM Platform

► PoemView : Visualization Component

Products



The POEM Platform

► PoemData : Modeling, Diagnosing and Managing Data

Products

The screenshot displays the POEM Platform Data Engine interface. On the left, a tree view shows the database structure under 'TMS', including tables like 'Liste des tables', 'Address', 'Client', 'Client Vehicle Type', 'Depot', 'Depot Product', 'Depot Vehicle Type', 'Distance Matrix', 'Division', 'Feedback', 'Order', 'Parameter', 'Product', 'Route Sheet', 'Rule', 'Tour', 'User', and 'Vehicle'. The 'Vehicle' table is selected, showing its fields: ID, Name, Type, Depot, Zone, Shift, Earliest, Latest, Min #Tour, Max #Tour, Min #Order, Max #Order, Min Makespan, Max Makespan, Min Worktime, Max Worktime, Min Quantity, and Max Quantity.

The main window displays the 'Vehicle' table data. The table has columns: Division, ID, Name, Type, Depot, Zone, Shift, Earliest, Latest, Min #Tour, Max #Tour, Min #Order, Max #Order, Min Makespan, Max Makespan, Min Worktime, Max Worktime, Min Quantity, and Max Quantity. The data is filtered by 'Division' (Transporter X) and 'ID' (002). The table shows 21 rows of data, with the first row highlighted in blue.

Below the table, there is a 'TMS : Vehicle - [Ln 2/16]' section with a 'Liste...' button and a 'Selection...' button. The table below this section shows the selected vehicle data:

Division	ID	Name	Type	Depot	Zone	Shift	Earliest	Latest
Transport001	001	7T5				7 06:00..19:00		
Transport002	002	9T				7 06:00..19:00	2019-05-01 06:00	2019-05-01 18:00
Transport003	003	7T5				7 06:00..19:00		
Transport004	004	7T5				7 06:00..19:00		
Transport005	005	7T5				7 06:00..19:00		

On the right, a 'Vehicle' form is open, showing details for the selected vehicle (Division: Transporter X, ID: 002, Name: 002, Type: 9T, Depot: , Zone: , Shift: 7 06:00..19:00). The form includes fields for 'Min Weight', 'Max Weight', 'Min Volume', 'Max Volume', '#Tour', '#Order', 'Planned Start', 'Planned End', 'Mileage', 'Service Time', 'Route Time', 'Quantity', 'Weight', 'Volume', 'Receipts', 'Cost', 'Telephone', and 'State'. The 'State' is set to 'Planned'.

Below the form, there is a 'Products' table with columns: Product, Initial Quantity, Initial Weight, Initial Volume, Min Quantity, Max Quantity, Min Weight, Max Weight, Min Volume, and Max Volume. The table shows 21 rows of data, with the first row highlighted in blue.

Below the products table, there is a 'Special Shifts' table with columns: Start Date, End Date, and Shift. The table shows 21 rows of data, with the first row highlighted in blue.

Below the special shifts table, there is a 'Pauses' table with columns: Start Time and End Time. The table shows 21 rows of data, with the first row highlighted in blue.

The POEM Platform

► PoemClient : Client Terminal for The Server

Products

TMS Routing

File Import Compute Reoptimize View Export Billing System Help

Resource Management

- Vehicles
 - Vehicle Table
 - Vehicle Types
 - Work Shifts
- Products
 - Product Table
 - By Depots
 - By Vehicle Types
 - By Vehicles
- Addresses
 - Address Table
 - Sites (Depots) on Map
 - Distance Matrix
- Clients
 - Client Table
 - Clients (Zones) on Map
- Orders
 - Order Table
 - Orders (Zones) on Map
 - Orders by Products
- Planned Results
 - Route Sheets
 - Tours
- Gantt Charts
 - Vehicles
 - Tours
- Maps
 - Vehicles
 - Tours
- Mobile Terminal Feedbacks
- Analysis
 - Snapshots
 - Statistics
 - Vehicle Loading
 - Tour Loading
 - Accounting

Vehicle (Profit)

Route Sheet

Vehicle	Type	Tour	Order	Site	Start	Service	Route	Mileage	Receipts	Cost
1	001	7T5	1	Start	50010	2019 05 10 06:00	15	2	3.0000	.00
2	001	7T5	1	11747	27612 Gr	2019 05 10 06:00	10	2	3.0000	1000.00
3	001	7T5	1	11579	27606 Na	2019 05 10 06:00	10	3	4.0000	1000.00
4	001	7T5	1	11938	27619 For	2019 05 10 06:00	10	0	.0000	1000.00
5	001	7T5	1	11938	27619 For	2019 05 10 06:00	10	2	2.0000	1000.00
6	001	7T5	1	11747	27621 Sai	2019 05 10 07:00	10	7	8.0000	1000.00

Order

Précédent Suivant Actualiser Message Police Annuler

ID 11622178

Client MAIRIE ECOLE

Priority 2

Pick-up

Delivery Villeneuve-Saint-Salves (89230 - F)

Product VR03

Quantity 1

Weight 0.821

Volume 1642

Receipts 1000

Fixed Vehicle

Fixed Time 10

Service Shift 6 06:00-18:00

Service Earliest 10/05/2019 12:00:00

Service Latest 10/05/2019 17:59:00

Time Strict Yes

Planned Start 11/05/2019 13:41:00

Planned End 11/05/2019 13:56:00

Vehicle 002

Tour 4

Service Time

Route Time

Mileage

Cost 5.00

State Planned

Client

ID	Name	Adress	Type	Planner	Zone	Shift	Latitude	Longitude	Telephone	Mobile	Contact
01002474	MAIRIE ECOLE	8.RUE DE ...	STFLO	1007			047.95103	003.96555	03 25 70 5...	07 86 0...	07 86 0...

Product

Division	ID	Name	Type	Unit Weight	Unit Volume	Unit Length	Unit Width	Unit Height
Transporter X	VR03	VR03	Bulk	1.00	1.00	1.00	1.00	1.00

Transporter X | Result

Parameter	Content
Mission	O298 V9 T43 P1
Solution State	Feasible
#Order	298
#Vehicle	9/16
#Tour	43
Profit	0
Cost	10875
Mileage	5795
Worktime	9063
Makespan	9980

Feedback Table

Vehicle	Tour	Latitude	Longitude	Clock Time	KM	State
001	3	48.58396	2.95140	2023 08 21 08:30	.00	1
001	3	48.38920	3.65418	2023 08 21 09:30	85.00	3
001	3	48.34535	3.70896	2023 08 21 09:35	90.00	5
001	3	48.23885	3.90675	2023 08 21 10:10	125.00	6
001	3	48.10656	3.91478	2023 08 21 10:15	128.00	7
001	3	48.05001	3.33435	2023 08 21 11:20	192.00	9
001	3	48.00166	3.34216	2023 08 21 12:00	222.00	8
001	3	47.99438	3.17910	2023 08 21 12:20	238.00	10

Map

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The POEM Platform

► PoemMobile : Mobile Terminal for The Server

Products

←

Route Sheet

+

Q Search

Vehicle ▾

Vehicle : 001
Tour : 1
Order : 11579293
Site : Nangis (77370 - F)
Start : 2019-05-10 06:29
Service : 10
Route : 3
Mileage : 4.0000
Receipts : 1000.00
Cost : 7.00

Vehicle : 001
Tour : 1
Order : 11938756
Site : Fontenailles (77370 - F)
Start : 2019-05-10 06:42
Service : 10
Route : 0
Mileage : .0000
Receipts : 1000.00
Cost : 4.00

Vehicle : 001
Tour : 1
Order : 11938787
Site : Fontenailles (77370 - F)
Start : 2019-05-10 06:52
Service : 10
Route : 2

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←

Feedback

+

Q

Vehicle ▾

Vehicle : 001
Tour : 3
Bar code : 3701119902397
QR code : www.provider_example.test
Latitude : 48,34535
Longitude : 3,70896
Date : 2023-08-21
Clock Time : 10:15
KM : 90.00
State : Loading start

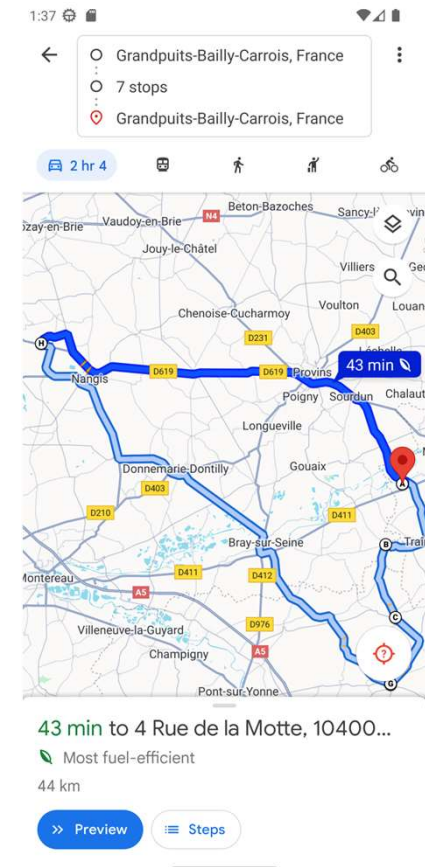
Vehicle : 001
Tour : 3
Bar code : 5123450001076
QR code : www.mapwaypoint.example
Latitude : 48,23885
Longitude : 3,90675
Date : 2023-08-21
Clock Time : 11:20
KM : 125.00
State : Loading end

Vehicle : 001
Tour : 3
Bar code : 9065632111768
QR code : www.orderdatas.example
Latitude : 48,10656
Longitude : 3,91478

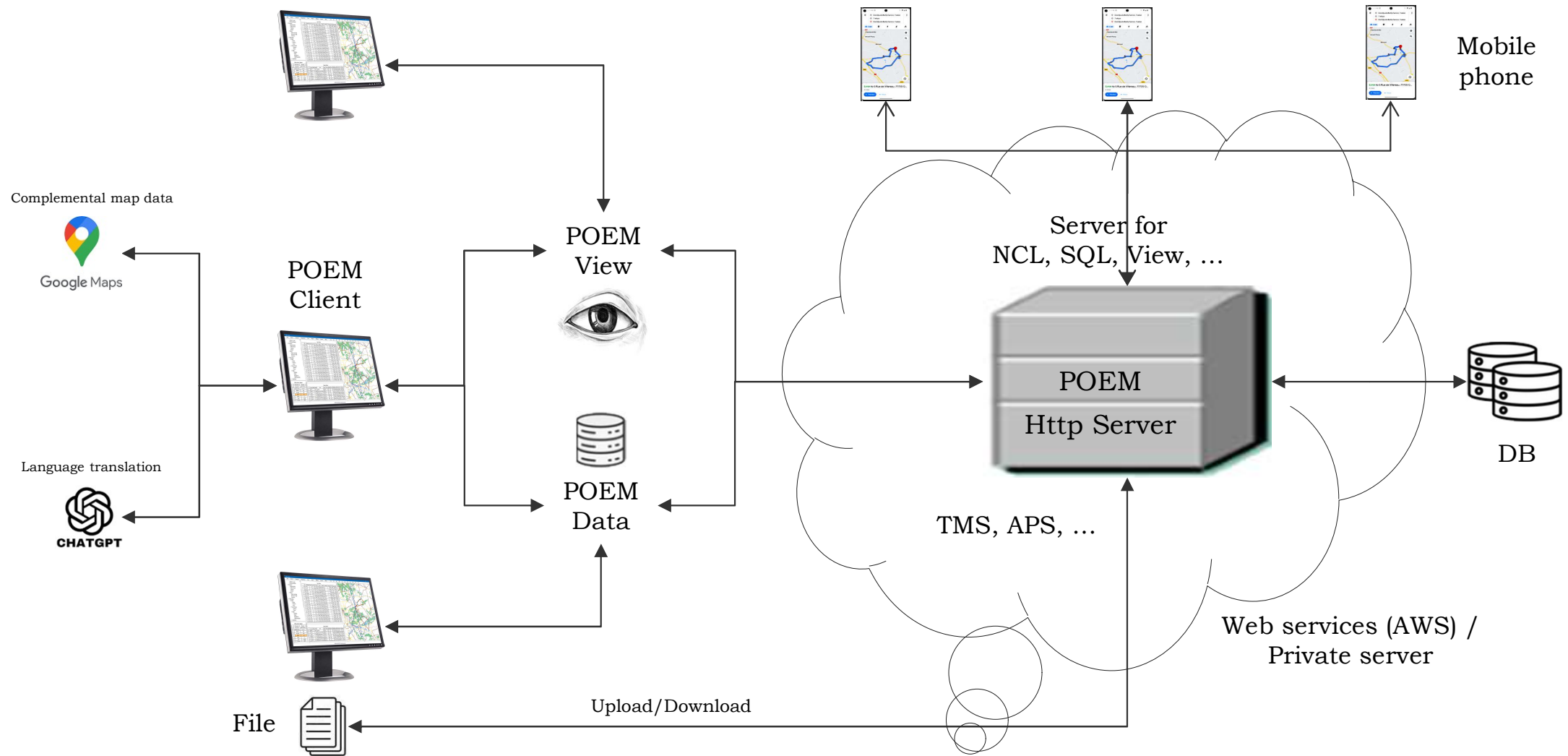
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Deployment SaaS



TMS : Transport Management System

Logistics Management

Transport Planning

Economic Zone Planning

► TMS Logistics : Logistics Management

- Objective: Optimize the plan of supply.
- Management: Sales (quotation/order), supply, stock, vehicle fleet and accounting (invoice/balance sheet).
- Constraints: stock capacity, demand (quantity/volume/weight), etc.

► TMS Routing : Route Optimization

- Generic: Multi-agency, multi-user, multi-depot, multi-product, multi-vehicle, multi-day, multi-tour, short or long trip.
- Objective: Number of vehicles/tours, mileage, duration/working time, cost and profit.
- Constraints: Vehicle capacity (quantity/volume/weight), work regulations, route distance (time/mileage) and customer time windows, etc.

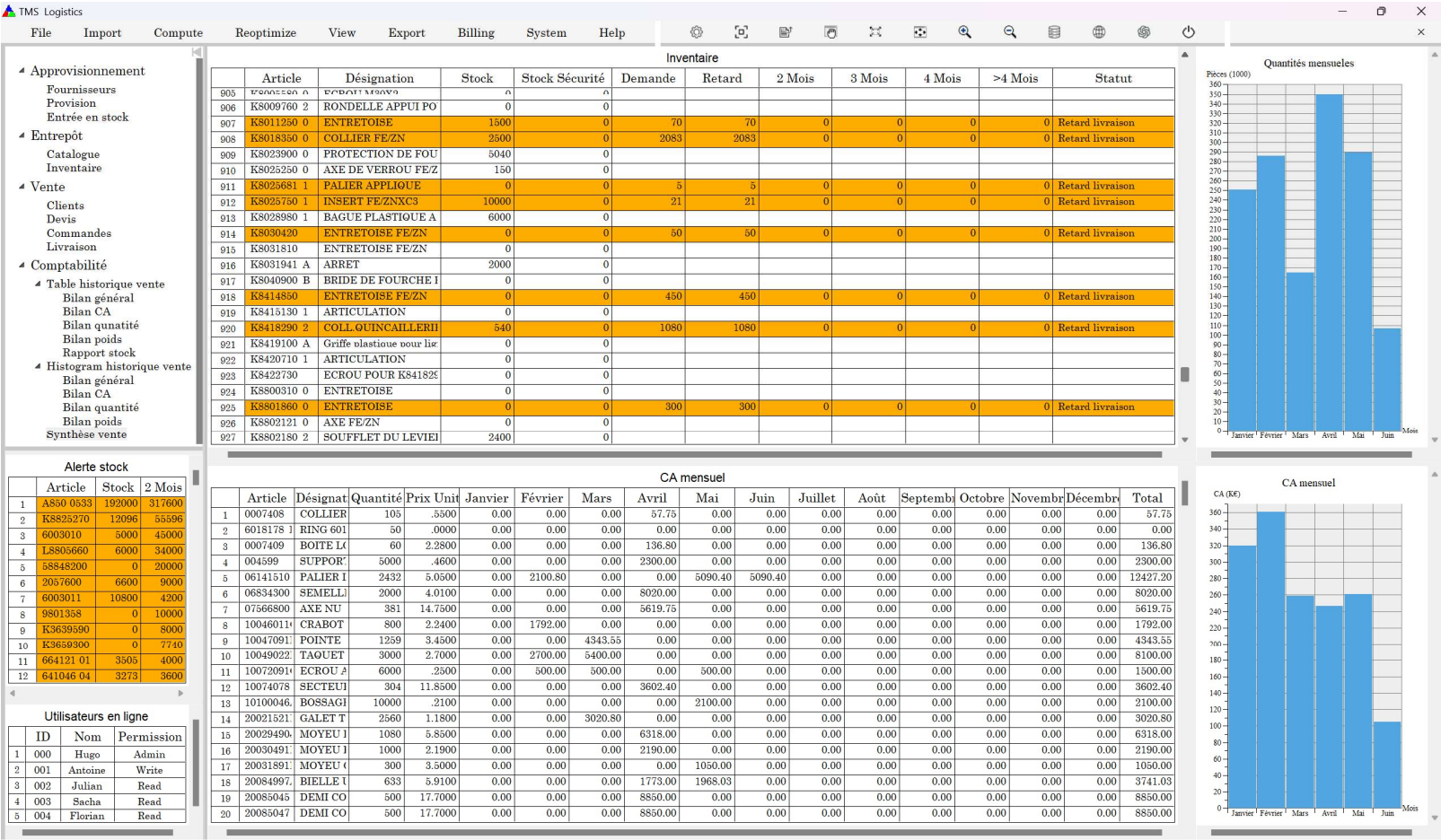
► TMS Depot : Economic Zone Optimization

- Objective: Minimize overall cost of depots over a period by defining their locations and economic zones.
- Constraints: Types (primary and secondary) and capacities (minimum and maximum monthly tonnage) of depots, products (types and prices), vehicles (types, capacities and costs), mileage between depots and customers, etc.

TMS : Transport Management System

► Logistics Module : Logistics Management

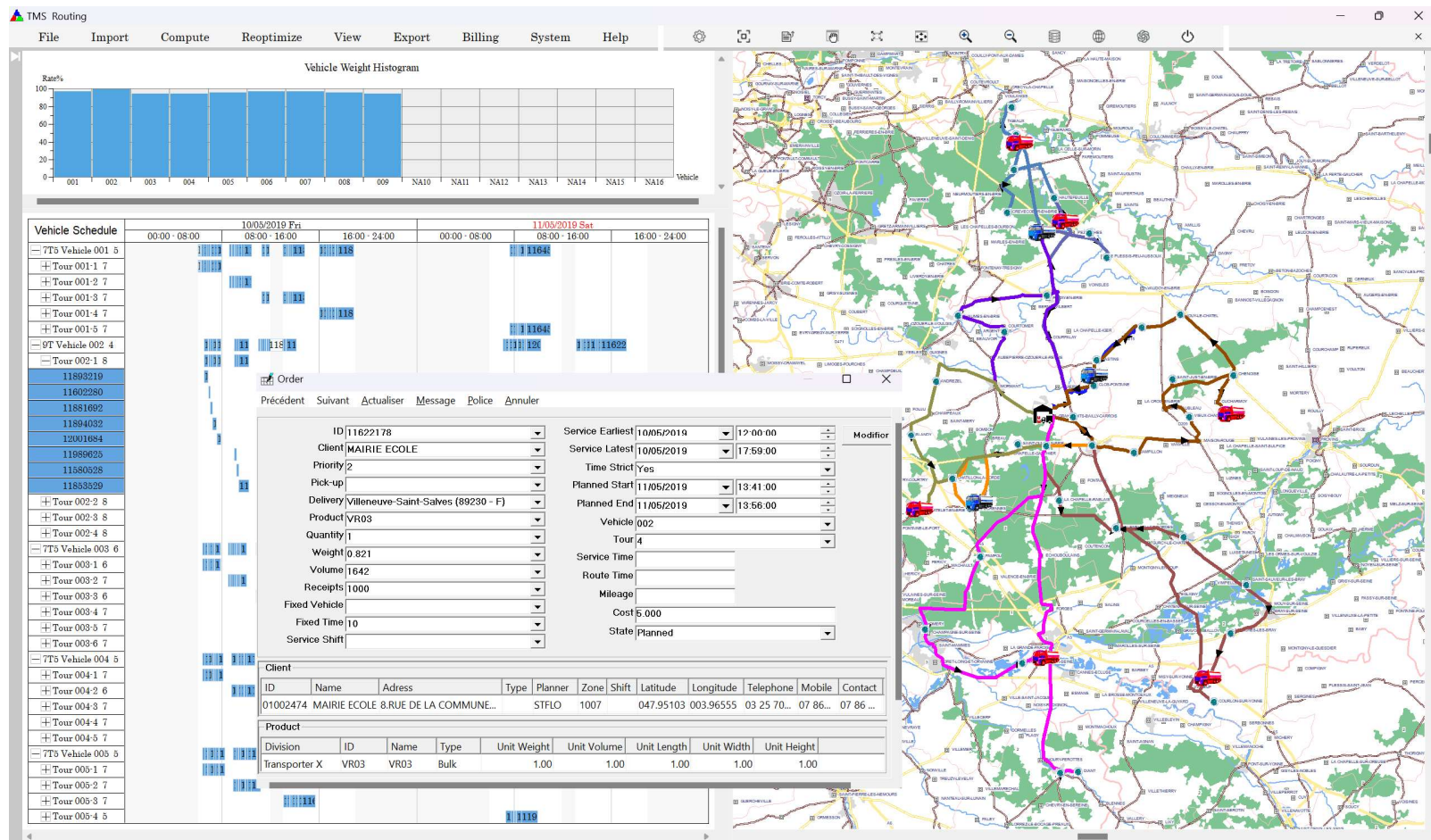
Applications



TMS : Transport Management System

► Routing Module : Route Optimization

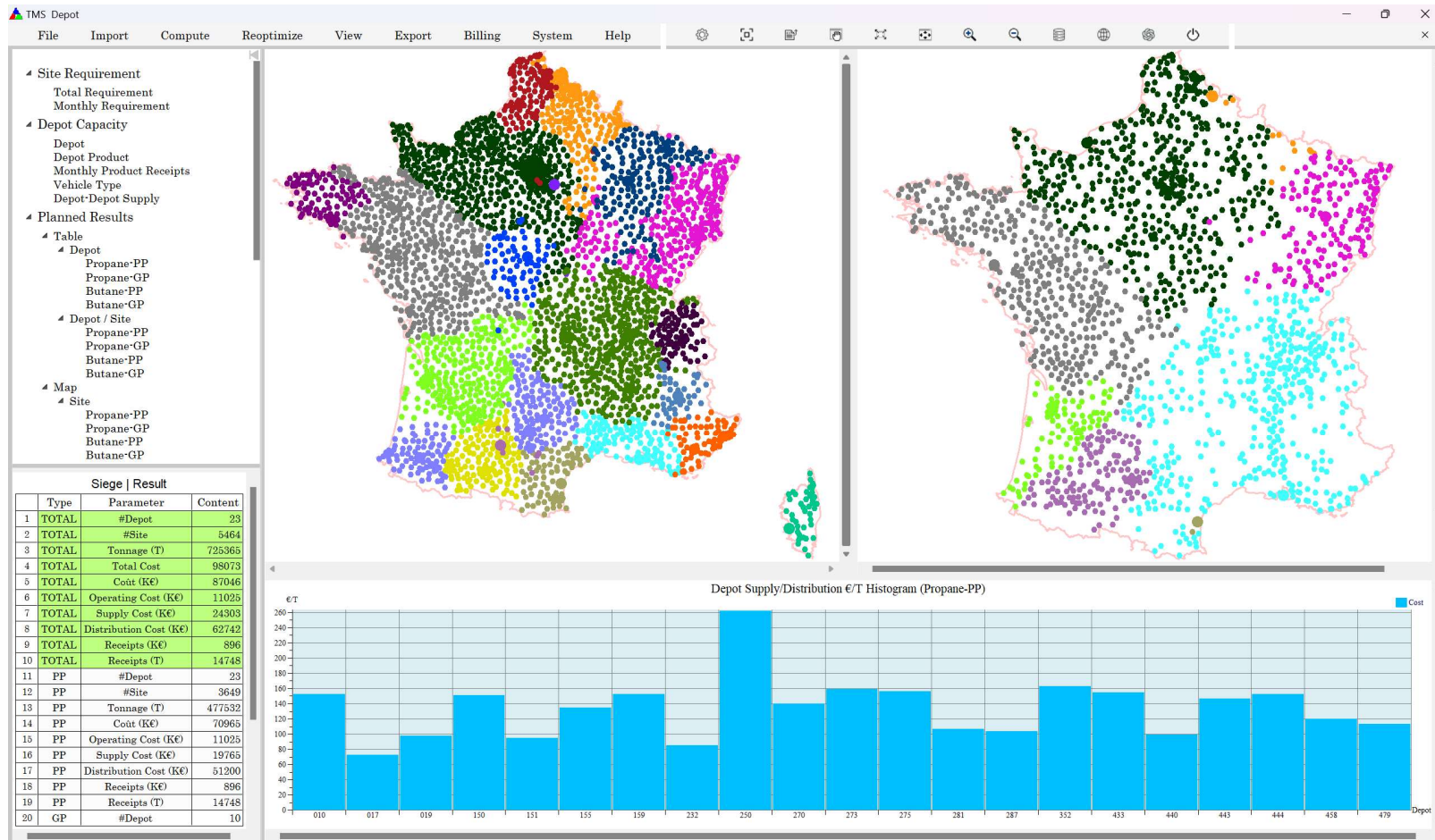
Applications



TMS : Transport Management System

► Depot Module : Economic Zone Optimization

Applications



APS : Advanced Planning and Scheduling

▶ Planning/scheduling tasks over resources

- Human or material, static or mobile
- Uni-capacitated or multi-capacitated or no capacity limit
- Time precision: day, hour, minute or second

▶ Respecting simultaneously more than 100 types of constraints

- The task structure of a project and its operation process
- Time constraints on projects
- The organization of work teams and the cooperation of teams across agencies
- The structural demand for resources by a task
- The working time, earliest start and latest end, of a task
- The division in time or quantity of a task over resources
- The constraints of coordinating tasks according to multiple resources
- Distance constraints between different tasks based on mobile resources
- Mobility and parallel/sequential capacities of a resource
- The work calendar and daily shifts of a resource
- Resource allocation and mobilization to work sites, ...

▶ Optimizing with multiple objectives

- Delay of projects, duration of projects, number of resources, cost, profit, ...

APS : Advanced Planning and Scheduling

► APS : Modeling and Managing Data Logically

Applications

APS Scheduling

File Import Compute View Export Feedback Billing System Help

Product Table

	ID	Name	Type	Stock	Purchase	Time (day)	Unit Weight	Unit Volume	Unit Length	Unit Width	Unit Height
27	ABCF80VF	Machinins86	Product	0	0	0	.63	1306.00	.58	.63	.67
28	ABCFZZUO	Machinins69	Product	0	0	0	.65	1328.00	.58	.63	.67
29	ABCKO8UA	Machinins11	Product	0	0	0	.66	1318.00	.58	.63	.67
30	ABCKZZFA	Machinins1	Product	0	0	0	.65	584.00	.60	.63	.67
31	DESAMZFM	Machinins586	Component	0	0	0	.63	1392.00	.62	.63	.67
32	DESAMZFM PCFKZANSA	Machinins120	Piece	0	0	0	.64	1268.00	.62	.63	.67
33	DESAMZFM PCFKZFFV	Machinins119	Piece	0	0	0	.65	1298.00	.62	.64	.67
34	DESAMZFO	Machinins262	Component	0	0	0	.67	1306.00	.62	.64	.67
35	DESAMZFO PCFKZANSF	Machinins120	Piece	0	0	0	.66	1306.00	.58	.63	.66
36	DESAMZFO PCFKZANZK	Machinins121	Piece	0	0	0	.65	1328.00	.58	.64	.67
37	DESAMZFO PCFKZFFZ	Machinins119	Piece	0	0	0	.29	1318.00	.60	.64	.67
38	DESAMZFO	Machinins264	Component	0	0	0	.63	1392.00	.62	.64	.67
39	DESAMZFO PCFKZANSU	Machinins120	Piece	0	0	0	.64	1268.00	.62	.64	.67
40	DESAMZFO PCFKZANZF	Machinins121	Piece	0	0	0	.64	1268.00	.62	.64	.67
41	DESAMZFO PCFKZFFFS	Machinins119	Piece	0	0	0	.64	1268.00	.62	.64	.67

Product

Précédent Suivant Actualiser Message Police Annuler

Product Diagram

	1	2
ABCFQUMS	1 DESQVZAV	
ABCFQUUZ	1 DESQUQSU	
1 DESQUQSU	1 DESQUQSU	
DESQUAMZ		
DESQUQSF		
DESQUQSF PCFKVUQVN	2 HINUNUNAZ	3 HINUNUNAS
2 HINUNUNAZ	2 HINUNUNAZ	
3 HINUNUNAS		3 HINUNUNAS
DESQUQSK		
DESQUQSK PCFKVUVUF	1 HINUNUSAN	2 HINUNUSAA
DESQUQSK PCFKVUVU	1 HINUNUSSK	2 HINUNUSSF
DESQUQZA		
DESQUQZM		
DESQUQZM PCFKVFMK	1 HINUNUQVNZ	2 HINUNUQVNS
DESQUQZM PCFKVFMU	1 HINUNUQVAS	2 HINUNUQVAQ
DESQUQZQ		
DESQUQZQ PCFKVFMV	1 HINUNUQVKS	2 HINUNUQVKQ
DESQUQZQ PCFKVFMV	1 HINUNUQVFM	2 HINUNUQVOK
DESQUQZS		
DESQUQZS PCFKVFMV	1 HINUNUSUM	2 HINUNUSNK
1 HINUNUSUM	1 HINUNUSUM	
2 HINUNUSNK		2 HINUNUSNK
3 HINUNUSNF		3 HINUNUSNF
4 HINUNUSNU		4 HINUNUSNU
5 HINUNUSNN		5 HINUNUSNN
6 HINUNUSNA		6 HINUNUSNA
7 HINUNUSNZ		7 HINUNUSNZ
DESQUQZS PCFKVFMV	1 HINUNUSNS	2 HINUNUSNQ
DESQUQZV		

Division Plant X

ID DESAMZFM-PCFKZANSA

Name Machining120

Type Piece

Stock 0

Purchase 0

Time (day) 0

Unit Weight 0.64

Unit Volume 1268

Unit Length 0.62

Unit Width 0.63

Unit Height 0.67

Modifier

Sub processes

ID	Name	Type	Parent ID	Serial Number	Continuous?	Preemptive?	Quantity Ratio	Time Ratio	Unit Time	Init Time	Check Time	Post Time	Min Division
HINFKMAA	HINFKMAA	Task	DESAMZFM-PCFKZANSA	3	No	No	1	1	360	0	33.6	0	
HINFKMAN	HINFKMAN	Task	DESAMZFM-PCFKZANSA	2	No	No	1	1	81.6	0	2.4	0	
HINFKMAU	HINFKMAU	Task	DESAMZFM-PCFKZANSA	1	No	No	1	1	168	0	43.2	0	
HINFKMAZ	HINFKMAZ	Task	DESAMZFM-PCFKZANSA	4	No	No	1	1	528	0	91.2	0	

Related processes

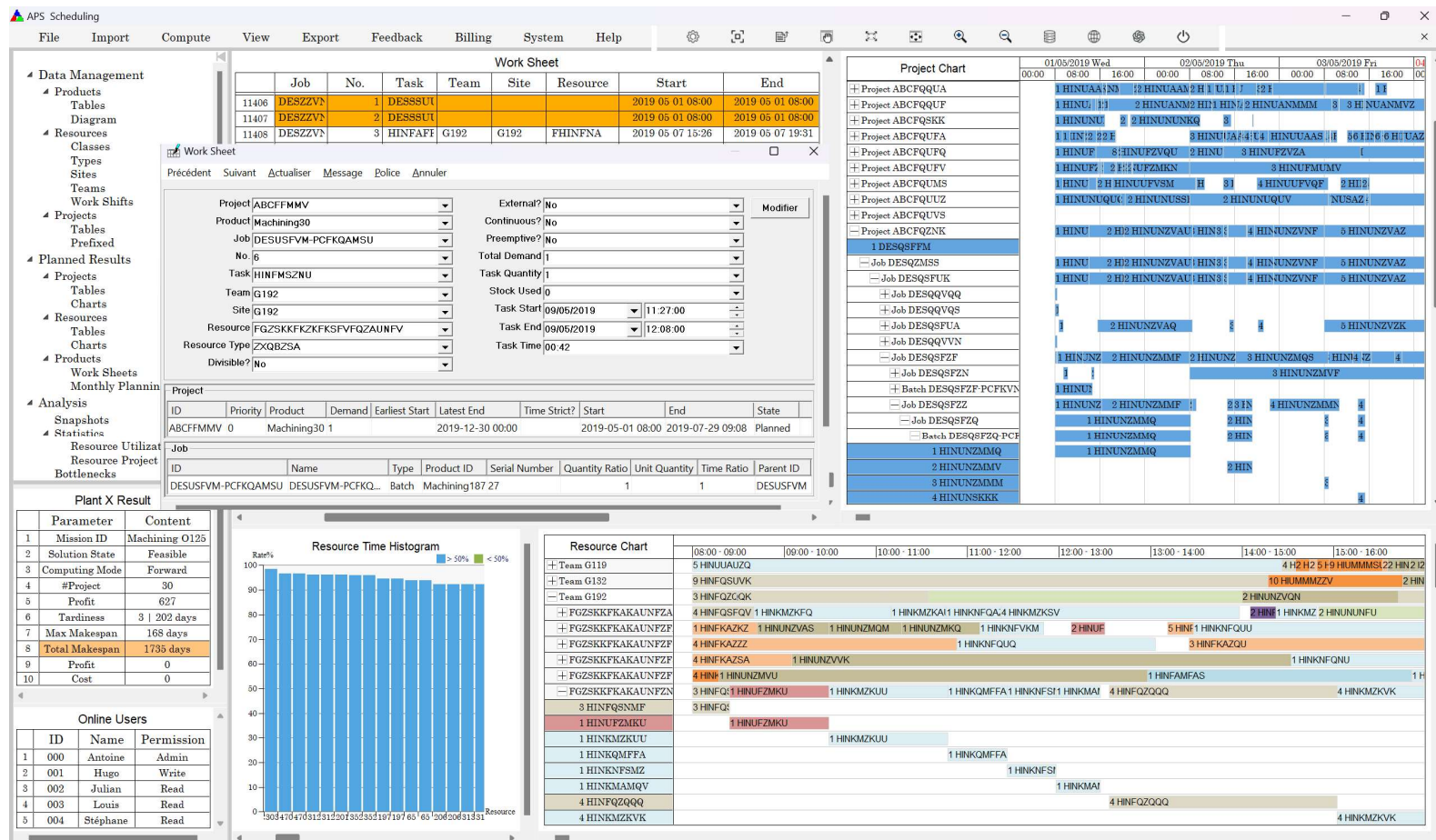
Process	Relation
DESASAAF-C1	Coupled
DESASAAF-E1	Exclusive
DESASKMN-PCFKZUFF	Successor

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APS : Advanced Planning and Scheduling

► Scheduling Module : Operational Scheduling (Precision: hour/minute/second)

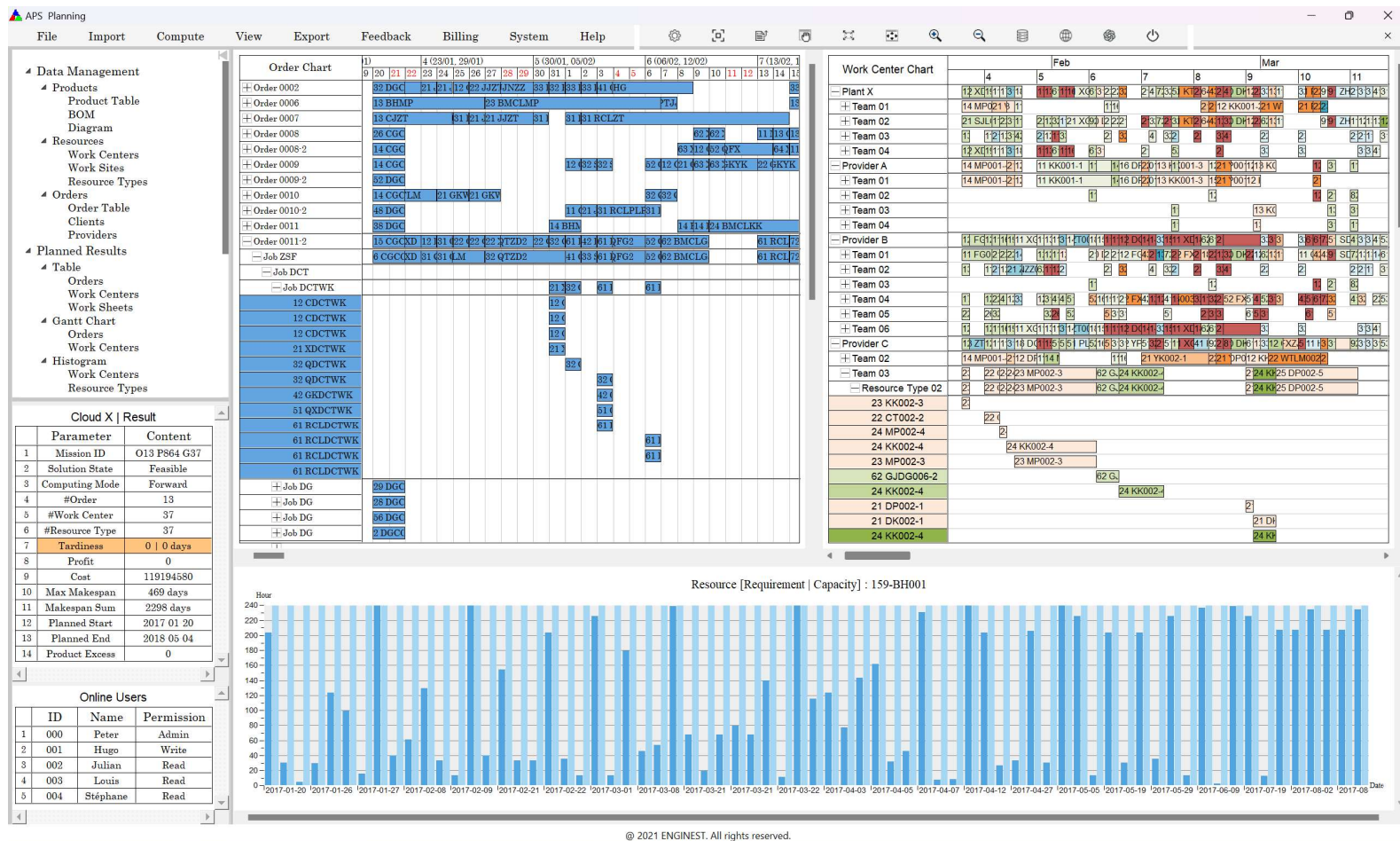
Applications



APS : Advanced Planning and Scheduling

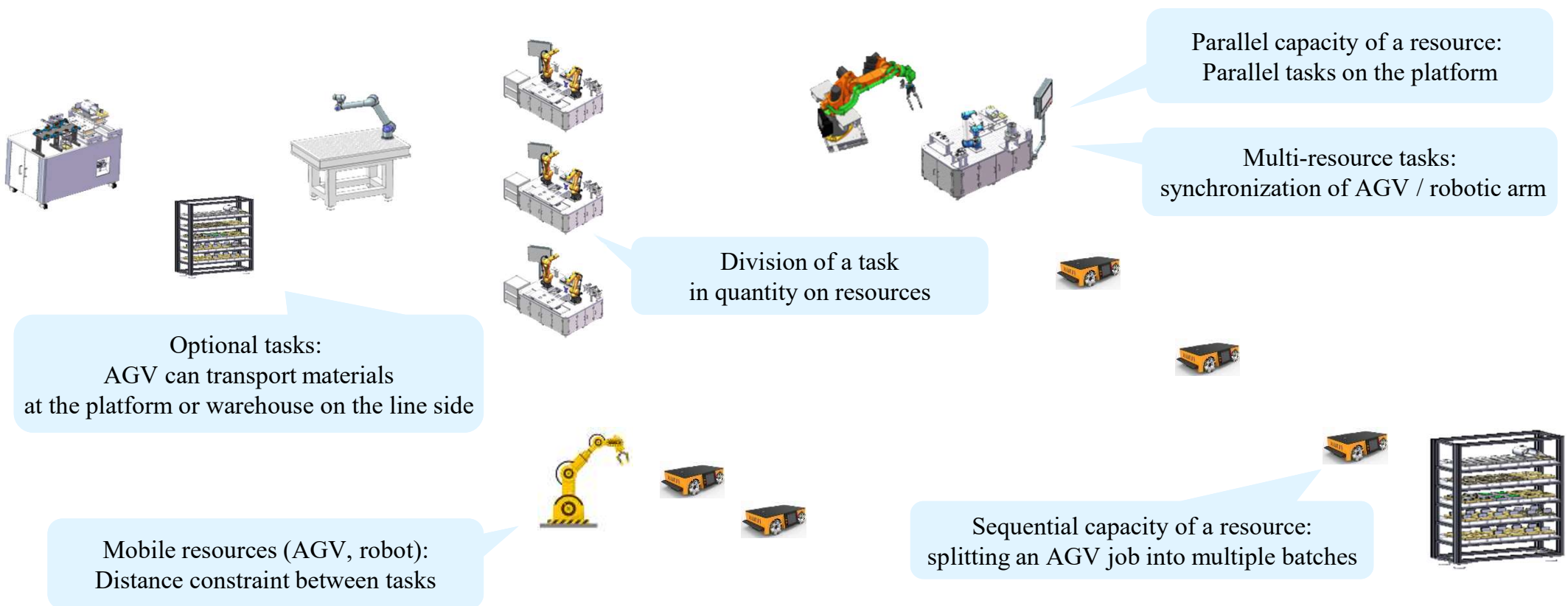
► Planning Module : Project Management and Personnel Planning

Applications



APS : A Generic Model

- ▶ Generalized through around fifteen different types of projects :
 - Production planning/scheduling (machining/shaping, coating, heat treatment, assembly, integration)
 - Project planning and human resource optimization, etc.
 - Complex context: synchronization of mobile (AGV/robot) and static (machine/tool) resources



Advantages

▶ NCL : Turing-Complete Mathematical Language

- Artificial Intelligence : Mathematical parser and debugger
- Operations Research : Set programming
- Inference Engine : Reasoning based on first-order logic
- Exact Method + Parallelism : Significantly increased performance

▶ The POEM Platform: Open Architecture

- Flexible: Parameterizable NCL models; configurable terminal interfaces
- Complete: Data management, visualization/interaction and optimization

▶ Agile Applications: Project Cost Minimized / Solution Optimized

- Generic : Easy to deploy, train, maintain and duplicate; project cost minimized
- Optimal : Optimized Mathematical solution; operating cost minimized

Thanks

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