

# Performance and Memory

We run tests with different releases of LemonTree against different test-models to examine the improvement of the memory usage and performance.

This page gives an overview of the performance and memory usage and describes the test-models.

Performance and memory usage are continually improved in LemonTree.

## Environment

Win10, 16GB RAM i7-6700HQ CPU @2.60 GHz, 64 BIT

## Test description

We have different test setups which run against the recent releases of LemonTree.

1: **Small model**, with few changes in 3-way comparison

These models are the example models which come with the LemonTree installation.

2: **Medium model** with several changes in 3-way comparison

A larger model which is diffed in a 3-way comparison. There are changes in A (relative to Base) and B (relative to Base). This test-case can be regarded as standard use-case for LemonTree, when used with models that are under version control (GIT, SVN).

3: **Large model** with a lot of changes in 2-way comparison

A really large model with a lot changes and even more elements to be checked by LemonTree. This is quite challenging for LemonTree. In a 2-way comparison Model A is also regarded as Base model.

4: **EaExample**, compared with empty model

When comparing an empty model with another model the diff results in a lot of new objects which leads to special challenges for LemonTree. In older versions of LemonTree (< 1.5) this was not successful within the test environment.

5: **Tagged Value model** with a lot of TaggedValues in 2-way comparison

TaggedValues needed a lot of RAM in older versions of LemonTree (<1.8).

## Testmodels

Test Name	Version	File size	Total packages	Total diagrams	Total elements	Total connectors	Total TaggedValues*	Description
<b>Small Model</b>	Base	3 MB	6	17	202	152	242	
	A	3 MB	6	17	205	154	242	
	B	3 MB	6	17	203	153	242	
<b>Medium Model</b>	Base	128 MB	758	2.038	21.922	26.075	88.326	
	A	128 MB	739	1.988	21.685	25.594	88.810	
	B	133 MB	739	1.987	21.670	25.568	88.331	
<b>Large Model</b>	Base	233 MB	8.490	6.733	114.962	69.652	32.788	same as A
	A	233 MB	8.490	6.733	114.962	69.652	32.788	same as Base
	B	195 MB	8.059	6.252	107.111	64.345	29.157	
<b>EaExample</b>	Base	1,4 MB	1	0	0	0	0	empty model
	A	1,4 MB	1	0	0	0	0	empty model

	B	20 MB	427	564	4.656	2.623	29.460	
TV Model	Base	142 MB	338	909	46.380	22.819	316.458	same as A
	A	142 MB	338	909	46.380	22.819	316.458	same as Base
	B	152 MB	347	982	50.810	27.289	336.759	

\* Total Tagged Values are calculated via SQLs in EA:

```
select count(*) from t_attributetag UNION
select count(*) from t_connectortag UNION
select count(*) from t_operationstag UNION
select count(*) from t_taggedvalue UNION
select count(*) from t_objectproperties
```

## Test results

Test name	LT Version	1) Loading models	2) Diff & Merge calculation	3) Writing merge file	Max RAM usage
Small Model	1.5.5	22s	0.5s	3s	250 MB
	1.7.2	20s	1s	2s	284 MB
	2.0	22s	1s	1s	257 MB
	2.1.4	13s	1s	1s	263 MB
	2.2	18s	1s	1s	292 MB
	2.3	20s	1s	1s	297 MB
	2.4	19s	1s	1s	300 MB
	LT Version	1) Loading models	2) Diff & Merge calculation	3) Writing merge file	Max RAM usage
Medium model	1.5.5	2m	15s	4m42s	6.500 MB
	1.7.2	2m18s	40s	40s	7.200 MB
	2.0	2m16s	20s	1m	5.454 MB
	2.1.4	1m57s	32s	12s	5.595 MB
	2.2	2m23s	13s	20s	6.184 MB
	2.3	2m17s	13s	14s	5.928 MB
	2.4	2m07s	19s	17s	5.908 MB
		1) Loading models	2) Diff & Merge calculation	3) Writing merge file	Max RAM usage
Large model	1.5.5	2m30s	37m	68m	9.100 MB
	1.7.2	2m45s	25m	37m	10.100 MB
	2.0	2m30s	15m	49m	9.525 MB
	2.1.4	2m22s	17m58s	22m38s	10.011 MB
	2.2	2m09s	7m55s	21m53s	10.486 MB
	2.3	3m13s <sup>1</sup>	8m13s	29m14s <sup>1</sup>	10.548 MB
	2.4	2m52s	10m49s	24m14s	11.809 MB
		1) Loading models	2) Diff & Merge calculation	3) Writing merge file	Max RAM usage
EAExample	1.5.5	25s	25s	15m40s	770 MB
	1.7.2	26s	60s	6m	980 MB
	2.0	23s	10s	7m13s	764 MB
	2.1.4	13s	32s	4m44s	789 MB
	2.2	19s	14s	4m53s	805 MB
	2.3	22s	16s	4m57s	841 MB

	2.4	22s	16s	4m59s	826 MB
		1) Loading models	2) Diff & Merge calculation	3) Writing merge file	Max RAM usage
TV Model	1.5.5	2m	1m10s	13m10s	5.500 MB
	1.7.2	3m10s	11m11s	6m10s	6.708 MB
	2.0	1m52s	1m	5m54s	4.219 MB
	2.1.4	1m19s	59s	3m54s	4.359 MB
	2.2	1m46s	31s	3m57s	4.541 MB
	2.3	1m47s	33s	4m10s	4.073 MB
	2.4	2m17	25s	4m12s	4.266 MB

1: The test environment got a disc encryption since the last performance tests. We assume that's why the large models take longer on writing/loading. Older versions of LemonTree now also need longer with that models on writing.