

# Consumer Grade Router Testing

SWE 4040

Project Team: Alex Ross, Will deGrasse, Jeff Wo

Acting Customer: Gary Masson

# Roles

## Developers

Alex Ross: Project Manager, Python Developer

Jeff Wo: Database Manager

Will de Grasse: Server Manager

Gary Masson: Acting Customer

# Purpose

- ▶ Original idea Summer 2014
- ▶ Developed to offer convenient means of generating traffic load
- ▶ Easy platform to share results
- ▶ Testing standards and updates
- ▶ Low impact, low cost
- ▶ BSD Licensing

# Goals

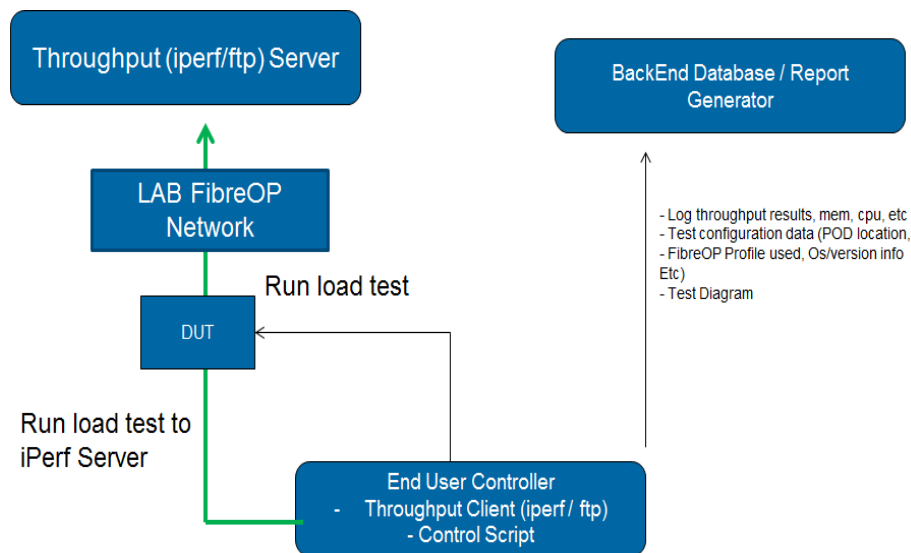
- ▶ Generates HSI payloads to simulate protocols using iperf and netcat
  - ▶ Peer to peer, torrents, TCP, UDP
- ▶ Runs on a single desktop for WAN traffic
- ▶ Desirable for recreating real life uses
- ▶ Destructive stress testing capabilities
- ▶ Logs and stores all data for analysis
- ▶ Data easily accessible on local network

# Costs

- ▶ Using existing obsolete equipment running \*buntu the cost is free
- ▶ A dedicated router with internet connection
- ▶ Existing server already in place
- ▶ Otherwise free

# General Overview

- ▶ Server acting as an iperf server
- ▶ Clients join iperf server
- ▶ Netem implemented to make traffic more realistic
- ▶ Port forwarding is required for this to function
  - ▶ DMZ is required if multiple users are stressing the server
- ▶ Data is sent to server where it is logged and stored



# The Frontend

**Bell RG Testing Suite** - + x

System Check Parameter Configurations

Welcome to the Bell RG Testing Suite

Please be advised this is for use by Bell employees only  
This program was developed under BSD Licensing

Enter text in all that apply  
Empty fields will not be run

Enter Employee ID[REQUIRED]:

Project Identifier:

Inject latency

Enter time to run Iperf test [H:M:S]:

Enter iperf server:

Custom iperf command:

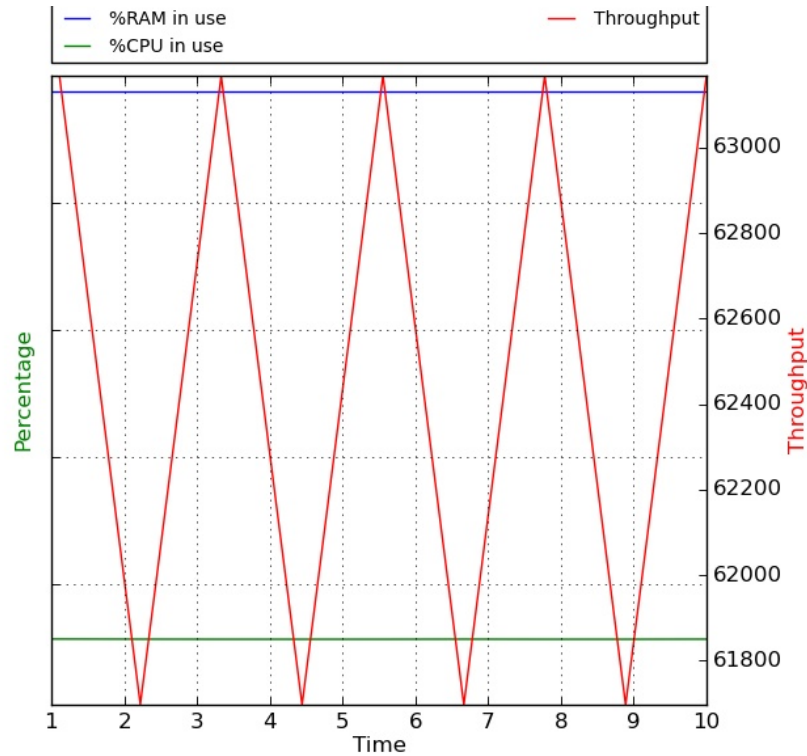
Enter specific tag:

Use predefined Iperf tests:

FTP On

/home/alex/Desktop/Bell Suite/Log/Master\_2015\_04\_07\_04:32:14\_test\_123\_hopefully\_last\_one\_33120L06

combined\_2 PCAP\_2015\_ Plot\_2015\_0 User\_Config  
015\_04\_07\_0 04\_07\_04:32: 4\_07\_04:32:1 \_2015\_04\_07  
4:32:14\_t... 14\_test\_1... 4\_test\_12... \_04:32:14\_...



BusyBox v1.00 (2014.04.30-03:29+0000) Built-in shell (msh)  
Enter 'help' for a list of built-in commands.

```
# sysinfo
sysinfo
Number of processes: 77
 1:28am up 42 days, 5:12,
load average: 1 min:1.12, 5 min:1.08, 15 min:1.07
      total    used    free   shared  buffers
Mem:   59768   52896   6872     0     4348
Swap:    0      0      0
Total: 59768   52896   6872
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```
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```

	A	B	C	D
1	97.47	88.6895997858	505344	63168
2	97.47	88.6895997858	493576	61697
3	97.47	88.7364475974	505336	63167
4	97.47	88.7565252309	505344	63168
5	97.47	88.7565252309	493576	61697
6	97.47	88.7565252309	505344	63168
7	97.47	88.7632177754	493576	61697
8	97.47	88.7632177754	505344	63168
9	97.47	88.7498326864	493576	61697
10	97.47	88.7498326864	505344	63168
11				
12				
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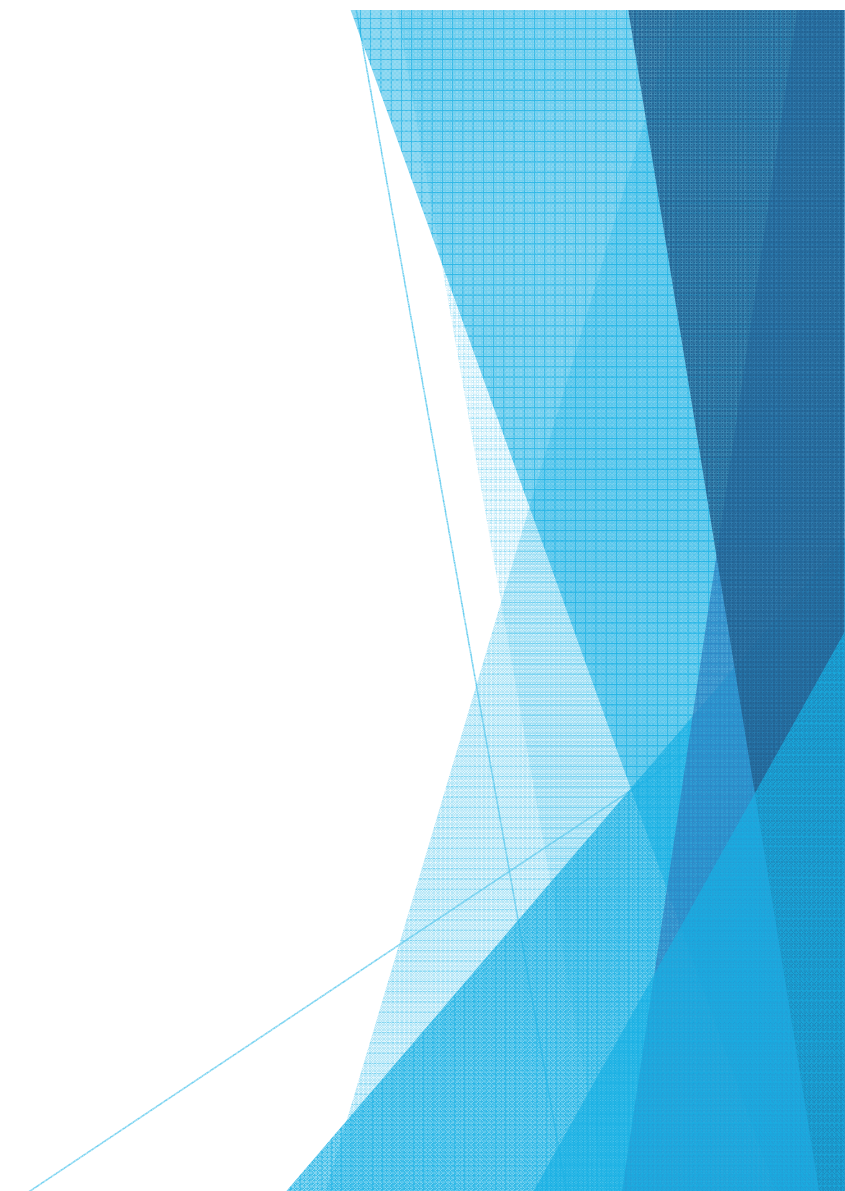
# Importance of Testing

- ▶ Eliminates potential loss of profits
- ▶ Stability and efficiency
- ▶ Existing platforms to test new errors



# Database Management

Jeff Wo



# Database Management

- ▶ Used to store all test records
- ▶ Inputs and fetches data automatically
- ▶ Monitor server status and track usage
- ▶ Indexed and searchable

# Database Input and Processing

- ▶ Processing sequence for each log



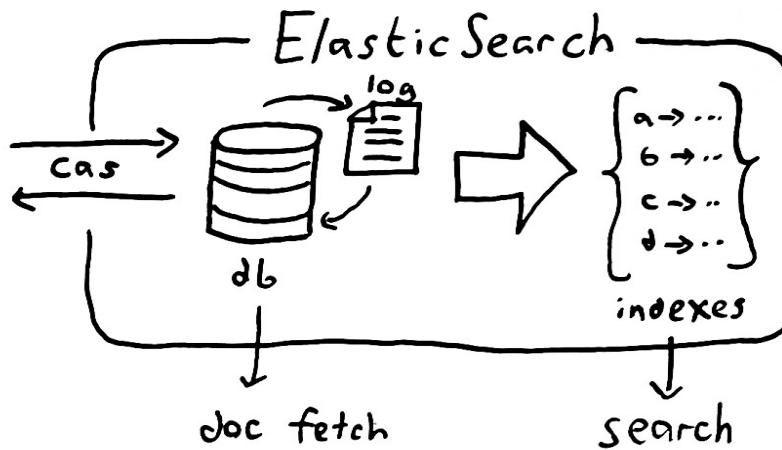
# Logstash and Elasticsearch

## ▶ Logstash

- ▶ Managing events and logs
- ▶ Parse and process with plugins

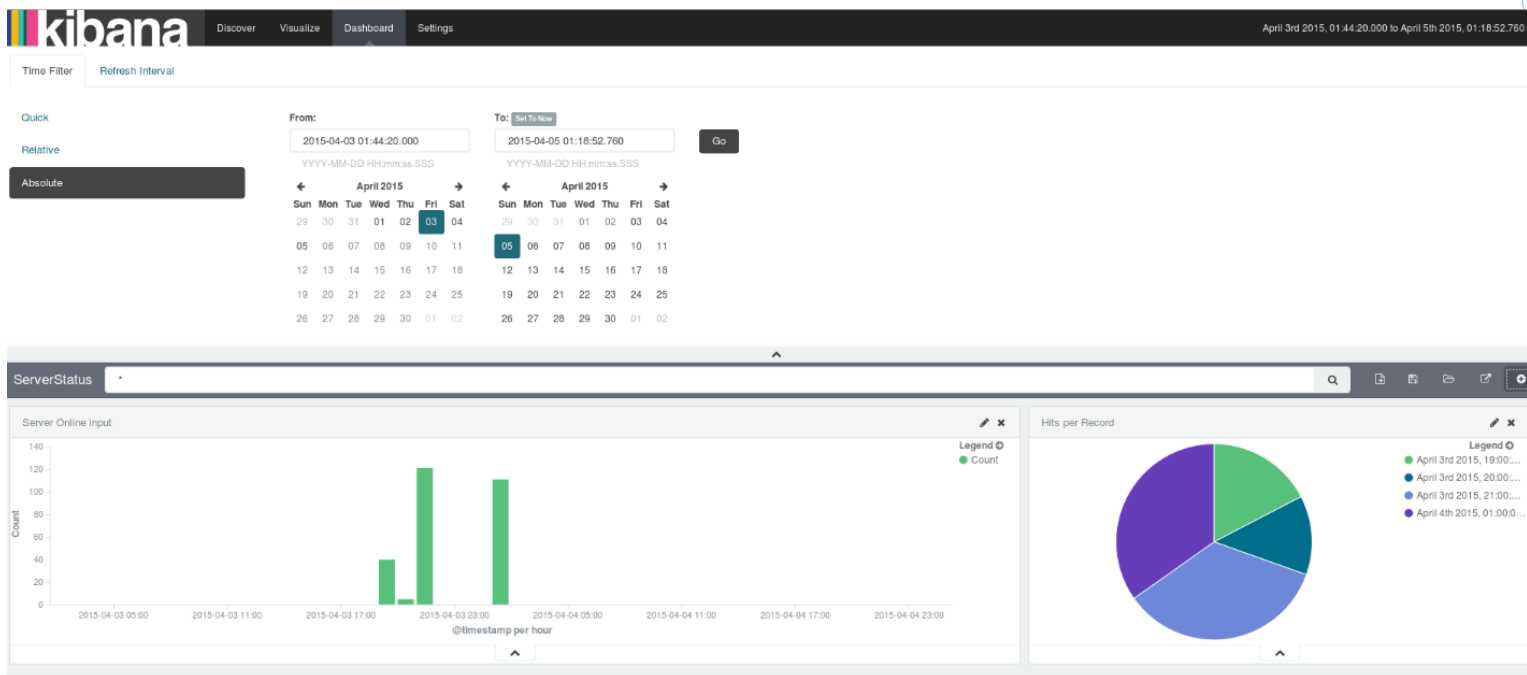
## ▶ Elasticsearch

- ▶ Java based searchable Database
- ▶ Schema-free, reads JSON (JavaScript Object Notation)
- ▶ Conflict Management



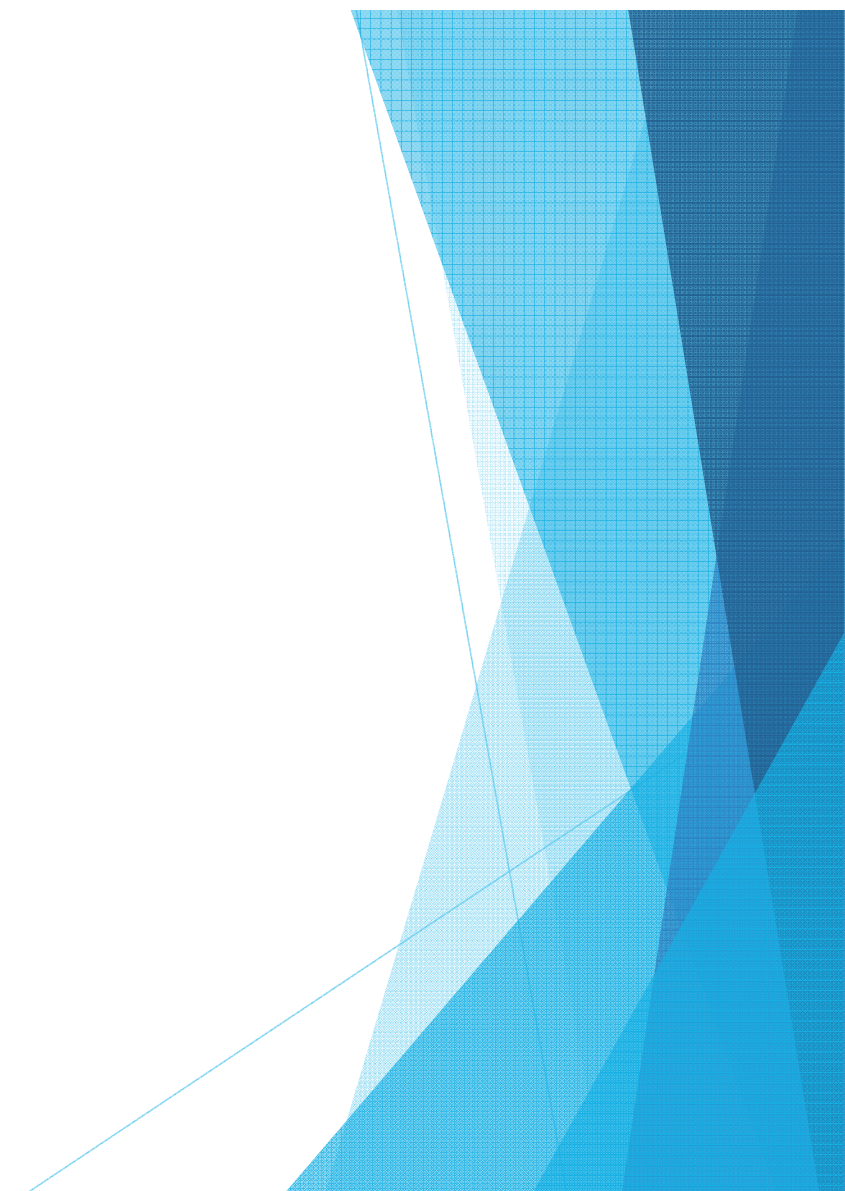
# Kibana

- ▶ Platform to visualize/query the database
- ▶ Web Interface
- ▶ Real-time capability



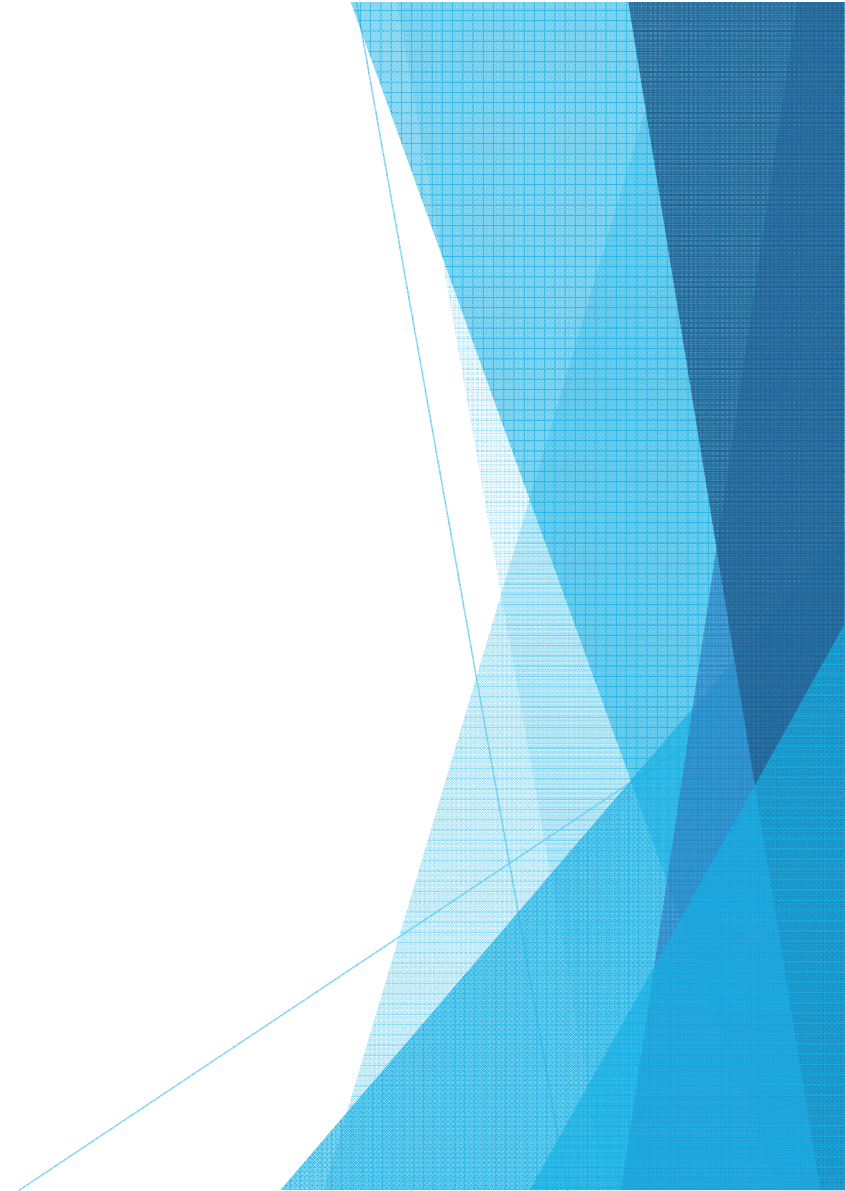
# Server Management

Will de Grasse



# SCP, RSYNC, and SSH

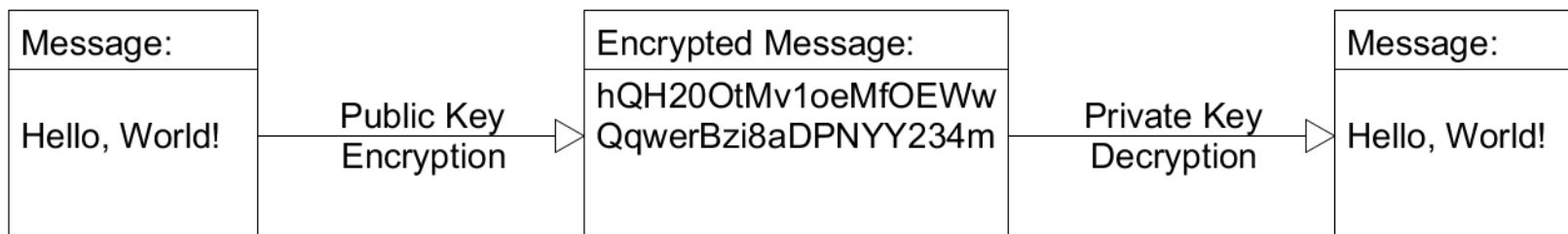
- ▶ SCP (secure copy) is a straight copy procedure
  - ▶ -Based on the SSH protocol
- ▶ RSYNC is more complex, using a delta-transfer algorithm
  - ▶ Can be configured to run through SSH protocol
- ▶ SSH (Secure Shell)
  - ▶ Used to initiate remote, secure terminal connections





# RSA keys (Cryptographic Key Pairs)

- ▶ Cryptographic key pairs form the basis of almost all modern web security



- ▶ This 2 part encryption/decryption only works when using a key pair

# VSFTPD

- ▶ Stands for Very Secure File Transfer Protocol Daemon
- ▶ File Transfer Protocol is a robust and easy to use protocol which is used to upload or download files
- ▶ VSFTPD chosen for configurability, performance and security
- ▶ OpenSSL encryption ready

# Conclusion

- ▶ The server is currently at the ready to deliver traffic
- ▶ A library and Wiki page prepared
- ▶ Not necessarily final design choices

# References

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