

# VisualBash

**Yet Another Framework?**

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# Musical Introduction

- My favorite Frameworks are found in Music.
- While we are here to examine the VisualBash Framework, sometimes Music Calms 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 currently write command line scripts in Python, Perl, Bash, C, VM-CMS, VSE-JCL, and Rexx. I started in Basic Fortran and Pascal but am here to share with you tricks collected into the topic “Visual Bash”

Well thought out questions at the end of this presentation will in fact, be rewarded with cans of delicious Ice Cold, Dark Beer.

# Did This Really Happen?

One Friday evening 17 years ago, in 2000 at the IBM Development Lab in Böblingen, 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). ....Just what I heard...

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

Linux on a Mainframe was born!

# The Legacy of Test Plan Charlie

16 years ago, in 2001 in Vienna Virginia, Dr. Boyes, (founder - SNA) writes a recursive Rexx script and cranks up 41,400 Functional Linux instances on a 10% LPAR on Nortel's VM system, may it rest in peace.

- No longer are Mainframers allowed the sidelines and the Priesthood of the Virtual Machine. 10,000 Linux instances is becoming 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?

# Programming Is Less of a Science and More of an Art.

...and if done right it has a personal creative resonance that you can - dance to...

For the next few minutes, I would like 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

# 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 the 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?
- Face it. Our Mainframes are not designed around GUIs at all.

# VisualBash 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 all seem to all be based upon the idea of an IDE. Is the GUI IDE really the basis of a good framework?

# Managing the Future

- Can we build the bash-based operating components capable of supporting modern tools such as Zoom, OpenStack, or 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 ddup.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

# Beyond the Shebang, It Boils Down To Three Elements

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

VisualBash Is All About This Simple,  
Humble Framework

# Functions

Fun, fun fun.... Just put it between {} 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.

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

# Never Deprecate the dummy

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

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

**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.

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.

# 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 "3" ] && [ "$1" = "tst" ]; then ARGS="3"; fi
if [ "$#" -eq "1" ] && [ "$1" = "dummy" ]; then ARGS="1"; fi
if [ "$#" -gt "0" ] && [ "$1" = "pipe" ]; then ARGS="9"; fi
if [ "$#" -eq "0" ]; then ARGS="0"; fi
#
```

**Note:**

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

# Dispatcher

## The Dispatcher:

- Orders the variables for execution by the function.
- Along with the evaluator, Handles defaults as different dispatches.
- Can handle from zero to an unlimited number of variables.
- Is very often over-provisioned

# A Basic Dispatcher

```
/* 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 and go
    "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 $1; done;;                 # run the command on piped variables
    *) clear; "help"; exit 1;;                           # got nothing, display help and go
esac # End main loop. To TEST:esac # End main loop. To TEST:
#
```

## 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...

# The Python-ification of Bash?

- The whole point of VisualBash 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 can get the best of both worlds.

# The Bad News...

# Visual REX and/or Visual Regina?

- If it were only that simple...
- The whole point of the VisualBash Journey was the command line being the programming environment.
- REX is not particularly a command line environment! You edit a REX exec and submit it, a la RJE/NJE FTP, etc...
- Could there be a way? (Prepare for outrageous proposal...)

# Questions & A Modest Proposal For Discussion...

- Do you think it would be possible to either port the BASH command processor to run under CP? Or...
- alternatively write a BASH emulator under REXX?

...Maybe There Is a Way...

# Acknowledgements

I would like to thank the following coders:

- Kevin Cole
- Chris Yarger
- Robert Melton
- Eric Howard
- Jeff Elkner

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

# Musical Requests? Adult Beverages?

# 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](mailto:flint@flint.com)).

# Character Graphics Interface

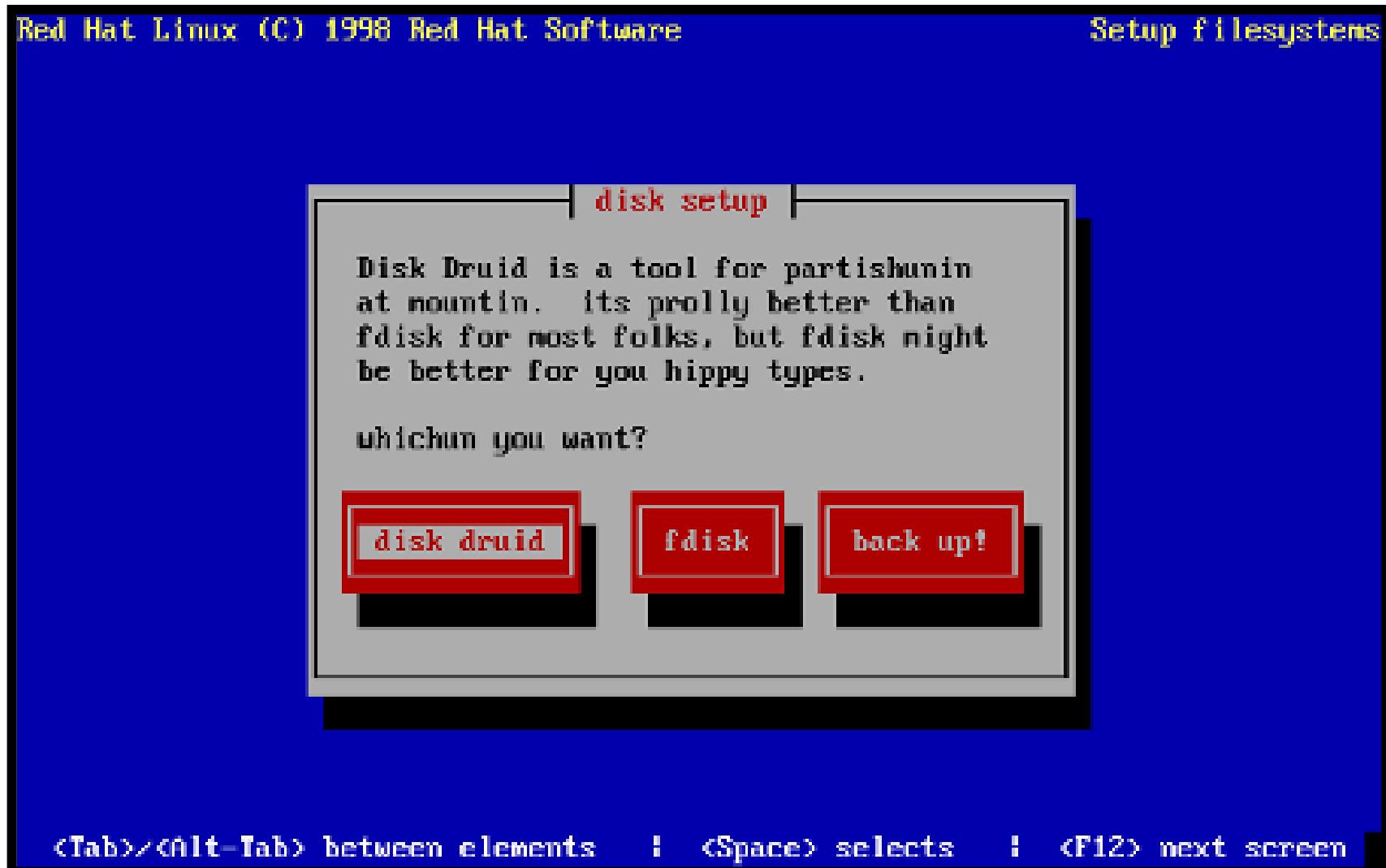
Covered extensively in the previous section,  
Visual Bash Framework Part I.

- 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

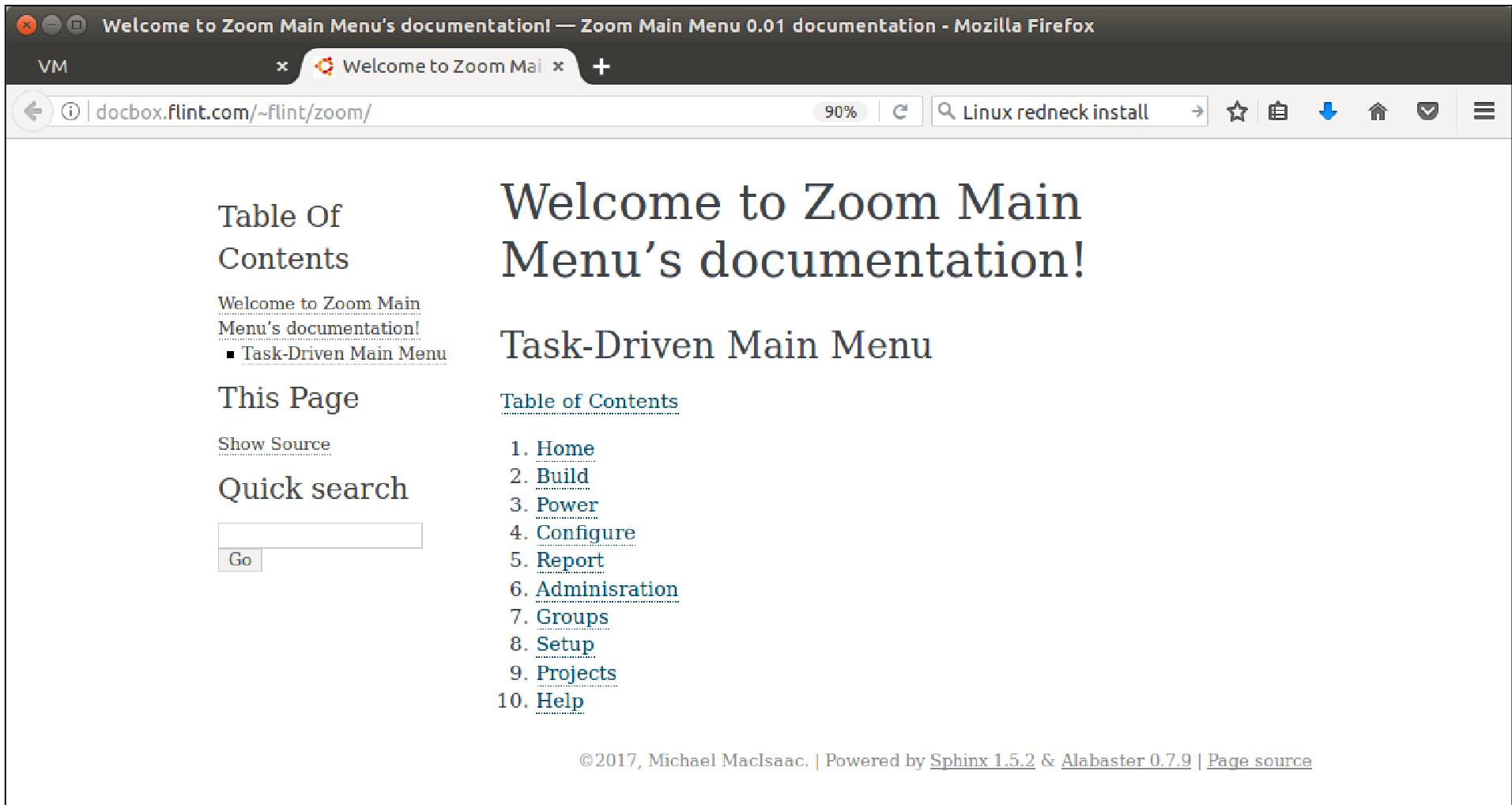


SOURCE: Redneck Language Option in Red Hat Linux Version 5.1.

# 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



The screenshot shows a Mozilla Firefox browser window with the following details:

- Tab Bar:** The active tab is "Welcome to Zoom Main Menu's documentation! — Zoom Main Menu 0.01 documentation - Mozilla Firefox". Other tabs include "VM" and "Welcome to Zoom Main".
- Address Bar:** The URL is "docbox.flint.com/~flint/zoom/".
- Search Bar:** The search term is "Linux redneck install".
- Content Area:**
  - Left Sidebar:** Contains "Table Of Contents" and a navigation tree:
    - Welcome to Zoom Main
    - Menu's documentation!
    - Task-Driven Main Menu
  - Section Headers:** "Welcome to Zoom Main Menu's documentation!" and "Task-Driven Main Menu".
  - Table of Contents:** A numbered list from 1 to 10, each with a link:
    1. Home
    2. Build
    3. Power
    4. Configure
    5. Report
    6. Administration
    7. Groups
    8. Setup
    9. Projects
    10. Help
  - Page Footer:** "©2017, Michael MacIsaac. | Powered by Sphinx 1.5.2 & Alabaster 0.7.9 | Page source"

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.

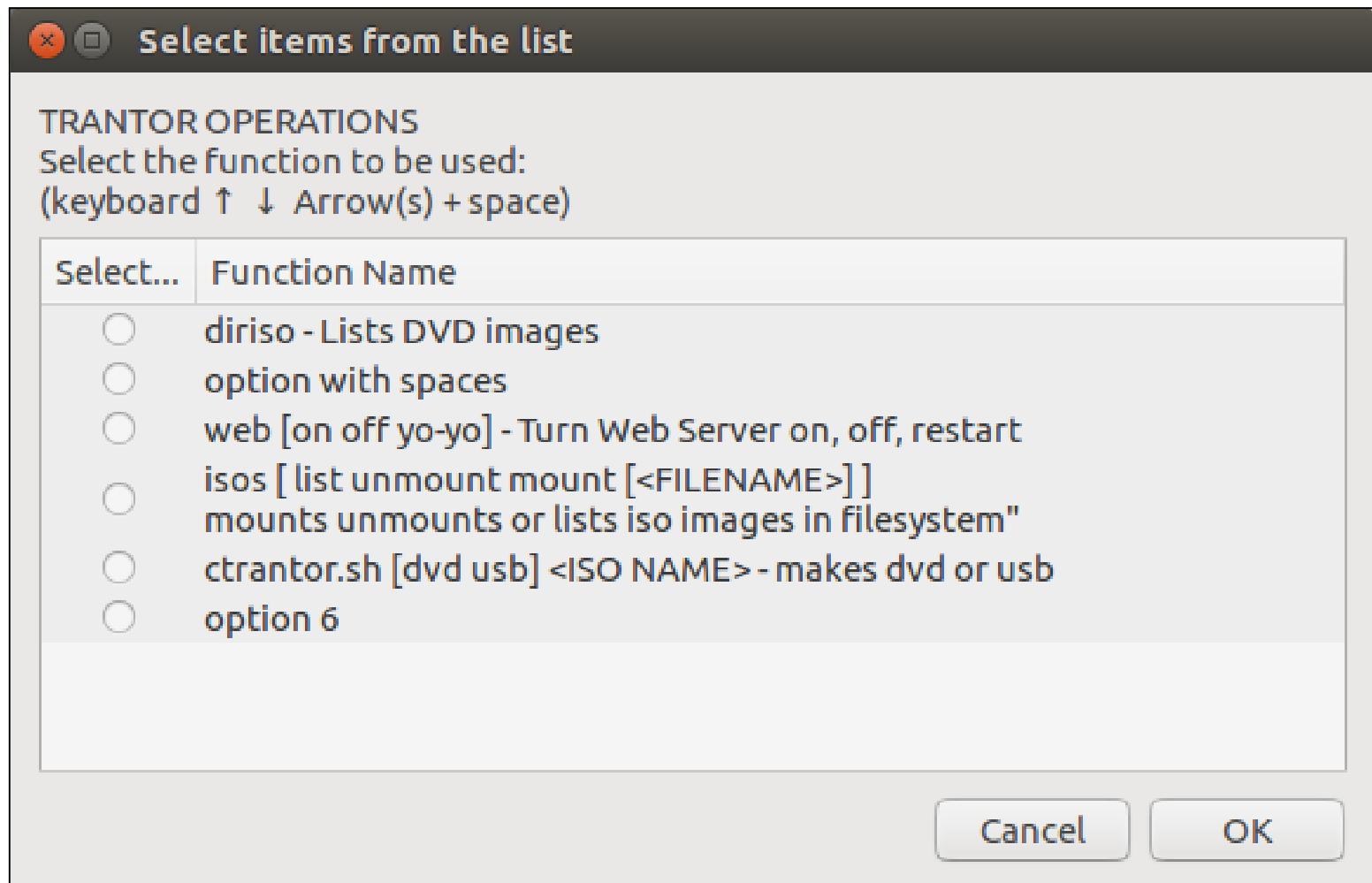
Allows for the coolest name in the Visual Bash universe...

# 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...

# 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>

Immortality? Lets hope! Remember...

Good Question = Free Dark Beer

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

**Final Questions?**

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