STEP System Solution

Infrastructure Checks

StiboSystems

Content

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1 Document Control

1.1 Revision Control

Version	Date	Author	Comment
1.0	August, 17th 2018	Juri Alexandrowiz	Initial Delivery

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2 Scope

The purpose of this document is to instruct in how to check the setup of the STEP infrastructure.

IMPORTANT – Requirements

It is important that the requirements described later in this document are read carefully so any uncertainties can be clarified during the initial infrastructure discussions.

This includes:

- Platform and Software support
- Virtualization support
- Network requirements
- Storage performance requirements

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3 Network

3.1 STEP Server to Server Connections

All connectivity between servers within each environment must be direct connections. This can be achieved either through dedicated NICs or through point-to-point switches without the interference from any additional hardware and/or software.

Introduction of load balancing hardware/software, firewall hardware/software is known to cause degradation of performance and/or server/environment instability due to limitations and malfunctions in the introduced software/hardware.

Servers must have permanent IP addresses assigned, either by manually configuring network settings on the servers, or by dedicating a specific IP address for each server on the DHCP server. Server IP addresses must under no circumstance change while the application is in operation. This is particularly important for systems with multiple application and/or database servers.

All application servers in a STEP application cluster must be located on the same network segment / VLAN. Thus a firewall may never be located between application servers.

3.2 Network bandwidth requirement

Minimum requirement is 1 Gbit dedicated network between all servers except to file servers. 10 Gbit is recommended for enterprise systems with a heavy workload profile.

3.3 Network latency requirements

The requirements for network latency between application servers in a STEP application cluster and between application server(s) and database server(s) are:

- Maximum 0.2 ms with a 64 bytes packetsize
- Maximum 0.4 ms with a 8K packetsize
- Maximum 1.0 ms with a 32K packetsize

3.4 Network latency measurements and tools

Results in: ms

3.4.1 How to measure latency on Linux using ping:

e.g. from application server to database server:

```
ping -c20 <db-host> |grep rtt

ping -c20 -s8000 <db-host> |grep rtt

ping -c20 -s32000 <db-host> |grep rtt
```


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3.4.2 How to measure latency on Windows using hrping:

e.g. from application server to database server:

```
hrping -l 64 -n 20 <database-host>

hrping -l 8000 -n 20 <database-host>

hrping -l 32000 -n 20 <database-host>
```

3.4.2.1 Tool download:

Using spot:

```
spot --baseurl=updates:/install/software --download=hrping/windows/hrping-v506.zip --output=L:/install-software
```

3.4.3 How to measure latency using 'benchnet5.sql' script

Results in: sec

Executed from the application-server against the database, with different package-sizes, to measure any network influence (latency).

benchnet5.sql

e.g. from Linux application

Logon to application server as 'stibosw'

Copy the attached sql-script '`benchnet5.sql`' to `/home/stibosw`

```
sqlplus stepsys/stepsys

@/home/stibosw/benchnet5.sql
```


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3.4.3.1 Limits

Collect all output and attach to Jira issue

Small without network influence

Stibo recommends maximum limit = 00:00:00.15

Small with network influence

Stibo recommends maximum limit = 00:00:02.00

Medium without network influence

Stibo recommends maximum limit = 00:00:08.00

Medium with network influence

Stibo recommends maximum limit = 00:00:12.00

Large without network influence

Stibo recommends maximum limit = 00:00:24.00

Large with network influence

Stibo recommends maximum limit = 00:00:30.00

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4 CPU & Storage

Performance of the storage used for the database has been measured when testing scalability of the STEP solution. The I/O performance has been measured as IOPS.

The requirements on the database are up to 2,500 IOPS during normal operations and up to 5,000 IOPS during peak operations.

The STEP Oracle Database uses a block size of 8 KB. The read/write ratio is typically between 60/40 and 70/30.

The application server (including shared storage) requires 500 – 1,000 IOPS.

4.1 How to measure read, write and CPU performance using stibo-ts-load-test.pl script

Results in: ms

e.g. from Linux application

Log onto database server as 'oracle'

Locate db-server-toolbox – e.g. `/opt/stibo/step/admin/db-server-toolbox/`

```
/opt/stibo/step/admin/db-server-toolbox/stibo-ts-load-test.pl -stepsys-
schema stepsys -stepsysdata-tbs stepsysdata
```

To report results:

```
/opt/stibo/step/admin/db-server-toolbox/stibo-ts-load-test.pl -stepsys-
schema stepsys -stepsysdata-tbs stepsysdata -report
```

4.1.1 Limits:

I/O General classification of results for reads/writes:

< 5s very good

< 10s good

< 20s moderate

CPU:

Stibo define 60 sek for the CPU test, as the 'standard' level.

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4.2 How to measure IOPS performance on storage devices using fio

Results in: iops

4.2.1 Tool download - Windows:

Using spot:

```
spot --baseurl=updates:/install/software --download=fio/windows/fio-
2.2.10-x64.zip --output=L:/install-software

spot --baseurl=updates:/install/software --download=fio/windows/fio-
examples.zip --output=L:/install-software
```

4.2.2 Tool download - Linux:

Using spot:

```
spot --baseurl=updates:/install/software --download=fio/linux/fio-2.1.7-
1.el7.rf.x86_64.rpm --output=/workarea/install-software

spot --baseurl=updates:/install/software --download=fio/linux/fio-
examples.zip --output=/workarea/install-software
```

Install fio using the following command, logged on as user with admin privilege (root):

```
yum install /workarea/install-software/fio/linux/fio-2.1.10-
1.el7.rf.x86_64.rpm
```

4.2.3 Configure fio:

Edit `settings.fio` in respect to which device to measure and run script:

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4.2.4 Execute fio:

Windows:

```
L:\install-software\fio\windows\fio-examples\windows\fio_test.bat
```

Linux:

```
/workarea/install-software/fio/linux/fio-examples/linux/fio_test.sh
```

4.2.5 Example:

Below is an example of the output from fio, executed with 8k block size:

```
trivial-readwrite-1g: (g=0): rw=randrw, bs=8K-8K/8K-8K/8K-8K,
ioengine=posixaio, iodepth=64
fio-2.1.10
Starting 1 thread
trivial-readwrite-1g: Laying out IO file(s) (1 file(s) / 1024MB)
Jobs: 1 (f=1): [m] [100.0% done] [12122KB/12241KB/0KB /s] [1515/1530/0
iops] [eta 00m:00s]
trivial-readwrite-1g: (groupid=0, jobs=1): err= 0: pid=55096: Tue Dec  6
12:37:25 2016
  read : io=525088KB, bw=11687KB/s, iops=1460, runt= 44928msec
```


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