

Basic demonstrator

Optimises total cost by aligning asset operating schedules with asset maintenance schedules (for example Loodswezen and Apache asset pools that are repaired by replace)

Optimises component operating schedule by aligning maintenance moments for redundant components (for example redundant diesel engines on ships that are repaired by repair)

Input

Day	Region A					Region B				
	1	2	3	4	5	1	2	3	4	5
Asset 1	8	7	5	3	9					
Asset 2	2	8	5	5	6					
Asset 3						7	4	9	6	7
Asset 4						9	6	7	9	8
Asset 5						6	8	8	8	5

- Required pool operating schedule
- List of assets
- List of required maintenance tasks, for each asset including:
 - Driver for maintenance
 - Duration
 - Cost

Assumptions:

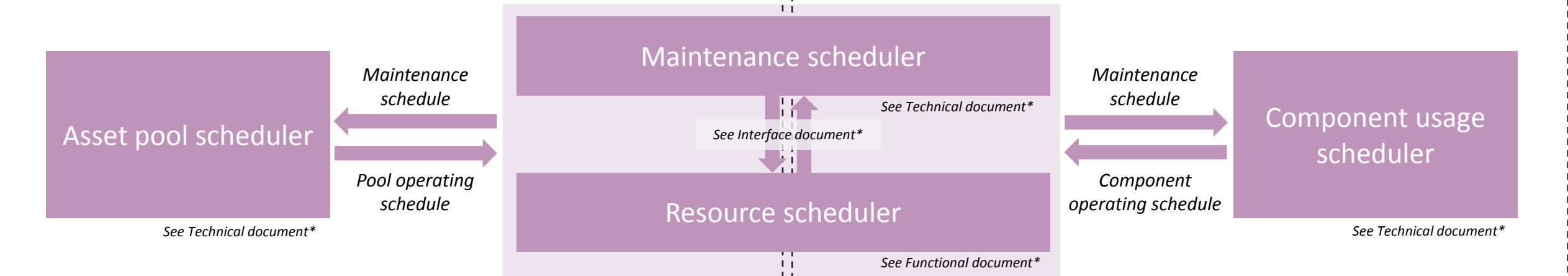
- Asset operating schedules are already given

Input

Day	1	2	3	4	5
Operate in region A	2	8	5	5	
Operate in region B		4			8

Component	Redundant	MTBSM	Time to repair
A	YES	2,000h	5,000h
B	YES	2,500h	6,000h
C	YES	2,300h	5,000h

- Required operating schedule for an asset
- List of components and corresponding redundancy information
- Mean time between scheduled maintenance
- Estimate of remaining time to replace/repair
- Set-up times and costs for on/off
- List of required maintenance tasks, for each component including:
 - Driver for maintenance
 - Duration
 - Cost



Output

Day	Region A					Region B				
	1	2	3	4	5	1	2	3	4	5
Asset 1	8	M1	5	3	9					
Asset 2	2	8	5	M2	5					
Asset 3						7	M3	6	9	7
Asset 4						9	4	M4	9	8
Asset 5						8	8	M5	8	5

Orders	Quantity	Order day	Req. Day
Emergency part A	2	1	2
Part A	1	3	5
Part B	1	2	4
Part C	1	2	4

- Operating and maintenance schedule per asset
- Total cost of maintenance

Output

Day 1	08:00	09:00	10:00	11:00	12:00	13:00	14:00
Component A	ON	ON	ON	OFF	OFF	OFF	M
Component B	M	OFF	OFF	ON	ON	ON	ON
Component C	OFF	OFF	ON	ON	ON	OFF	OFF

Task	Part	Day	Asset	Quantity
M1	Part A	1	5	1
M2	Part A	2	1	1
	Part B	2	1	2
M3	Part B	3	4	2
M4	Part A	4	3	1
	Part C	4	3	1
M5	Part A	5	2	1

Orders	Quantity	Order day	Req. Day
Emergency part A	2	1	2
Part A	1	3	5
Part B	1	2	4
Part C	1	2	4

- Component operating schedule for redundant components
- List of maintenance tasks and required spare parts
- Workorders

To-do

In asset pool scheduler:

- Make it possible to upload input files in tool
- Develop GUI
- Implement asset pool (fleet) level functionality
- Make MTTR a variable (greater than 0)

In maintenance and resource scheduler:

- Implement BOM functionality
- Create workorders output

To-do

OUT OF PROJECT SCOPE FOR NOW

*Technical document: IMOLA Software Development Process development, Interface document: Data specificatie MCPT-Interface v20180516, Functionl document: xxxxx

Advanced demonstrator

Optimises total cost by aligning asset operating schedules with asset maintenance schedules (for example Loodswezen and Apache asset pools that are repaired by replace)

Optimises component operating schedule by aligning maintenance moments for redundant components (for example redundant diesel engines on ships that are repaired by repair)

Input

Day	Region A					Region B				
	1	2	3	4	5	1	2	3	4	5
Asset 1										
Asset 2										
Asset 3										
Asset 4										
Asset 5										
Required:	10	12	10	8	12	20	18	20	19	23

- Required pool operating schedule
- List of assets
- List of required maintenance tasks, for each asset including:
 - Driver for maintenance
 - Duration
 - Cost

Assumptions:

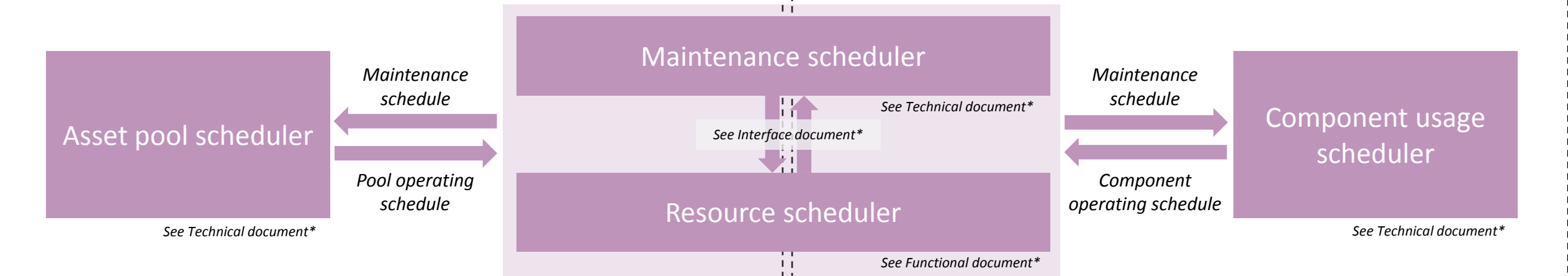
- Assets are identical and therefore interchangeable
- During regional changeover, an asset is unavailable for a certain amount of time and this will cost money (greater than 0)
- Scrap rate of repairables is 0%

Input

Day	1	2	3	4	5
Operate in region A	2	8	5	5	
Operate in region B		4			8

Component	Redundant	MTBSM	Time to repair
A	YES	2,000h	5,000h
B	YES	2,500h	6,000h
C	YES	2,300h	5,000h

- Required operating schedule for an asset
- List of components and corresponding redundancy information
- Mean time between scheduled maintenance
- Estimate of remaining time to replace/repair
- Set-up times and costs for on/off
- List of required maintenance tasks, for each component including:
 - Driver for maintenance
 - Duration
 - Cost



Output

Day	Region A					Region B				
	1	2	3	4	5	1	2	3	4	5
Asset 1	8	M1	5	3	9			3	5	
Asset 2	2	8	5	5	M2	4				
Asset 3		4				7	4	9	M3	7
Asset 4						9	6	M4	9	8
Asset 5				3		M5	8	8	8	5
Required:	10	12	10	8	12	20	18	20	22	20

Task	Part	Day	Asset	Quantity
M1	Part A	1	5	1
M2	Part A	2	1	1
	Part B	2	1	2
M3	Part B	3	4	2
M4	Part A	4	3	1
	Part C	4	3	1
M5	Part A	5	2	1

Orders	Quantity	Order day	Req. Day
Emergency	2	1	2
part A	1	3	5
Part B	1	2	4
Part C	1	2	4

- Operating and maintenance schedule per asset
- Workorders for maintenance tasks including required spare parts and timing
- Total cost of maintenance

Output

Day 1	08:00	09:00	10:00	11:00	12:00	13:00	14:00
Component A	ON	ON	ON	OFF	OFF	OFF	M
Component B	M	OFF	OFF	ON	ON	ON	ON
Component C	OFF	OFF	ON	ON	ON	OFF	OFF

Task	Part	Day	Asset	Quantity
M1	Part A	1	5	1
M2	Part A	2	1	1
	Part B	2	1	2
M3	Part B	3	4	2
M4	Part A	4	3	1
	Part C	4	3	1
M5	Part A	5	2	1

Orders	Quantity	Order day	Req. Day
Emergency	2	1	2
Part A	1	3	5
Part B	1	2	4
Part C	1	2	4

- Component operating schedule for redundant components
- List of maintenance tasks and required spare parts
- Workorders

To-do

In asset pool scheduler:

- Basic demonstrator to-do's
- Implement asset pool maintenance optimisation heuristics

In maintenance and resource scheduler:

- Basic demonstrator to-do's
- Implement algorithm for repair by replace parts with closed loop (repairables). Additional logistic action is to increase turn around stock levels)

To-do

OUT OF PROJECT SCOPE FOR NOW

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