

# *Netperf4 and DNS Server Benchmarking*

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We will take a brief look at the history of netperf and how that leads to the design and implementation of netperf4.

# *A brief history of netperf*

- ◆ Started as an internal HP project for an engineer new to Unix who shall remain nameless :)
- ◆ First public release in 1993 with version 1.7 using the “netperf” license. The intention was to provide a defacto-standard “networking” benchmark
- ◆ Netperf3 was a multi-threaded netperf retaining the single-threaded netserver of netperf/netperf2
- ◆ Netperf4 is the multi-threaded, multi-system, multiple-connection, egg-laying, wolly, milk-pig netperf :)

# *Netperf4 Goals*

- ◆ Stop sending binary data on the netperf control connection
- ◆ Enable tests involving more than two servers
- ◆ Enable tests involving more than one “connection”
- ◆ Enable heterogeneous tests
- ◆ Maintain portability to a wide number of platforms
- ◆ Use an approved open-source license
- ◆ Add tests without a full recompile
- ◆ Replacing netperf2 is NOT a goal

# *Netperf4 Design Features*

- ◆ Configuration/command files and messages in XML, using libxml2
- ◆ Threads, dynamic module loading and others abstracted via glib-2
- ◆ netperf process now a benchmark controller, all testing happens between multi-threaded netserver processes
- ◆ synchronized init, load, measure, etc test states

# *Netperf4 Strengths and Weaknesses*

- ◆ Strengths
  - ◆ Wide portability
  - ◆ Synchronized, multi-system, multi-connection tests
- ◆ Weaknesses
  - ◆ Potentially cumbersome config files
  - ◆ Dependencies on other packages

# *Next Steps*

- ◆ Migrate netperf process to glib's event loop
- ◆ Generalize the report generator
- ◆ Tool to generate config files
- ◆ Flesh-out the test suites to become a superset of netperf2
- ◆ Optional GUI

# Sample DNS Test Config File

```
<?xml version="1.0" standalone="no" ?>
<!DOCTYPE netperf SYSTEM "http://www.netperf.org/netperf_docs.dtd/1.0" >
<netperf xmlns="http://www.netperf.org/ns/netperf">
  <!-- the "netserver" entity gives info on how to contact the netserver -->
  <netserver nid="n1" >
    <!-- within the netserver there can be several "test" entities -->
    <test tid="t0"
      test_name = "send_dns_rr"
      library   = "nettest_dns" >
      <!-- The dependency data section gives the info for the DNS server -->
      <dependency_data use_tcp = "false" remote_port = "53" remote_host="15.243.160.51" />
      <!-- We get local addressing info from the socket_args entity -->
      <socket_args
        fill_file = "/tmp/dns_requests"
        send_buffer_size = "128"
        recv_buffer_size = "128" />
      <dns_args
        max_outstanding = "1"
        timeout         = "5000" />
    </test>
  </netserver>
</netperf>
```

# Sample DNS Command File

```
<?xml version="1.0" standalone="no" ?>
<!DOCTYPE commands SYSTEM "http://www.netperf.org/netperf_docs.dtd/1.0" >
<commands xmlns="http://www.netperf.org/ns/netperf">

<!-- 20 second DNS_RR test, details of the config in the config file
eg dns_config.xml or whatever you may want to use -->

<!-- cause a set of tests to be instantiated -->
<create_test_set set_name="s0" tests_in_set="t0" />
<wait tid="s0" />
<!-- now ask that all the tests in the set go to the load state -->
<load tid="s0" />
<wait tid="s0" />
<!-- now ask that all the tests in the set go to the MEAS state -->
<measure tid="s0" />
<wait tid="s0" seconds="20" />
<load tid="s0" />
<wait tid="s0" />
<get_stats tid="t0" />
<clear_stats tid="t0" />
<idle tid="s0" />
<wait tid="s0" />
<report_stats test_set="s0"
  library="nettest_dns"
  function="report_dns_test_results" />
</commands>
```

# Sample DNS Test Output

```
# netperf -c ./dns_config_linux.xml -i ./dns_commands.xml
```

AVE	SET	TEST	TRANS	conf	Min	Max	CPU	+/-	SD	+/-
Over	Name	Time	RATE	+/-	Rate	Rate	Util	Util	usec	usec
Num		sec	tran/s	tran/s	tran/s	tran/s	%/100	%/100	/tran	/tran
A1	s0	484.09	14254	-0.00	14254	14254	0.0000	-0.0000	0.000	-0.000

# *Where to find netperf4*

- ◆ General netperf info at <http://www.netperf.org/>
- ◆ [netperf-talk@netperf.org](mailto:netperf-talk@netperf.org) for discussion of netperf use and such
- ◆ [netperf-dev@netperf.org](mailto:netperf-dev@netperf.org) for discussion of netperf development and repository commit messages
- ◆ Source repository at <http://www.netperf.org/svn/netperf4/trunk>
- ◆ Tar/zip “release” files at <ftp://ftp.netperf.org/>