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Quick Start Guide ARIS Simulation

Quick Start Guide ARIS Simulation

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Author: *Volker Mohr* Version 1.0 | 24 March 2021

1.1 This document

... describes the most important options, functions, and technical relationships of the simulation in the ARIS – provided by the ARIS Extension Simulation. The quick guide serves as a first step and allows you to quickly get initial results. However, it cannot replace the product documentation and help functionality in terms of scope and actuality. The compilation is carried out to the best of our knowledge without the claim of absolute completeness.

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2 Details

2.1 Benefits of ARIS Simulation

The ARIS Extension Simulation allows processes that are available in the form of BPMN models, value chains or event-driven process chains (EPC) to evaluate their runtime behavior, personnel costs, resource utilization and estimated costs. From the results of the simulation, essential process information such as:

- Executability and possible errors,
- throughput and waiting times in the process,
- bottlenecks in processing,
- estimated utilization of staff and technical resources,
- qualitative and quantitative comparison of processes, and
- costs.

2.2 How the ARIS Simulation works

The ARIS simulation is form a license perspective an extension pack of the ARIS Architect. This is where the simulation itself, its preparation and initial evaluations take place. In the backend, the simulation uses a runtime component in the ARIS Cloud environment (simulation_s|m|).

The functionality of ARIS simulation is quite simple: the steps of a process are "worked off" sequentially. The information of certain attributes is used to evaluate the ongoing process. The most important attributes are shown in the following table:

Objects	Attributes	Range	Usage
Function	Simulation group ¹ :		
	- Static wait time	- Time / Dist	ribution - Wait time without resources
	- Orientation time	- Time / Dist	ribution - Orientation with resources
	- Processing time	- Time / Dist	ribution - Processing time
	- Orientation necessary	- Value (onc	e per - Need for orientation times
		batch, onc	e per
		process,or	ice per

¹ If the time-related attributes in the Simulator attribute group are not maintained, the respective attributes in the Times attribute groups are used if they are valid.

Objects	Attributes	Range	Usage
		simulation run,	
		always)	
(Start-) Event	Frequency group:		Number of events (Input
	- Frequency, daily		objects) per time unit
	- Frequency, weekly		
	- Frequency, monthly		
	- Frequency, yearly		
			Priority of the input objects
	- Priority		(higher priority is preferably
			processed for queues,
			default=0)
Event (after	Simulation group:	- Probability	- Statistical distribution for a
branch)	- Probability		path

Depending on the desired results, the process descriptions must be maintained with attributes that can be used for the calculations. For cost accounting, it is necessary that the functions or roles have cost rates. The next table shows cost attributes that the simulation takes into account:

Objects	Attributes	Range	Usage
Funktion	Simulation group ² :	Value /	Fixed costs per
	- Avg. total costs	currency	execution of the
	- Avg. material costs		_ function
	- Avg. personnel costs		
	- Avg. Operating supplies costs		
	 Avg. energy costs 		
	- Avg. Various overhead costs		
	- Avg. Costs for		
	depreciation/repair/maintenanc	e	
	- Avg. Imputed interest		
	- Avg. other costs		
	- Resource allocation		

² Die Kosten einer Funktion werden pro Ausführung und unabhängig von der Ausführungszeit herangezogen. Avg. Total costs kann nur als exklusive Alternative zu den übrigen Kosten verwendet werden.

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Objects	Attributes	Range	Usage
Organisationseinheiten,	- Number of employees		- Number of
Gruppen, Positionen,	- Cost rate (busy time)		employees in the
Personen Typ, Person	- Cost rate (idle time)		Org unit and their
			cost rates per
			hour
Verknüpfung Personal -	- Number of rerequired employees	Number	Number of
Funktion	- Commit ressource		persons required
		- True/False	to carry out
			function
			- Execution of all
			functions by the
			same person

In addition to the functions and assigned personnel, there are 2 variants of resources that are used to determine costs and runtime behavior: technical resources and capacitive resources.

The cost of technical resources is multiplied by processing time to determine the resource cost of a function. Like with human resources, there is also an attribute defining whether the resources are used additively (standard) or alternatively.

Capacitive resources are used to simulate receipts and exits—the capacitive resources (products, services, or general resources) do not bear the costs used for simulation. Depending on your connection to the functions, your receipts and exits are logged and your inventory can affect runtime behavior by defining minimum and maximum stocks.

2.3 Getting started

The start of the simulation starts with a process model, which is enhanced with simulation parameters.

This includes processing times in the process steps.

Propertier	×
attributes Assignments Reused obje	Relationshins Occurrences SAP propert
Attribute name	Check if ext is still usable or not (English
Attribute name	Check if car is still usable or not Check if car is still usable or not
Name	
Identifier	
Link I	Franklan
lype	Function 10.05 2010 14:20:15
lime of generation	10.05.2016 14.30.15
Creator	37 02 2010 14:44-51
Last change	27.03.2018 14:44:51
Last user	system
Static wait time	
Orientation time	
Processing time	(a = 0000:00:02:00 , b = 0000:00:20:
Process folders processed	100
Static wait time sum	0000:00:00:00
Dynamic wait time sum	0011:13:04:46
Orientation time sum	0000:00:00:00
Processing time sum	0000:15:45:52:0074
Process folders in static wait state	0
Process folders in dynamic wait state	0
Process folders in orientation	0
· · · · ·	0

Different statistical distributions are available for the runtimes – based on the defined runtime (minimum, maximum, mean). Details of the distributions can be found in the ARIS Help at "Special topics and functions" -> "Model" -> "Probability distributon" "Which distributions are available?"

Attribute name	Check if car is still usable or not (English (United States) - A	Iternative language)	
Static wait time			
Orientation time			
Processing time	($\mathbf{a} = 0000:00:02:00$, $\mathbf{b} = 0000:00:20:00$, $\mathbf{c} = 0000:05:00$)	Triangular distribution	▼
Interruptible	Interruptible	Equal distribution	*
Processes to be processed		Normal distribution	
Resource allocation		Log-normal distribution	
Orientation necessary		Exponential distribution	
Description for a second secon		Erlang distribution	_1
Resource for resumption		Triangular distribution	
Control trigger		Gamma distribution	
Execution interval		Truncated normal distribution	+
Control effectiveness			
Risk occurrence probability reduction			
Risk damage reduction			

The events by branching are given the "Probability" attribute, which defines the probability of a selected path.



		_
Attribute name	Service dispatcher (English (United States) - Alter	
Name	Service dispatcher	y Request by
Identifier		customer received
Link 1		
Туре	Role	Number of employees: 1
Time of generation	10.05.2016 14:41:12	B Chark Kroz is still
Creator	system	Service dispatcher
Last change	03.04.2018 19:52:57	Costrate (busy time): 35 EUR
Last user	system	<u>+</u>
Cost rate	40	
Number of employees	1	
Processed functions	400	Trousania, o _v a
Orientation time sum	0000:00:00:00	Car is usable
Processing time sum	0016:20:49:08:0066	
Degree of utilization	0,1681	
Priority		Number of employees: 1
Accumulated scheduled time	0100:08:00:34:0570	
Accumulated idle time	0083:11:11:26:0503	Comparison of the servicing Service dispatcher (
Accumulated overtime	0000:00:34:0570	Cost rate (busy time): 35 FUR

After all underlying values (for the expected results) are entered, the simulation can be started via "Start simulation". The model is then prepared for simulation. If there are inconsistencies, this step may display model errors that prevent simulation.



The actual simulation is started via the "Start" icon in the simulation window. By default, the models are animated, but this slows down the simulation process. This can be turned off by switching the "Animation active" field.

Additional parameters and settings of the active simulation can be maintained in the "Status and settings" windows in the lower part of the simulation. For more details, see 3.1.2 Configuration in the simulation



2.4 Darstellung und Interpretation der Simulationsergebnisse

After successful pass, the simulation results are written to a statistics table and to the result attributes of the objects. The table has different tabs to view runtime behavior and costs.

All results, parts of them, or worksheets can be displayed and exported as graphs.

Statistics					×	144
l.) Human resources (cumul.)	Technical resource	s (cumul.) Capa	city resources (cu	mul.) Function o	costs (cumul.) × ∢ → ≡	713
Name	Process folders	Accumulated b	Accumulated b	Human reso 🔻	Technical reso Total re	E
Schedule servicing	5	0000:18:53:31	0000:00:00:00	661,22	0,00	
Service the car	4	0000:09:08:17	0000:00:00:00	365,53	0,00	G
Check if car is still usable or not	5	0000:00:56:47	0000:00:00:00	33,12	0,00	
Choose car pool to book back	4	0000:00:09:08	0000:00:00:00	5,33	0,00	
Book car to own pool	3	0000:00:05:36	0000:00:00:00	3,27	0,00	1
Book car to other pool	1	0000:00:02:17	0000:00:00:00	Int	Generate column chart	
Dispatch servicing	0	0000:00:00:00	0000:00:00:00	lane lane	Generate line chart	
Service the car	0	0000:00:00:00	0000:00:00:00		Generate nie chart	
Request car service	0	0000:00:00:00	0000:00:00:00	Ģ	Generate pie chart	
Classify issue and request advance	0	0000:00:00:00	0000:00:00:00		Export statistics	
Carry out advanced service	0	0000:00:00:00	0000:00:00:00		Export all statistics	
Travel to car location	0	0000:00:00:00	0000:00:00:00	0,00	0,00	
Attend customer to new car	0	0000:00:00:00	0000:00:00:00	0,00	0,00	
Chart						×
Function costs (cumul.) 1 ×						
Punction costs (cumul.) 1 ×						
Schedule services	the cal usable of not produports	on bothe pool services	ethe de serves serves	Travelo Casoner In ref	a de	

2.5 Experiments

The Experiments function allows the simulation of processes with the variation of parameters such as the number of people in an organization.

For example, the goal of an experiments is to find optimal resource utilization by varying the number of resources in a predefined range.

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3 Annex

3.1 Configuration

The simulation has two central configuration settings:

- Global settings in ARIS Architect options ([ARIS] [Options] Selection: [Simulation]).
- Settings in the simulation itself in the lower "Status and settings".

3.1.1 Global settings

Global configuration defines default parameters that can be overridden in the simulation as needed and defines options that are used in the simulation.

In the global configuration, the first overview defines standard parameters for the nesting depth of processes and objects to be evaluated.

Doptions	
Selection Help	Models included
Layout Automatic alignment Page layout Perspective Select topics Select working environment Process automation Live messages Model data flow Transformation Simulation Publisher export profiles SAP © options Select server Solution Manager Search Simulation Models included Period Statistics	Include the following models in addition to the selected ones: Image: Models using shared control flow objects, up to recursion depth: Image: Models using shared resources, up to recursion depth: Image: Models using shared resources, up to recursion depth: Image: Models using shared resources, up to recursion depth: Image: Models using shared resources, up to recursion depth: Image: Models using shared resources, up to recursion depth: Image: Models using shared resources, up to assignment level: Image: Models using shared resources, up to assignment level: Image: Models using shared resources, up to assignment level: Image: Models using shared resources, up to assignment level: Image: Models using shared resources, up to assignment level: Image: Models using shared resources, up to assignment level: Image: Models using shared resources, up to assignment level: Image: Models using shared resources, up to assignment level: Image: Models using shared resources, up to assignment level: Image: Models using shared resources, up to assignment level: Image: Models using shared resources, up to assignment level: Image: Models using shared resources, up to assignment level: Image: Models using shared resources, up to assignment level: Image: Models using shared resources, up to assignment level: Image: Models using shared resources, up to assignment level: Image: Models using shared resources, up to assignment level: Image: Models using shared resources, up to assignment level: Image: Models using shared resources, up to assignment level:

The second overview defines standards for the periods to be simulated.

Doptions	
Selection Help Pe	eriod
Layout Automatic alignment Page layout Perspective Select topics Select working environment Process automation Live messages Model data flow Transformation Simulation	Simulation time period Absolute Start: 4:42:58 PM 10.03.2021 End: 5:42:58 PM 18.06.2021 Relative Duration: 0005:00:00:00 Exit simulation when all processes are complete
Publisher export profiles ✓ SAP © options Select server Solution Manager Search ✓ Simulation Models included Period Statistics	Warm-up phase Duration: 0000:00:00:00 Jote: Changes will take effect only after starting or resetting a simulation run.

The third overview defines which statistics to collect during the simulation. These specifications cannot be adjusted during the simulation itself.

Options 🗍				
Selection Help	Statistics			
Layout				
Automatic alignment	Cumulative statistics			
Page layout	Events (cumul.)			
Perspective	Functions (cumul.)/Activities (cumul.)			
Select topics				
Select working environment	Rules (cumul.)/Gateways (cumul.)			
Process automation	Processes (cumul.)			
Live messages	Human recourses (cumul.)			
Model data flow				
Transformation	Technical resources (cumul.)			
Simulation	Capacity resources (cumul.)			
Publisher export profiles				
▼ SAP [®] options	 Function costs (cumul.)/Activity costs (cumul.) 			
Select server	Human resource costs (cumul.)			
Solution Manager	Technical recourse costs (cumul.)			
Search				
 Simulation 	Risks (cumul.) (only for EPC)			
Models included				
Period	Datailed statistics			
Statistics				

3.1.2 Configuration in the simulation

In the simulation itself, nesting depth and simulation periods for the current run can be adjusted and, if necessary, written back as default.



atus Models included		Period	General animation	Object animation	Attribute a	
Sim	ulation t Absolu	time period				
Star	rt: [4:42:58 PM		10.03.2021		
End	l: [5:42:58 PM		18.06.2021		
۲	Relativ	re				
Dur	ation:	0005:00:00:	00			
	Exit sir	nulation wł	nen all pro	ocesses are complete		
War	m-up pl	hase				
	ation:	0000:00:00:	00			
Dur						

3.2 Outlooks and other functions

In addition to the skills described, the simulation can take into account many more dependencies, such as shift calendars.

And the experiments also offer a variety of possibilities that would go beyond this description. A recommendation for further study is the training "737 41E – Dynamic Simulation with ARIS Business Simulator".

If specific attributes and correlations are not directly evaluated by the simulation, it is recommended to use queries, macros or reports, to consolidate information into simulation attributes so that these are taken into account dureing simulation.