VisualBash

Yet Another Framework?

Paul Flint - Barre Open Systems Institute

Musical Introduction

- My favorite Frameworks are found in Music.
- While we are here to examine the VisualBash Framework, sometimes music focuses me.
- The “Blues” Musical Framework is simple and compelling.
- The “Blues” Framework reminds me that while life and technology go on and on, there are some structures that seem to endure.
- Also, Automatic Data Processing Equipment gives us all the “Blues”

Technical Introduction

Greetings,

I am, for what I think are very good reasons, a Mainframer. Currently, I write command line scripts in Bash, Python, Perl, C, VM-CMS, VSE-JCL, and Rexx. I started in Basic Fortran and Pascal but wish to share with you tricks collected into the topic “Visual Bash”

Hold those questions till the end of this presentation and be rewarded with cans of delicious Ice Cold, Dark Beer.

What Is a Mainframer doing at The South East Regional Linux Conference?

One Friday evening in 2000 at the IBM Development Lab in Böeblingen, Germany, Management told the software engineers to either make IBM OS390 Unix System Services (USS) work better or else…

The way I heard the story is that during this weekend the junior developers got the GNU C complier running on IBM VM (now zVM).

Hard on the heals of this, a Linux Kernel and user space was compiled and ran under VM

Linux on a Mainframe was born!

Management Was Not Happy…

By 2001 in Vienna Virginia, David Boyes, (no IBM'er) writes a recursive Rexx script and cranks up 41,400 Functional Linux instances. This takes place 16 years ago on 10% of Nortel's VM, may it rest in peace

- No longer are Mainframers allowed the sidelines and the Priesthood of the Virtual Machine. 100,000 Linux instances is a fairly standard load for an IBM z-13 – "No Pets all Cattle"
- Currently, it turns out that Mainframers are responsible for a great deal of Linux based code.
- What tools does the community have to operate and manage all of this Linux?

Is Programming Less of a Science and More of an Art?

...and if done right, does it have a personal creative resonance that you can - dance to…

For the next few minutes, I would like all of us to tune in to a particular tool, we are going to look at the realized potential of:

BASH – Bourne Again SHell

Bash is one of many command processors that typically run in a Unix or Linux text window. Over the years it has developed advantages…

Bash Is Portable!

- IBM zOS
- Windows
- Macintosh
- Linux
- Unix
- BSD…

Visual Bash’s Legacy

In a bygone day, the DOS based program QBASIC had a framework that allowed you to conveniently access individual subroutines. The big ticket was the editor. Is QBASIC essentially the first Integrated Development Environment, and can we get back to it's essence?.

Visual Basic and it's successors seem to all be based upon the idea of an Graphic User Interface Integrated Development Environment. Is this really the basis of a good framework?

Why Not Build a Command Line Interface Framework Around BASH?

- In the Microsoft Universe, Visual Basic's successors all seem to all be based upon this idea of a Graphical User Interface based Integrated Development Environment being the central element of the development process.
- Is the Graphic User Interface based Integrated Development Environment really the basis of a good framework?
- Mainframes are not designed around GUIs at all.

Managing the Future

- Can we build the bash-based operating components capable of supporting modern tools such as Ansible, Chef, Puppet, Zoom, OpenStack, and JuJu "charms"?
- In order to do this, could a framework be developed that would allow for extensive use of bash as the go to general purpose information management system automation tool?

How about an example?

It All Starts Innocently enough…

It's late, you just got the system to a "Pound Sign" (#) root prompt... The octothorpe stares back…Suddenly…The Devil makes you type…

```
# find . -type f -print0  | xargs -0 sha1sum
```

…and voilà the duplicate file hunt begins!

Next, you find yourself echoing lines to a file and expanding this out from a single line to multiple lines…

```
$ mkdir bin       # gotta put it somewhere…
$ echo "#!"$(which bash) > \
  bin/dedup.sh # …shebang in a file with a cute name …
$ echo "find . -type f -print0  \| xargs -0 sha1sum " > \
  bin/dedup.sh # …again with the cute name…
$ echo " # other long pipe based command string " \  >>
  bin/dedup.sh # …adding to the caldron…
$ gedit bin/dedup.sh & # …edit add description…
$ chmod +x bin/dedup.sh # …ready to run
```

Finally… It Lives!

```
#!/bin/bash
# This generates a list of files with duplicate SHA1 checksums
#
if [[ -e SHA1SUMS ]]
then
  rm SHA1SUMS
fi
#
touch SHA1SUMS
find . -type f -print0  | xargs -0 sha1sum >> SHA1SUMS
sort SHA1SUMS > SHA2SUMS
mv SHA2SUMS SHA1SUMS
cut -d " " -f 1 SHA1SUMS | uniq -d > dups
grep -F -f dups SHA1SUMS > fixus
```

…but wait, there's more

The Visual Bash Precipice

You christen your effort dudup.sh , dadup.sh dedup.sh…whatever cute name you like.

But wait – how do you really animate it?

It needed a shebang.

It needs author and date…

Does it need a help section?

Does it need parameters?

You bet it needs a way to convey argument…

Do you do it over in Python?

GOODNESS NO!

Your Baby Becomes A Function

```
function dedup(){
#* function dedup - This generates a list of files with duplicate SHA1 checksums
echo "This is the \""$FUNCNAME"\" function in "$0" version "$version #debug
#
if [[ -e SHA1SUMS ]]
then
  rm SHA1SUMS
fi
#
touch SHA1SUMS
find . -type f -print0  | xargs -0 sha1sum >> SHA1SUMS
sort SHA1SUMS > SHA2SUMS
mv SHA2SUMS SHA1SUMS
cut -d " " -f 1 SHA1SUMS | uniq -d > dups
grep -F -f dups SHA1SUMS > fixus
#
} # Test:
```

…the code gets a set of { Wings } & A “Sheborg”

What's So Special?

Beyond the Sheborg, These Three Elements:

- FUNCTIONS - lots and lots of functions
- An EVALUATOR – the inbound command line argument counter/parser
- A DISPATCHER - The over provisioned case statement…

Let us not overlook the **Sheborg.**

What the heck is a Sheborg? You ask. It is a bit of bash lore which we have hacked…

The Shebang Supermarket

Phoneme	Description	Element
shebang	Establishes a command processor	#!
shebout	Identifies an exposable help line	##
sheborg	Identifies a structural element	#*
sheblog	Toggles Logging in script	#>
shebug	Indicates Location of debugging code	#D

What else can we add?

Function Facts

Fun, fun functions…. Just get it to test, put it between {wings} and give it a name.

Explicitly sending variables into functions is pointless, as all variables are global in BASH.

Testing or returning variable from functions is just fine.

In VisualBash, all functions are available from the command line.

The “dummy” function is a great test and an essential model of how to set up a function in Visual Bash

Functions

This is the “dummy” Function
All Functions Are Based Upon This Dummy

```
#
function dummy(){
#* function dummy - Rename document function here
echo "This is the ""$FUNCNAME"" function in "$0“ \
version "$version
} # Test:
#
```

Notes:
Use dummy to test flow.
Use dummy function as prototype wrapper

Evaluator

The **Evaluator**:

Is ballistic, it is the first piece of code encountered in any Visual Bash script after the shebang.

It has two goals:

1. Figure out the number of incoming variables, zero to infinity
2. Based upon number and type of inbound variables, assign an Argument to properly dispatch the command.

Note:
Default Values – use multiple cases to land on
Pipe Support – use keyword (e.g. pipe)

The Evaluator Dive

```
# EVALUATOR ROUTINE
#D echo "Arg# = "$#"  $1 = "$1"  $2 = "$2" $3 = "$3" $ARGS = "$ARGS
   ;spause
if [ "$#" -eq "1" ] && [ "$1" = "dirl"   ]; then ARGS="1"; fi
if [ "$#" -eq “2" ] && [ "$1" = "makeiso"]; then ARGS=“2"; fi
if [ "$#“ -eq "1" ] && [ "$1" = "tst"    ]; then ARGS="1"; fi
if [ "$#" -eq “3" ] && [ "$1" = "prtcd"  ]; then ARGS=“3"; fi
if [ "$#" -gt "0"  ] && [ "$1" = "pipe"  ]; then ARGS="9"; fi
if [ "$#" -eq "0" ]; then ARGS="0"; fi
#
```

Dispatcher

The **Dispatcher**:

- Orders the variables for execution by the previously referenced Evaluator.
- With the Evaluator, Handles defaults as different dispatches.
- Can handle from zero to an unlimited number of variables.
- Is very often over-provisioned

The Dispatcher Dive

```
#* Dispatcher Routine
# typical cases, be careful to make your own...
#D echo "Arg# = "$#"  $1 = "$1"  $2 = "$2" $3 = "$3" $ARGS = "$ARGS ;spause
case "$ARGS" in
    "0") clear; "help";;                          # got nothing, display help
    "1") $1 ;;                                    # run the command
    "2") var2=$2;  $1 ;;                          # run the command pass an argument
    "3") var3=$3; var2=$2;  $1 ;;                 # run the command pass two arguments
    "4") var4=$4; var3=$3; var2=$2;  $1 ;;  # run the command pass three arguments
    "9") while read var; do $2; done;;            # run the command on piped variables
      *) clear; "help"; exit 1;;                  # got nothing, display help
esac # End main loop. To TEST: remove “#D” in line above
#
```

Notes:

Over provisioning – Many numeric values beyond scope for now…
Debug Statement – Thank me later.
Extra Case Space – for custom directives/declarations
Default Values – use multiple cases to land on
Pipe Support – Go to town...

Beyond the Shebang, It Boils Down To Three Elements

1. **Function(s)**
2. **Evaluator**
3. **Dispatcher**

VisualBash Is All About This Simple, Humble Framework

The Python-ification of Bash?

- The whole point of the VisualBash Journey was the command line being the programming environment.
- The Bash Shell lets you feel your way through the tasks you need to accomplish and allows you to seamlessly preserve and string together the result.
- Thus the common weakness of Python, Go, C, Ruby, Rexx etc is that they do not easily allow you to probe and then save the programming possibilities as you go along. This is the powerful strength of Bash.
- This can also be the weakness of Bash, but if you add a framework similar to Python – like VisualBash you get the best of both worlds.

Web Locations...

- http://visualbash.org

Central Site – Much confusion…

- https://github.com/flintiii/VisualBash

Someone should show me how to use this…

- https://www.youtube.com/user/southeastlinuxfest

Imortality? Lets hope! Remember…

Good Question = Free Dark Beer

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For their help in developing VisualBash and in review of this document

End of Part I
& Questions

Questions?

Note if you are of age, you get a cold beer for a good question ….Yes, being young sucks.

Part II Visual Bash Display

In Part I we described and detailed how Visual Bash can make your life better through the use of a Command Line Interface (CLI).

Mainframes appreciate Command Line Interfaces other systems rely on other interfaces…

- WIndows
- Mice
- Pointer Systems

WIMPS

Visual Bash Supports Four Interface Choices

…Including CGI, BOSI Research is concentrating on Four Interface Types:

1. Character Graphics Interface
2. Whiptail
3. Web
4. Zenity

All are based on the concept of Secure Graphic Dispatch…

Secure Graphic Dispatch

Most of the following display methods depend on Secure Graphic Dispatch (SGD), wherein we:

- Graphically Build a Visual Bash command element.
- Send it off in it's own shell to execute.
- If necessary, somehow get the results back.

NOTE: This is the research concept, is a work in progress, likely involves "tmux", this whole framework, is something individuals can contribute to – drop us an email (flint@flint.com).

Character Graphics Interface

Covered extensively in the previous section, Visual Bash Framework Part I.

- Demonstrated Advantages
  - ❖A natural consequence of using BASH
  - ❖Extremely Comfortable for the Developer
- Disadvantage
  - ❖Intimidating for the GUI based operator/user

Whiptail

- A mature display system
- Operates (kind of) in CGI based systems
- Used extensively in Linux Setups
- Under Active Development for use in Visual Bash

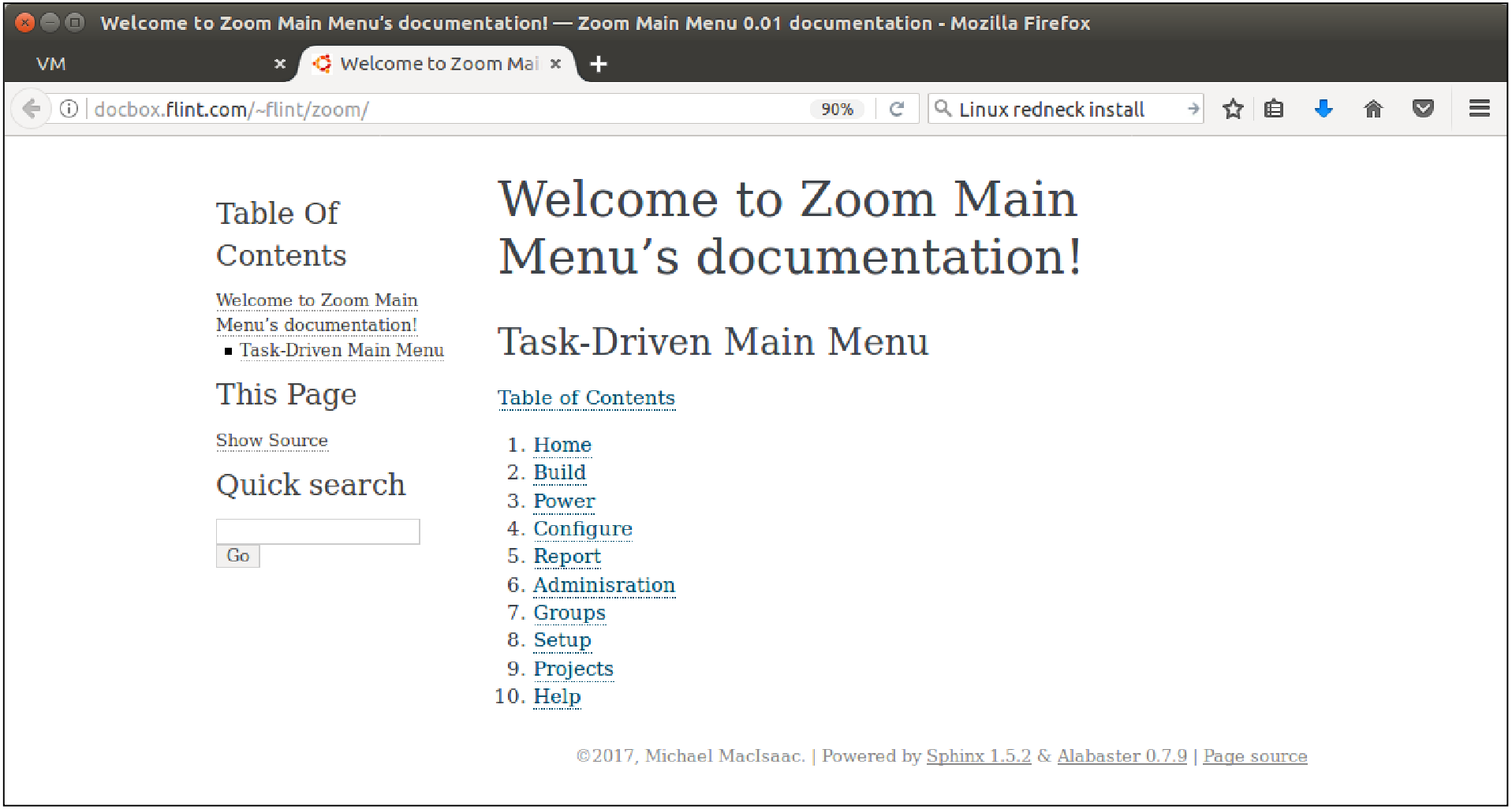
Whiptail Example

SOURCE: Redneck Language Option in Red Hat Linux Version 5.1.

Web Based Interface

- There are many ways to skin this cat
- Most preferred way at BOSI is to use Sphinx.
  - Sphinx puts out restructured web sites and documentation
  - reStructuredText is human readable
  - So Sphinx doubles as a documentation tool
- Intend to develop documentation/control elements in reStructuredText
- Still under active research & development

Web Based Example



SOURCE: BOSI Research & Development

Zenity

Ideal for use as a Graphic User Interface on a locally windowing Console.

Operates in all environment except CGI only systems.

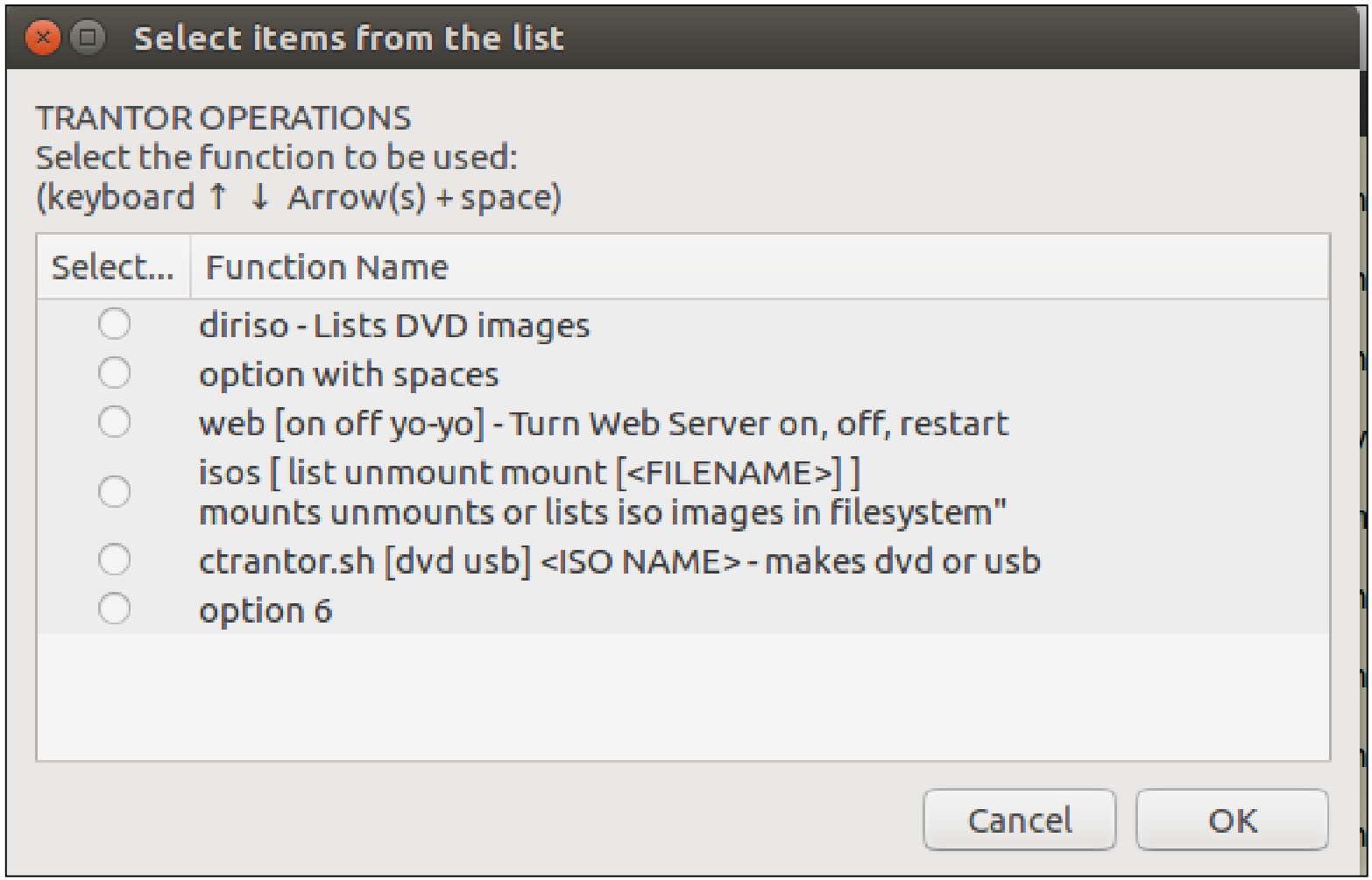
Allows for the coolest name in the Visual Bash universe…

BZINGA

Bash/Zenity Integration

- The Bash/Zenity integration has a separate web site http://bzinga.net
- The VisualBash project / community references this site.
- Currently in development for “trantor” project

Bzinga Example



SOURCE: BOSI Research & Development

…But Remember

A Graphic User Interface is useless without some function.

Visual Bash is the place to start. There is nothing wrong with a good and functional Character Generated Interface, especially if your target audience are Linux systems.

Finally, be aware that I only use Linux and thus “your mileage may vary” in other operating systems.

Try to say something nice…

…In the evaluation of this session…

The Barre Open Systems Institute in Vermont continues to meet, teach and research the areas covered by part I, VisualBash & part II Graphic Software Dispatch, of this presentation

Both of these are works in progress, and with encouragement will be worked upon.

If invited back next year there will be a new and most dazzling presentation...

Thank You For Your Time
Visit http://visualbash.org

Final Questions?

Contact:

Paul Flint, Director

Barre Open Systems Institute

40 Washington Street

Barre Vermont 05346

Flint@flint.com.