A Route to the Future of Network Management

Monitoring the US Lattice for Quantum Chromo Dynamics

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US Lattice for Quantum Chromo Dynamics
Floating-point Operations Per Second

<table>
<thead>
<tr>
<th>Cluster</th>
<th>Processor</th>
<th>Nodes</th>
<th>DWF Performance</th>
<th>asqtad Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>qcd</td>
<td>2.8GHz Single CPU Single Core P4E</td>
<td>127</td>
<td>1400 MFlops/node</td>
<td>1017 MFlops/node</td>
</tr>
<tr>
<td>pion</td>
<td>3.2GHz Single CPU Single Core Pentium 640</td>
<td>486</td>
<td>1729 MFlops/node</td>
<td>1594 MFlops/node</td>
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<tr>
<td>kaon</td>
<td>2.0GHz Dual CPU Dual Core Opteron</td>
<td>600</td>
<td>4703 MFlops/node</td>
<td>3832 MFlops/node</td>
</tr>
<tr>
<td>jpsi</td>
<td>2.1GHz Dual CPU Quad Core Opteron</td>
<td>856</td>
<td>10061 MFlops/node</td>
<td>9563 MFlops/node</td>
</tr>
<tr>
<td>ds</td>
<td>2GHz Quad CPU Eight Core Opteron</td>
<td>420</td>
<td>51520 MFlops/node</td>
<td>50553 MFlops/node</td>
</tr>
</tbody>
</table>
What is the LQCD used for?
\[ F = G \frac{m_1 m_2}{R^2} \]
Quark Gluon Interactions
Strong Force

- 100 times stronger than the electromagnetic force.

- The strong force is the force that holds together the nucleus of all atoms in the universe.

- Gluons are the force carriers of the strong force.

- Gluons interact with quarks in different ways according to their “color charge” which is why the study of these interactions is called quantum Chromo dynamics.
My Task

Make a network management system for the Ethernet network that presents data in a readable form that provides a quick and accessible way to monitor the efficiency of the network.
Networking is the way that data is transferred from one location to another.

Bandwidth: A measure of the amount of data that can be transferred.

Latency: A measure of the speed at which the data can be transferred.
Networking within the LQCD

- Infiniband: This network is used to connect all of the CPU’s and GPU’s together in order to allow them to function as one large unit. Fermilab uses 40 Gigabit Infiniband.

- Ethernet: Is used as a service and management network and therefore is just as vital to the success of the LQCD project.
Perl (is => 'so readable') {
    $you -> can (also read it);
    when (you don' => 't') {
        see it;
    }
}
Simple Network Management Protocol

SNMP Community

Management Information Base (MIB)

Network Management Station

SNMP SET

SNMP GET/GET NEXT

SNMP TRAP (ALERT)

Network Element (Agent Device)

Management Information Base (MIB)

SNMP Community and Functions
Multi Router Traffic Grapher

http://bc2.fnal.gov/cluster/internal/usage.html
# Compare each correct image with the one in test folder
my $errors = 0;
my $tests = scalar @correct_images;
print "Comparing $tests tests...\n";
for my $i (0..$tests-1)
{
    # correct vs. test image names
    my $corr_img = $correct_images[$i];
    my $test_img = $test_images[$i];

    # extract name part
    $test_img =~ m/\w+-\w+-\w+-\w+-(\w+)-(\w+)-(\w+)\./; my ($scene, $card, $api, $driver) = $1;
    my $err_img = "$result_dir/$api-$scene-$card-$driver";
    my $res = system("$compare $scene $corr_img $err_img"
    if ($res == 0 )
    {
        print "$ errors on $api\n";
        print "Failed $scene on $api\n"
        conv $corr_img, "$result_dir/"
    }
Windows versus Linux
Product

file:///C:/mrtg/bin/reports/192.168.1.10_3.html
THANK YOU