IQMULUS QUANTITATIVE PERFORMANCE ASSESSMENT

Bergen, 21. September 2016

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IQmulus, Final Workshop

Bergen, September 21, 2016

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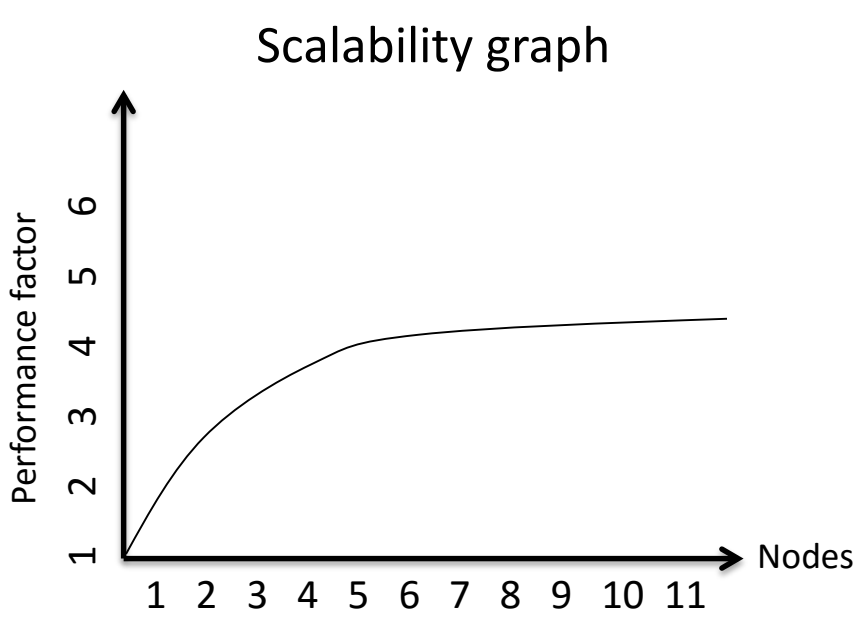
INTRODUCTION

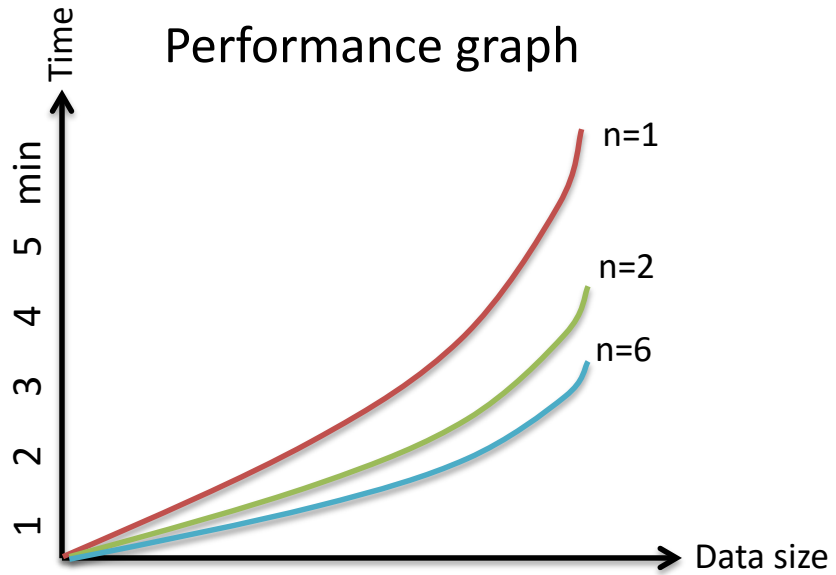
The aim of scalability testing is to produce

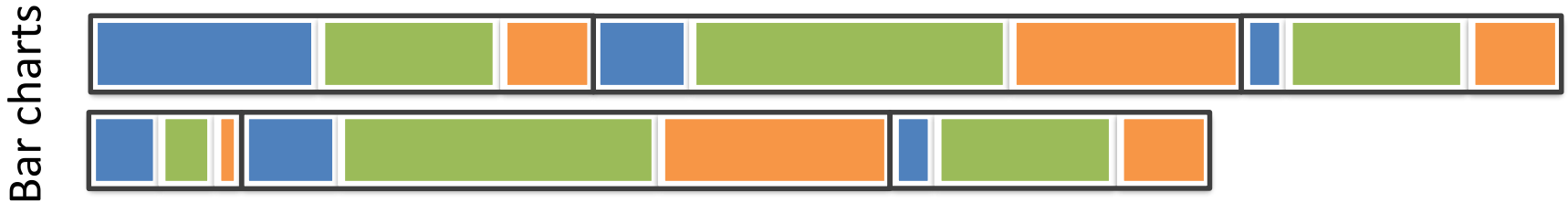
- quantitative,
- reproducible and
- comparable

performance results for all IQmulus system components operating on large volumes or very heterogenic data.

INTRODUCTION







INTRODUCTION

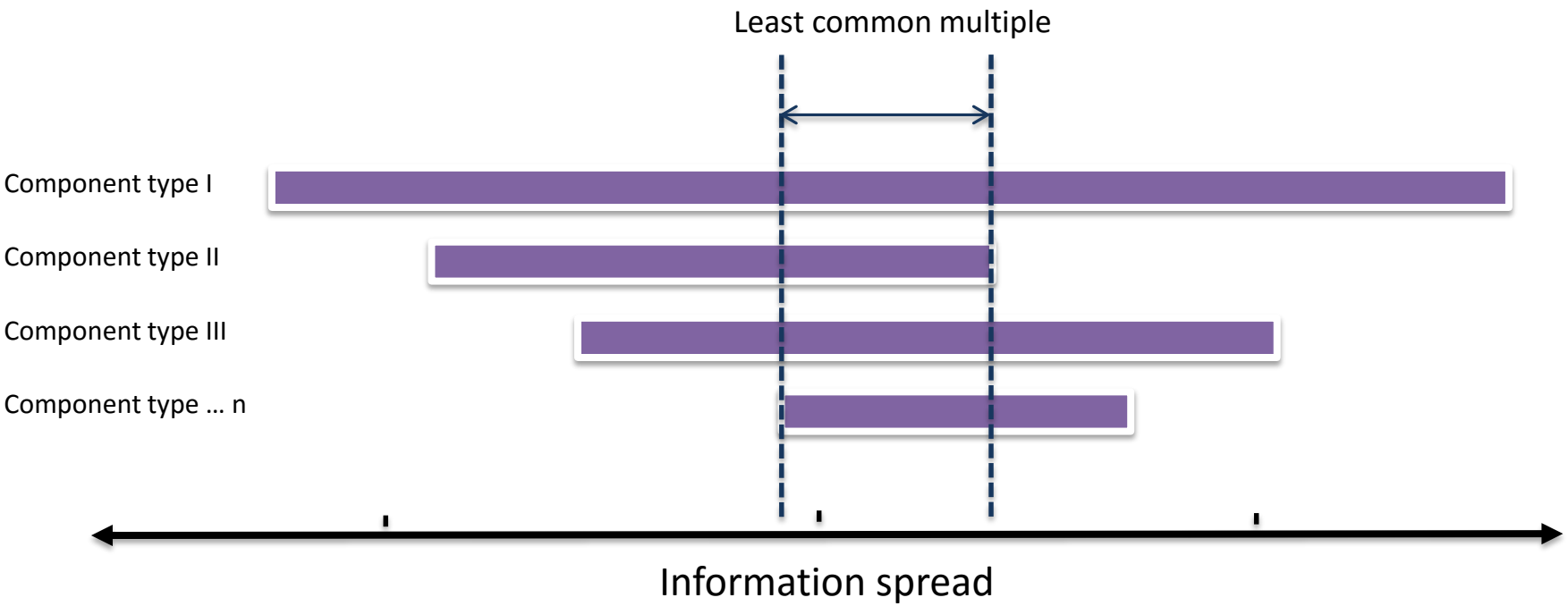
Development

- Identify common information bits
- Develop standard logging & test plans
- Build automated test infrastructure

Testing

- Produce statistical test results
- Interpret test results

Step 1: Identify common information provided by all components.



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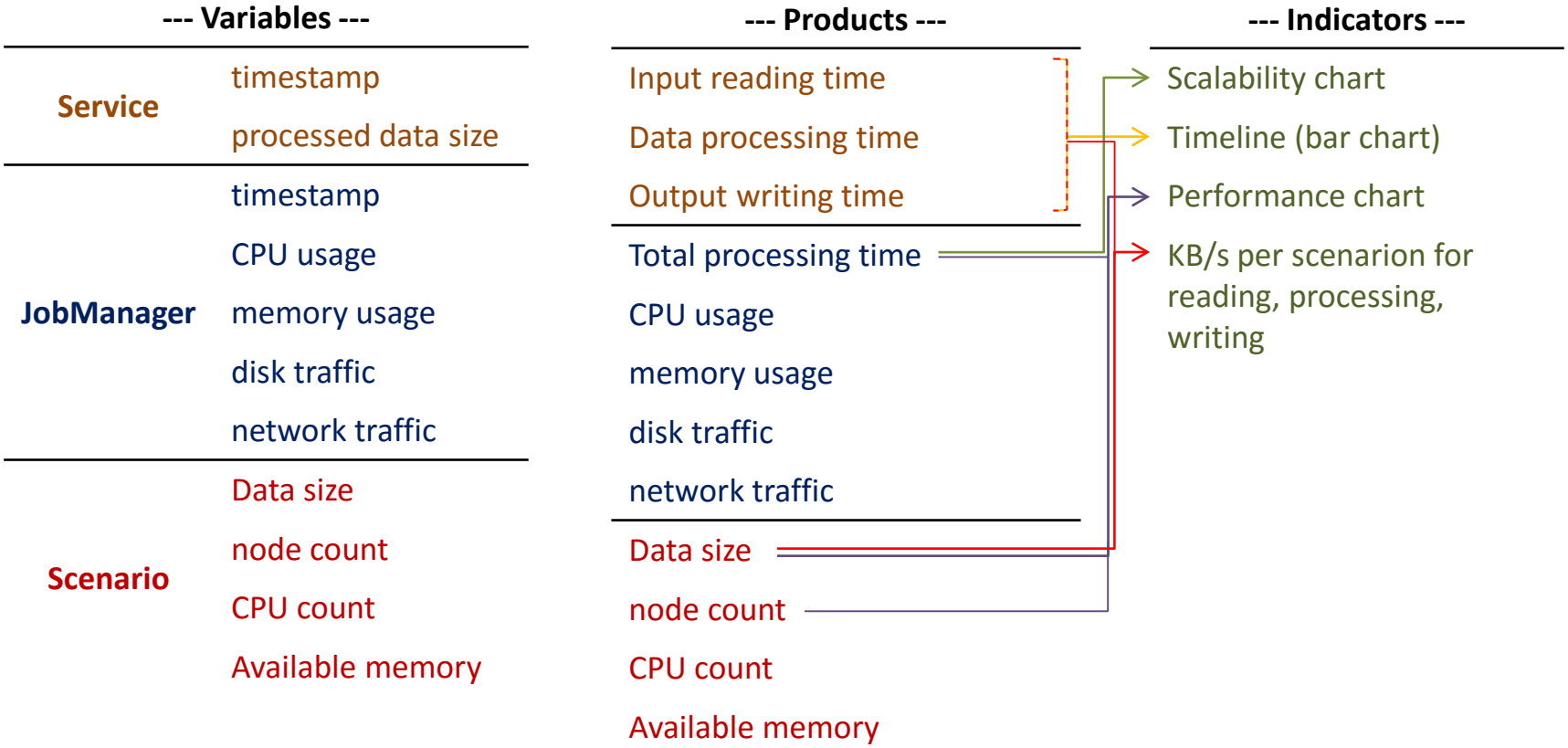


Step 2: Develop standardized logging & test plan definitions.

Logging syntax

(a logging specification that all components must adhere to)

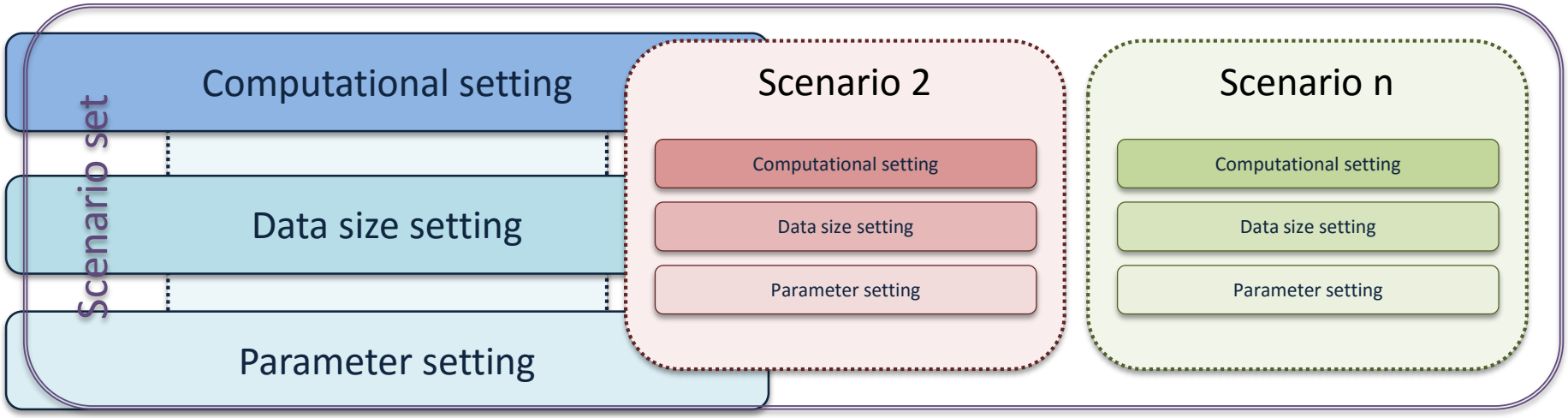
<*))))><{date/time|~|rawTimeStamp|~|logLevelDomainValue|~|logSourceDomainValue|~|serviceId|~|processName|~|functionName|~|message|~|list of data sets & data sizes}

<*))))><{2015-02-17 20:38:00|~|1424201901|~|info|~|service|~|62|~|generateExampleMessage|~|reading|~|This is a message|~|[[sample1.las,1809927],[sample2.las,1994632]]}

Step 2: Develop standardized logging & test plan definitions.

Test plan definitions

(A specification used to define variables/settings for scalability tests)



Step 2: Develop standardized logging & test plan definitions.

- Computational setting
- Data size setting
- Parameter settings

```
[
  {
     "name": "Distributed Processing of service 59 on 10 files",
     "node_counts": [
       1,2,3,4
     ],
     "mappings": [
           {
        "input_point_cloud":      "/mnt/hdfs/IGN/131010Toul1.xml",
        "output_point_cloud": "/mnt/hdfs/tmp/output1.ply",
        "nmin": "16",
        "nmax": "64",
        "window": "0"
     }, ...
   ]
  } , {
     "name": "Distributed Processing of service 59 on 50 files",
     "node_counts": [
       1,2,3,4,5,6,7,8
     ],
     "mappings": [
          {
        "input_point_cloud":      "/mnt/hdfs/IGN/131010Toul1.xml",
        "output_point_cloud": "/mnt/hdfs/tmp/output1.ply",
        "nmin": "16",
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     }, ...
   ]
  }, ...
]
```
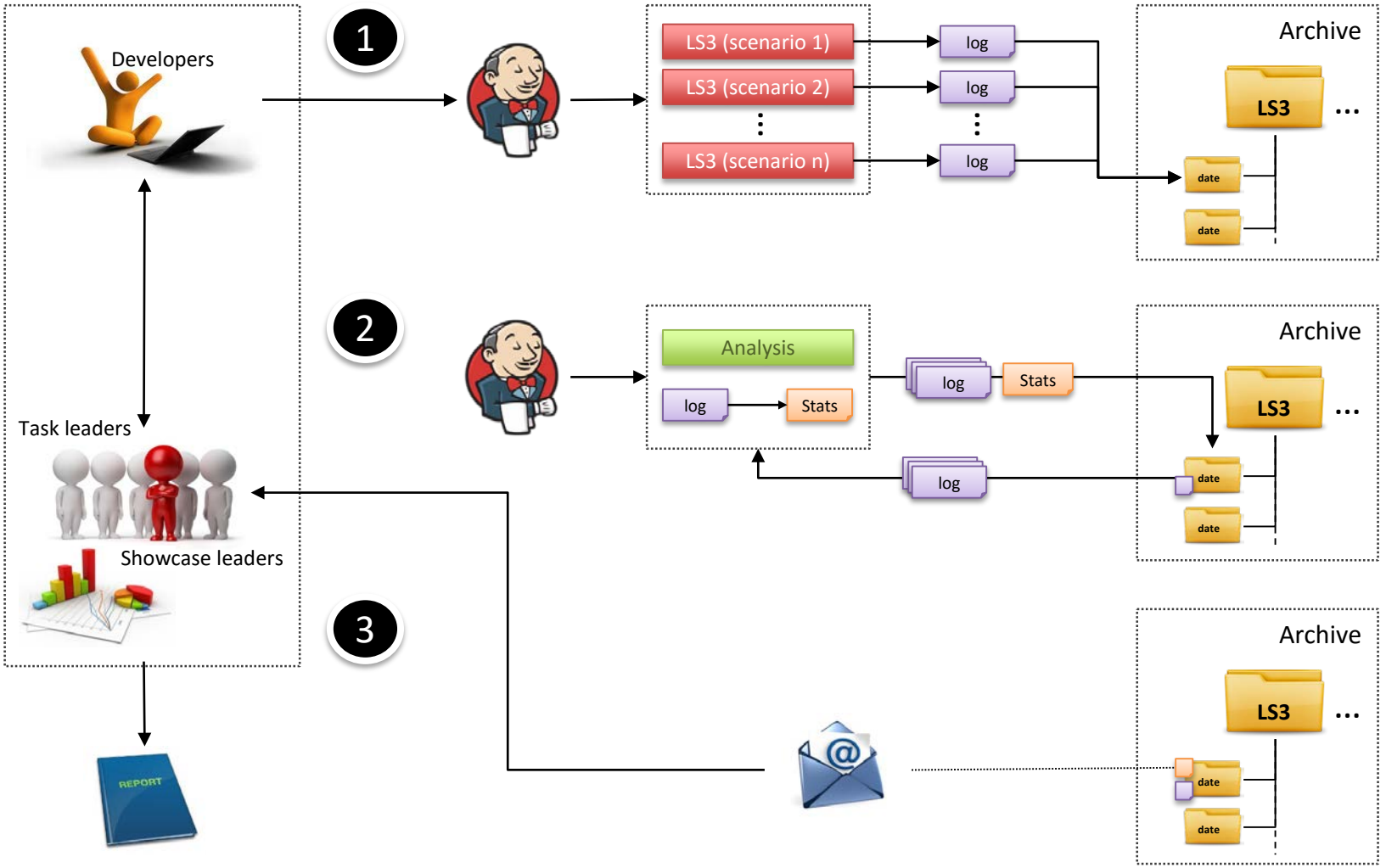

INFRASTRUCTURE

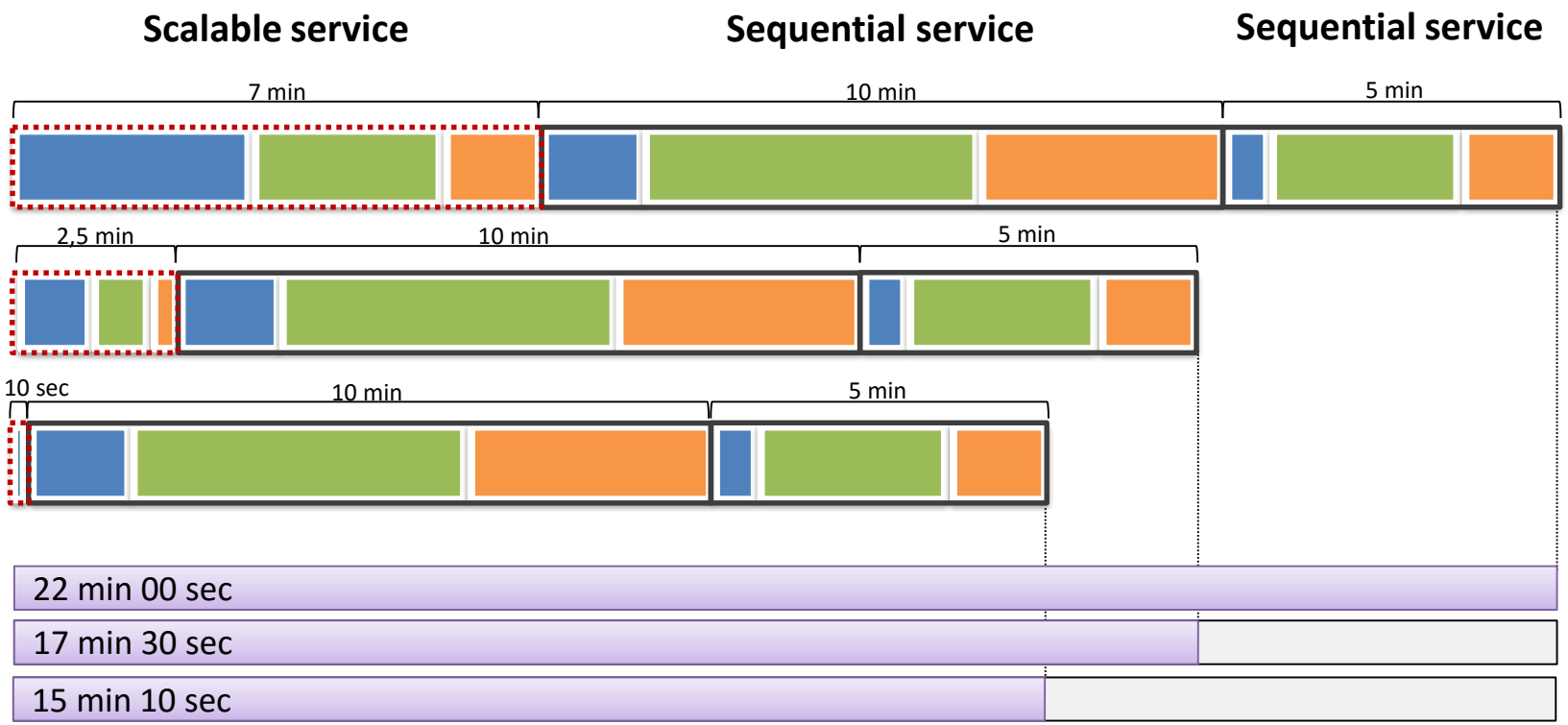


STATISTICAL RESULTS

logs

- △Total runtime (hrs:min:sec:…)
- △Reading time (hrs:min:sec:…)
- △Processing time (hrs:min:sec:…)
- △Writing time (hrs:min:sec:…)
- △Reading speed (MB/s)
- △Processing speed (MB/s)
- △Writing speed (MB/s)
- △Mem usage float (*continuous*)
- △CPU count integer
- △Node count integer

STATISTICAL RESULTS

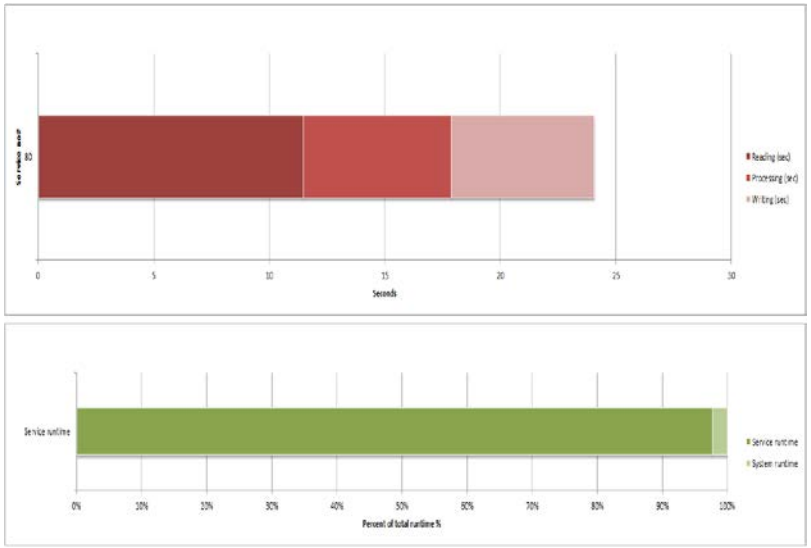


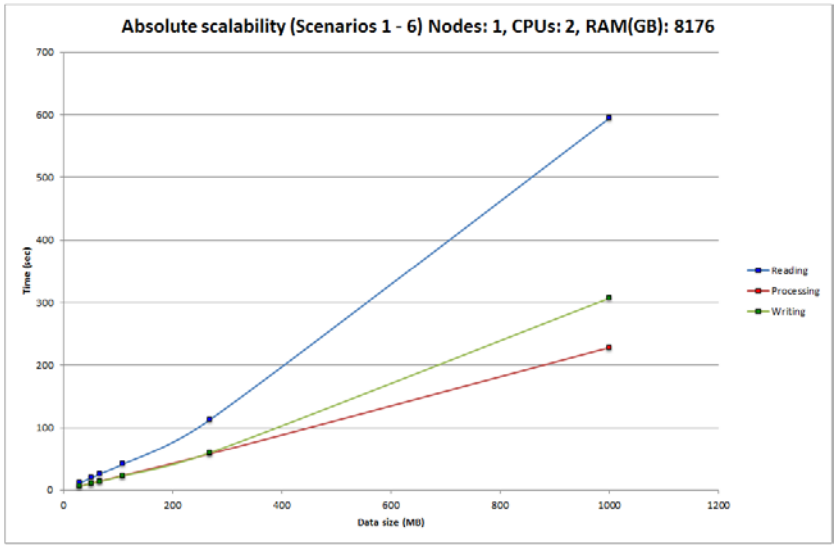
STATISTICAL RESULTS

exsample

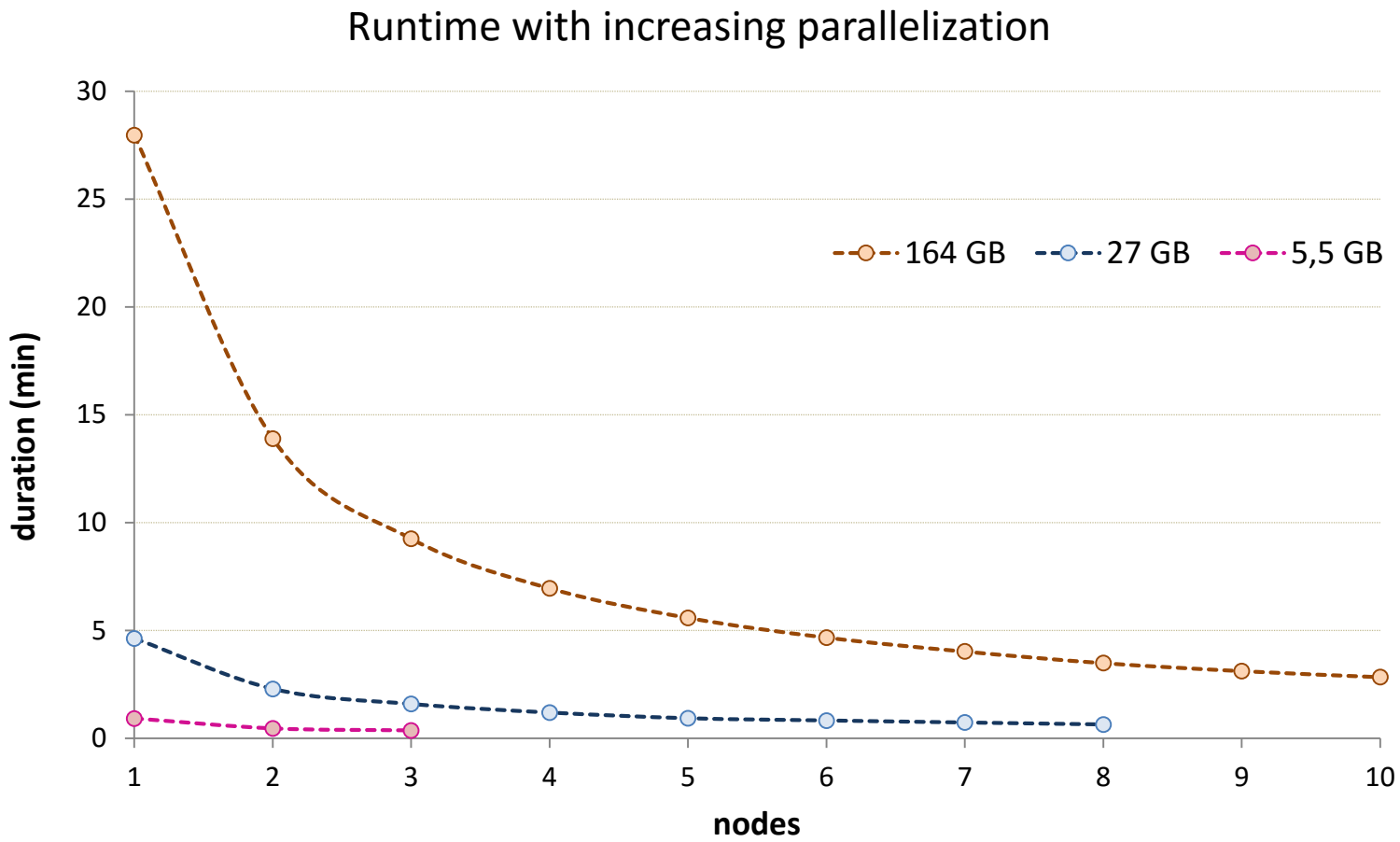
Scenario	File size (MB)	CPU count	RAM (GB)	Node count	Duration (sec)	MB/s
Scenario 1	29,9	2	8176	1	24,618	1,243243243
Scenario 2	50,4	2	8176	1	41,645	1,22771011
Scenario 3	67	2	8176	1	55,684	1,228456179
Scenario 4	109,2	2	8176	1	88,802	1,239500568
Scenario 5	268,1	2	8176	1	231,237	1,162216057
Scenario 6	1000	2	8176	1	1128,931	0,88620271
Scenario 7	29,9	8	16433	1	63,497	0,487526496
Scenario 8	50,4	8	16433	1	76,171	0,668257757
Scenario 9	67	8	16433	1	101,678	1,128326036
Scenario 10	109,2	8	16433	1	141,415	0,781507192
Scenario 11	268,1	8	16433	1	289,157	0,929386071
Scenario 12	1000	8	16433	1	1237,173	0,810044552

	Read (sec)	Process (sec)	Write (sec)	Read (%)	Process (%)	Write (%)	Overhead
Scenario 1	11,46	6,41	6,18	47,66%	26,65%	25,69%	2,31%
Scenario 2	19,54	10,98	10,53	47,60%	26,75%	25,64%	1,43%
Scenario 3	26,17	14,44	13,93	47,99%	26,48%	25,53%	2,05%
Scenario 4	41,71	23,5	22,89	47,34%	26,68%	25,98%	0,79%
Scenario 5	112,8	58,1	59,78	48,90%	25,19%	25,92%	0,24%
Scenario 6	593,92	227,88	306,61	52,63%	20,19%	27,17%	0,05%
Scenario 7	12,16	6,58	42,59	19,83%	10,72%	69,44%	3,41%
Scenario 8	30,66	11,02	33,74	40,65%	14,61%	44,74%	0,99%
Scenario 9	27,84	16,09	15,45	46,89%	27,09%	26,02%	41,60%
Scenario 10	91,89	24,23	23,61	65,76%	17,34%	16,90%	1,19%
Scenario 11	112,13	58,25	118,09	38,87%	20,19%	40,94%	0,24%
Scenario 12	662,66	244,61	327,23	53,68%	19,81%	26,51%	0,22%





STATISTICAL RESULTS



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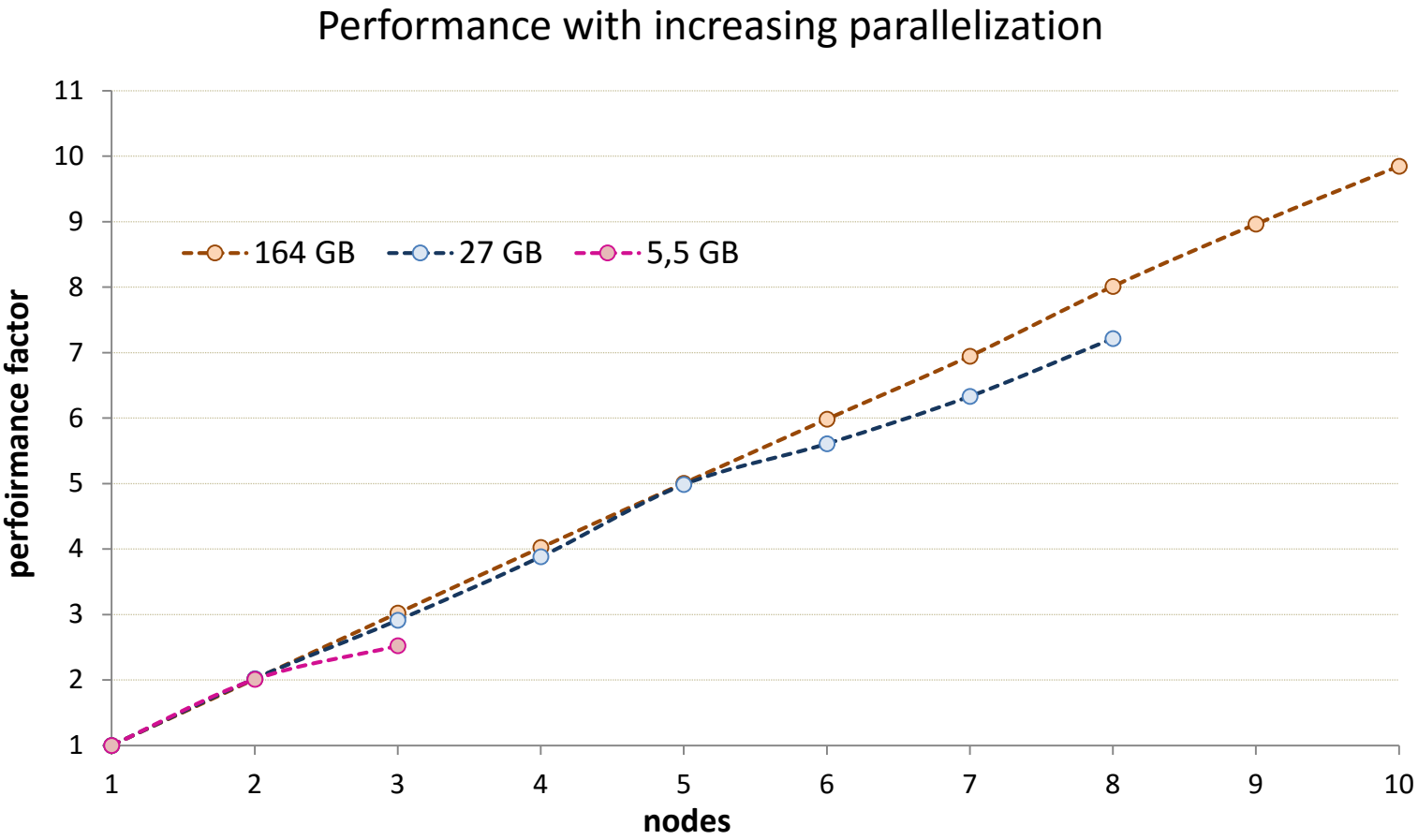

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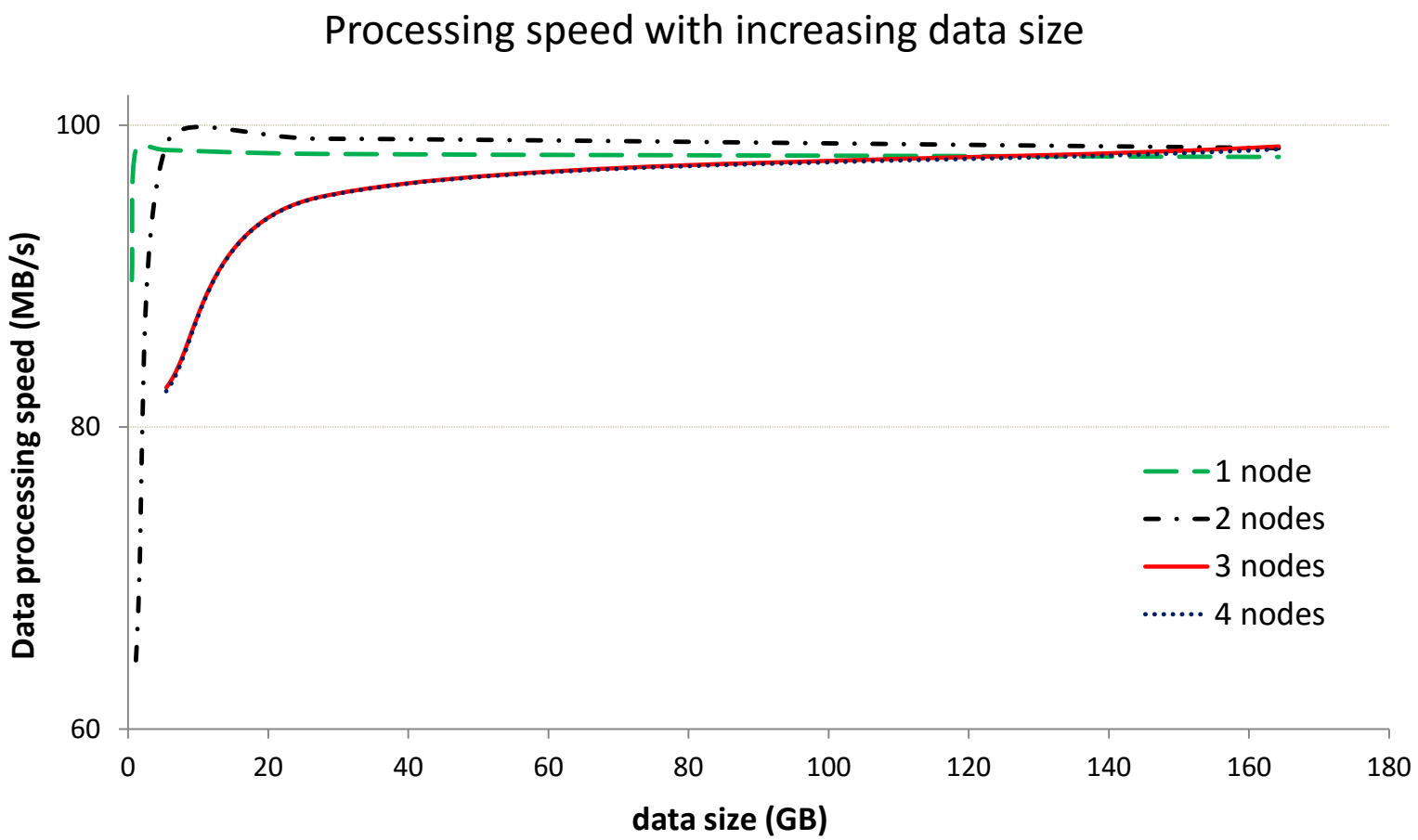

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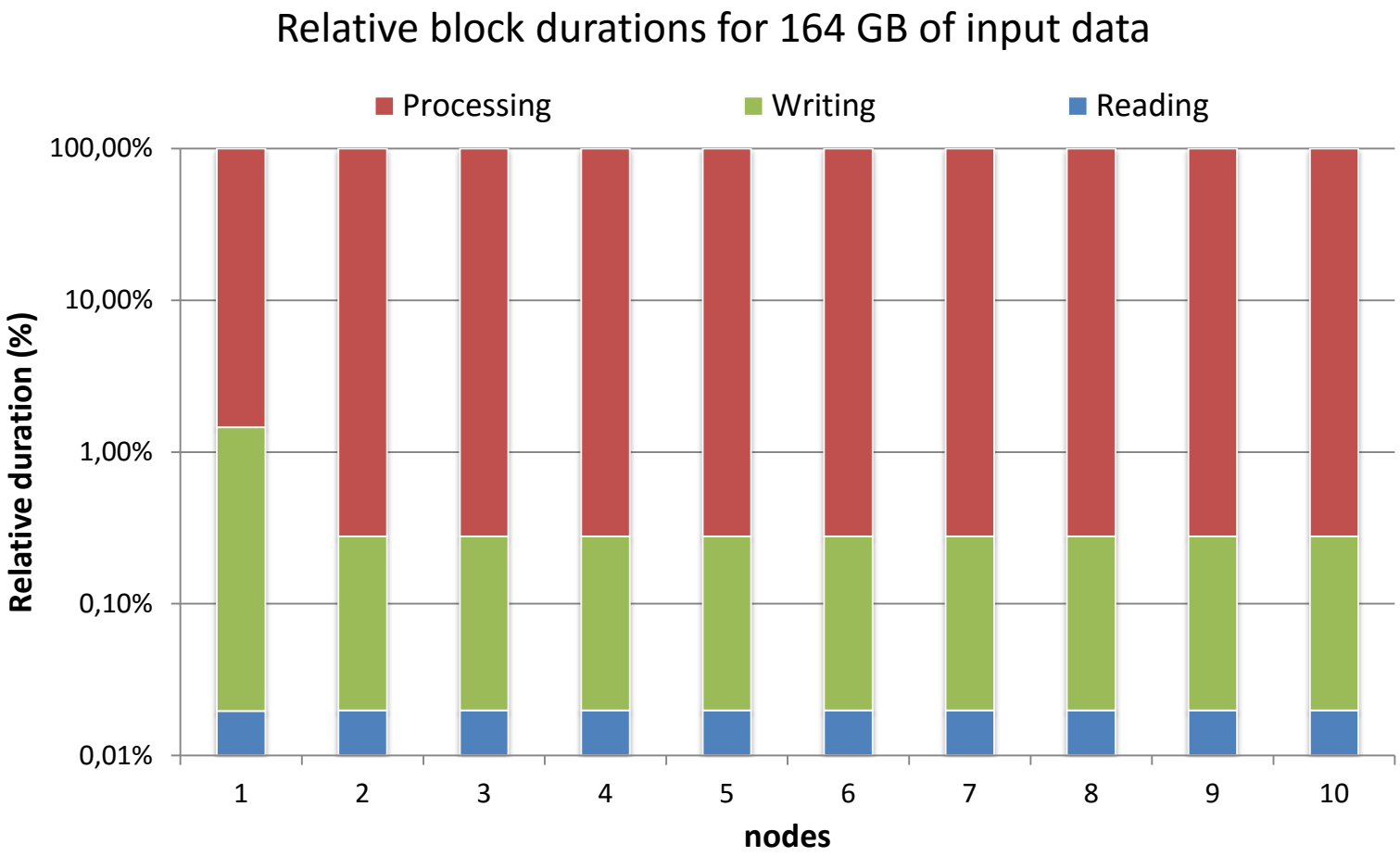

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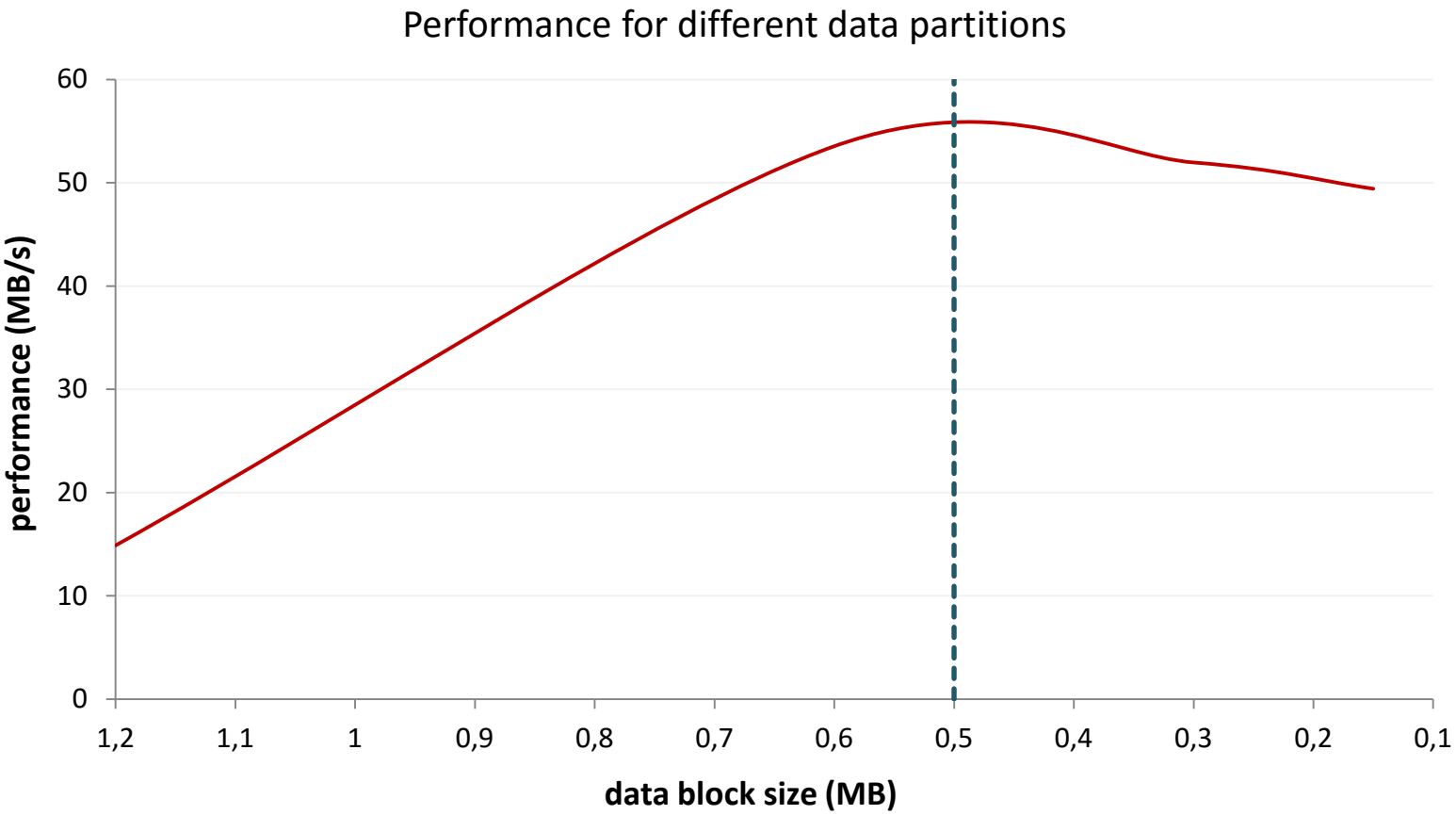


INTERPRETATION

Test result interpretation results in one of these 3 actions:

Amend the service to address identified issues (bottle necks / limitations)

OR

Amend test plan definition and re-test

OR

Submit a graphical/textual evaluation report

IQmulus

SINTEF

Fraunhofer IGD

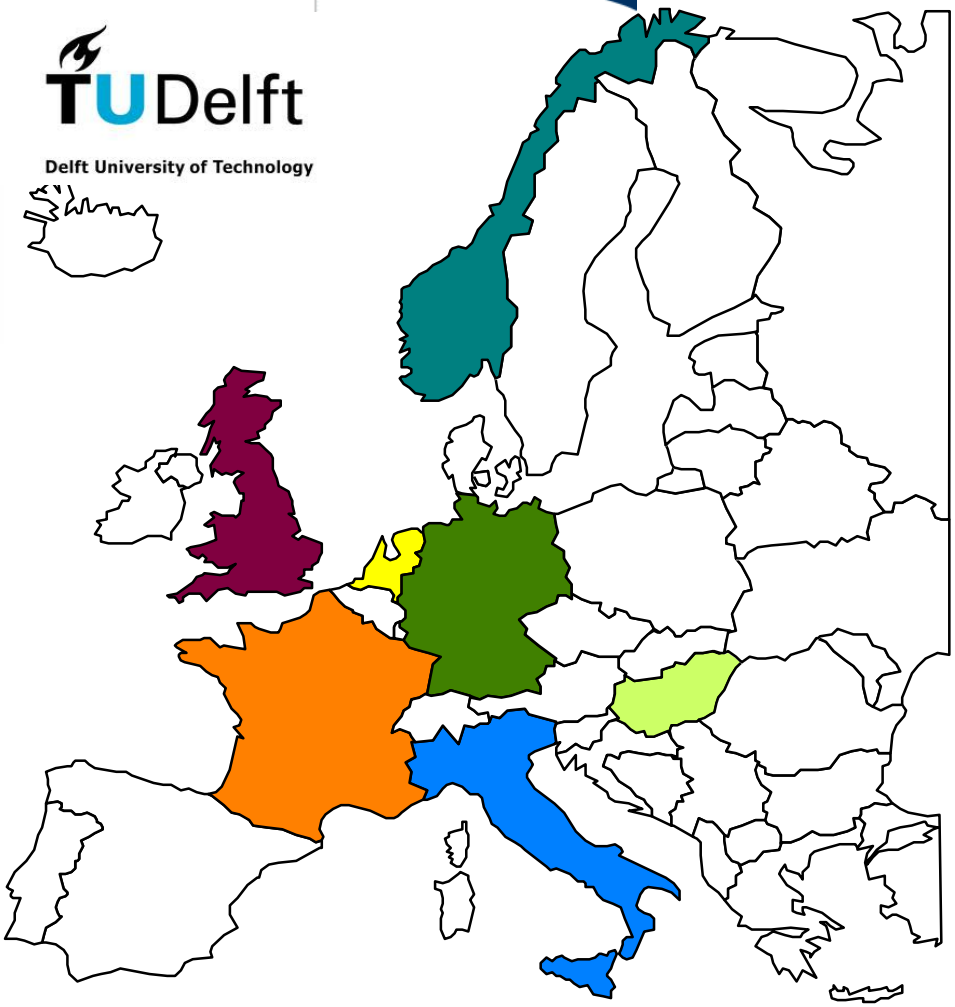
TU Delft
Delft University of Technology

HR Wallingford
Working with water

M.O.S.S.
Computer Grafik Systeme
Geoinformationssysteme

UCL

IGN
INSTITUT NATIONAL
DE L'INFORMATION
GÉOGRAPHIQUE
ET FORESTIÈRE



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