

Modernizing z/VM with zPRO, On prem cloud on IBM Z

www.VelocitySoftware.com
www.LinuxVM.com

Barton Robinson, CTO, Velocity Software

- **Who is Velocity Software**
- **Why zPRO**
- **zVWS – the z/VM Native Web Server**
 - Fast, powerful, modernizing, required in this century
- **Simplify your environment with on prem cloud**
 - zPRO – On-prem Private Cloud

Who is Velocity Software

Founded 1988,

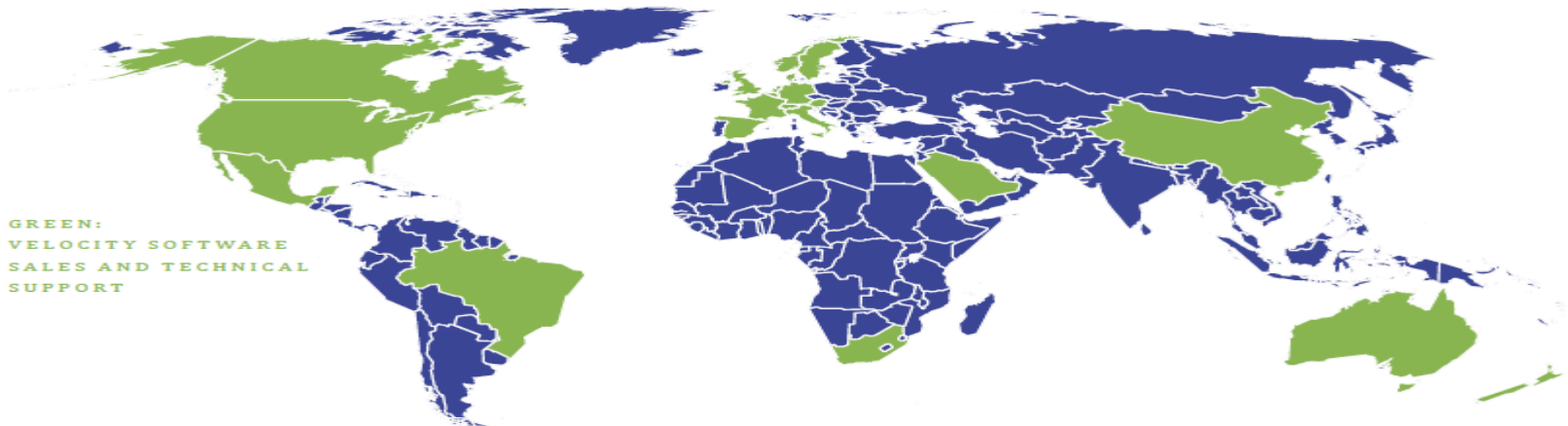
Mission: Provide software to assist customers in optimizing the VM platform:

Continuous fully integrated enhancements over 30 years

200+ Installations (zVPS) (more than z/VM ½ IFLs world wide)

22 countries, 6 continents

Velocity Software's Sales and Technical Support Map



Industries using Linux and Velocity Software

Banking, Financial:

Government / Military:

Health Care, Insurance, Retail

**Manufacturing: Automotive, computing, Oil
Outsourcing**

Velocity Software product set

zVPS: Performance Management Suite, includes:

- zVIEW: Web based Graphical Performance Displays
- zMON: Real-time Monitor
- zMAP: Historical Reports
- zTCP: Network Performance Data Collection
- zVWS: High Speed Native Web Server for z/VM
- zOPERATOR: Full Operator Console
- zALERT: Full Operations Alert Support
- zPORTAL: Web application to manage certain zVPS functions

zTUNE: Rules Based Analysis and Performance Services

zOSMON: z/OS Performance Monitoring

VSEMON: z/VSE Performance Monitoring

zPRO: Cloud Enablement for z/VM and Linux on IBM Z

Why zPRO?

Customers want simple

- Few z/VM Skills
- Little Time

Customers want on Prem Cloud

- Reduces Skills requirements
- Reduces Time requirements for server build / management

I want it now....

- zVPS installs in 2 hours for 1st LPAR
- zPRO Installs in 10 minutes on top of zVPS
- zPRO Tailors in 2 hours
- Usable by everybody concurrently that is authorized
- Clones servers in seconds (assuming flash copy)

zVWS – The Velocity Software Webserver

Modern means “internet”

zVWS Developed (1998) for native z/VM web pages

- VelocitySoftware.COM
- Linuxvm.ORG
- Other user groups

Developed to be very very fast

- VelocitySoftware.com hosted on z/VM on p390 (18Mhz)
- **Written in assembler – running on z, fastest server possible**
- Built in security is important too

Many customers have built zVWS applications

- Used by DOD for secure client certificate
- Used by banks for financial applications
- Used by government agencies for serving critical applications
- State government uses zVWS to server state legislature
 - **(if zVWS goes down, state government goes down)**

zVWS – The Velocity Software Webserver

zVWS is **very simple** – secure, reliable, and elegant

- Web servers single threaded to **maintain reliability**
- VERY small foot print per server (32mb) – compare to http process....
- 5 servers (160mb) sufficient for most applications
- Security via SSL, now using IBM SSL/TLS (HTTPS)

What can be served?

- All forms of HTML, PDFs, CGI
- CSL, Java script, JAVA (no server side java, no “dot net”)

What CGIs can be developed?

- Anything that runs in CMS (EXEC, REXX, Assembler, PL/1....)

zVWS is very powerful, very simple modernizing engine

- General purpose
- Flexible

zVWS – Samples

zVWS is z/VM native generalized webserver

- Multi-application
- Full access to CP, CMS, z/VM Applications!
- zVIEW, zOPERATOR, zALERT, zPORTAL, zPRO.....

Easy samples

- Issue any browser issued CP command in 25 lines of code
<http://192.168.5.43/cpform.html>
- Interface to DIRMAINT to look at directory entries
<http://192.168.5.43/dirmform.html>
- Interface to view a file on a browser
<http://192.168.5.43/view?fn=showdirm&ft=CGI>

zVWS – Customers want simple

CPFORM HTML

```
<html><head>
<title>Issue a CP command</title>
</head><body>
<form action="showcp.cgi"
  method="post" enctype="multipart/form-data">
<p>Enter a CP command then hit ENTER</p>
<input type="text" name="cpcommand"
  placeholder="CP command" />
<p>
<input type="submit" name="b1" value="Issue Command" />
</form></body></html>
```

Enter a CP command then hit ENTER

SHOWCP CGI

```
/* How much easier can it be? */
cpcommand = ''
'GETARGS'
'OUTPUT <html><body><pre>'
If cpcommand = '' Then
  'OUTPUT You must enter a command'
Else
  Address 'COMMAND' 'PIPE (endchar ? Name
                                SHOWCP:1)',
    '| VAR CPCOMMAND',
    '| XLATE',
    '| CP',
    '| OUTPUT'
'OUTPUT </pre></body></html>'
```

```
z/VM Version 7 Release 1.0, service level 1902 (64-bit)
Generated at 11/20/19 10:51:20 PST
IPL at 12/08/19 04:22:46 PST
```

zVWS – Customers want simple SHOWDIRM CGI

dirmform.html

```
<html><head>
<title>Issue a DirMaint Command</title>
</head><body>
<form action="showdirm.cgi"
  method="post" enctype="multipart/form-data">
<p>Choose a DirMaint Command</p>
<p><input type="submit" name="b1" value="TERM ?" />
  <input type="submit" name="b1" value="DATEFORMAT ?" />
  <input type="submit" name="b1" value="DEFAULTS ?" />
  <input type="submit" name="b1" value="IPL ?" />
  <input type="submit" name="b1" value="SCREEN ?" />
</form></body></html>
```

Choose a DirMaint Command

TERM ?

DATEFORMAT ?

DEFAULTS ?

IPL ?

SCREEN ?

```
DVHXMT1191I Your IPL request has been sent for processing to DIRMAINT at
DVHXMT1191I VSIVM3.
DVHREQ2288I Your IPL request for ZWEB05 at * has been accepted.
DVHIPL3274I The current IPL setting for ZWEB05 is CMS with PARMS of
DVHIPL3274I FILEPOOL VMSYSVPS:
DVHREQ2289I Your IPL request for ZWEB05 at * has completed; with RC = 0
```

```
/* How much easier can it be? */
Parse Value '' With b1 b2 b3 b4
'GETARGS'
'OUTPUT <html><body><pre>'
If b1 = ''
Then 'OUTPUT You must choose a command'
Else Do
  Call Diag 8,'SET MSG IUCV'
  Call Diag 8,'SET VMCONIO IUCV'
  Address 'COMMAND' 'PIPE (NAME QPRT02 ENDCHAR ~)',
    '| STARMMSG *MSG EXEC DIRMAINT' b1,
    '| SPECS 17-* 1',
    '| PICK 1.1 == /D/',
    '| OUTPUT',
    '| ALL / RC/ ! /complete;',
    '| C: FANINANY',
    '| SPECS /PIPMOD STOP',
    '| SUBCOM CMS',
    '~ LITERAL +00:02',
    '| DELAY',
    '| C:
  Call Diag 8,'SET MSG ON'
End
'OUTPUT </pre></body></html>'
```

zVWS – View a file

VIEW CGI

```
/**/  
Parse Value '' With fn ft  
'GETARGS'  
'OUTPUT <html><body><pre>  
If fn ft = '' Then  
    'OUTPUT You must send the file to view'  
Else  
    Address 'COMMAND' 'PIPE (endchar ? name SHOWCP:1)',  
        '| FILEFAST' fn ft 'VMSYSVPS:ZVWS.ROOT',  
        '| CHANGE /</ /&lt;/',  
        '| CHANGE />/ /&gt;/',  
        '| OUTPUT'  
'OUTPUT </pre></body></html>'
```

<http://192.168.5.43/view?fn=showcp&ft=CGI>

```
/* How much easier can it be? */  
cpcommand = ''  
'GETARGS' 'OUTPUT <html><body><pre>  
If cpcommand = ''  
Then 'OUTPUT You must enter a command'  
Else Address 'COMMAND'  
    'PIPE (endchar ? name SHOWCP:1)',  
    '| VAR CPCOMMAND',  
    '| XLATE',  
    '| CP',  
    '| OUTPUT'  
'OUTPUT </pre></body></html>'
```

zVWS – Simple Summary

Native z/VM WebServer

- CP/CMS Commands
- Dirmaint commands
- RACF commands

Velocity Applications

- VelocitySoftware.com (corporate website)
- zVIEW (z/VM, Linux, z/VSE, z/OS, distributed)
- zPortal
- zPRO

zVPS Enterprise View – All LPARs in Enterprise

Tailorable, expandable, zoomable

Today is Monday 2 Dec 2013

zVIEW Version 4159



zVIEW

Enterprise View - Velocity Software - VSIVM4 (DEMO)

First level

VSIVM1 Expand **VSIVM2** Expand **VSIVM3(old)** Expand

VM1	13/12/02	18:29	CP Total (2)	6.63%
Linux Nodes (Distributed Servers)				
LINUX9 (9)			3.93%	
suselnx3 (9)			2.57%	
REDHAT (2)			2.30%	

VSIVM2

VM2	13/12/02	18:29	IFL Total (1)	0.91%
Linux Nodes (z/VM-Guests)				
RH5X161			0.43%	
RH5Z161			0.37%	

VSIVM3(old)

VM3	13/12/02	21:29	024B42-0	99.22%
Linux Nodes (z/VM-Guests)				
000000-64			99.22%	
Linux Nodes (Distributed Servers)				
LES11T			2.29%	
PENSUSE			7.68%	

Demo System V4

Demo	13/12/02	18:29	IFL Total (1)	17.77%
Linux Nodes (z/VM-Guests)				
roblx1			2.83%	
redhat6			1.18%	
oracle			0.82%	
redhat56			0.47%	
redhat5x			0.43%	
lxsugar (2)			0.41%	
redhat64			0.31%	
sles8 (2)			0.31%	
sles10			0.29%	
redhat5			0.27%	
redhat3			0.25%	
redhat6x			0.24%	
suselnx2			0.22%	
sles11 (2)			0.22%	
sles11x			0.20%	
sles11x3			0.19%	
sles9x			0.18%	
scsil0s			0.17%	
sles10x4			0.17%	
sles9			0.16%	
Linux Nodes (Distributed Servers)				
linux93 (2)			100.00%	
opensuse (2)			8.97%	
JIRA (2)			5.88%	
vpnbrz			5.50%	
vpnbrc			4.76%	
mail (9)			3.42%	
vpnz			2.35%	

Close

Second level

Times Test System

Tim12	13/11/27	13:09	IFL Total (1)	0.10%
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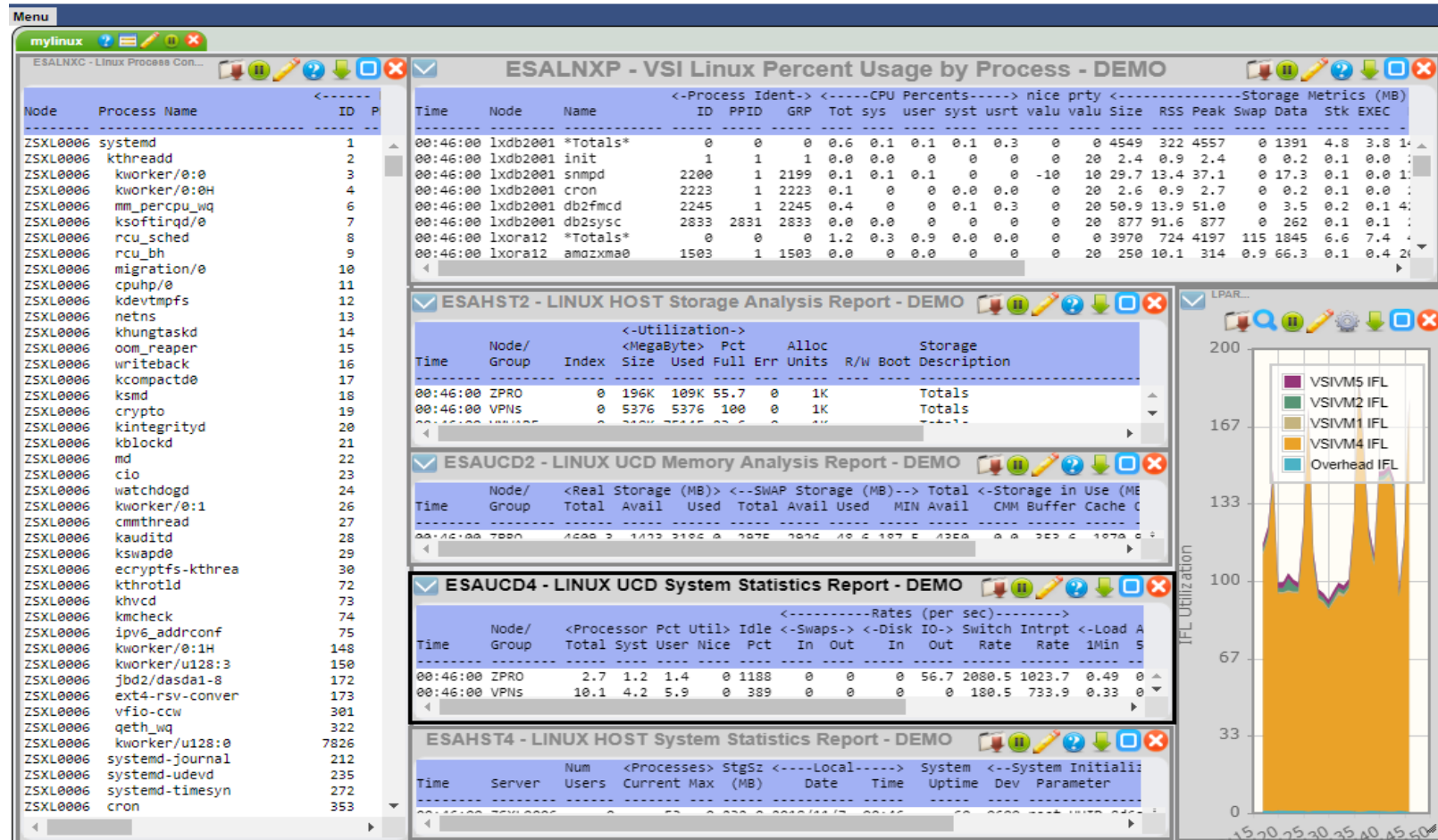
zVIEW Linux performance “portal”

Nednesday 7 Nov 2018 00:46

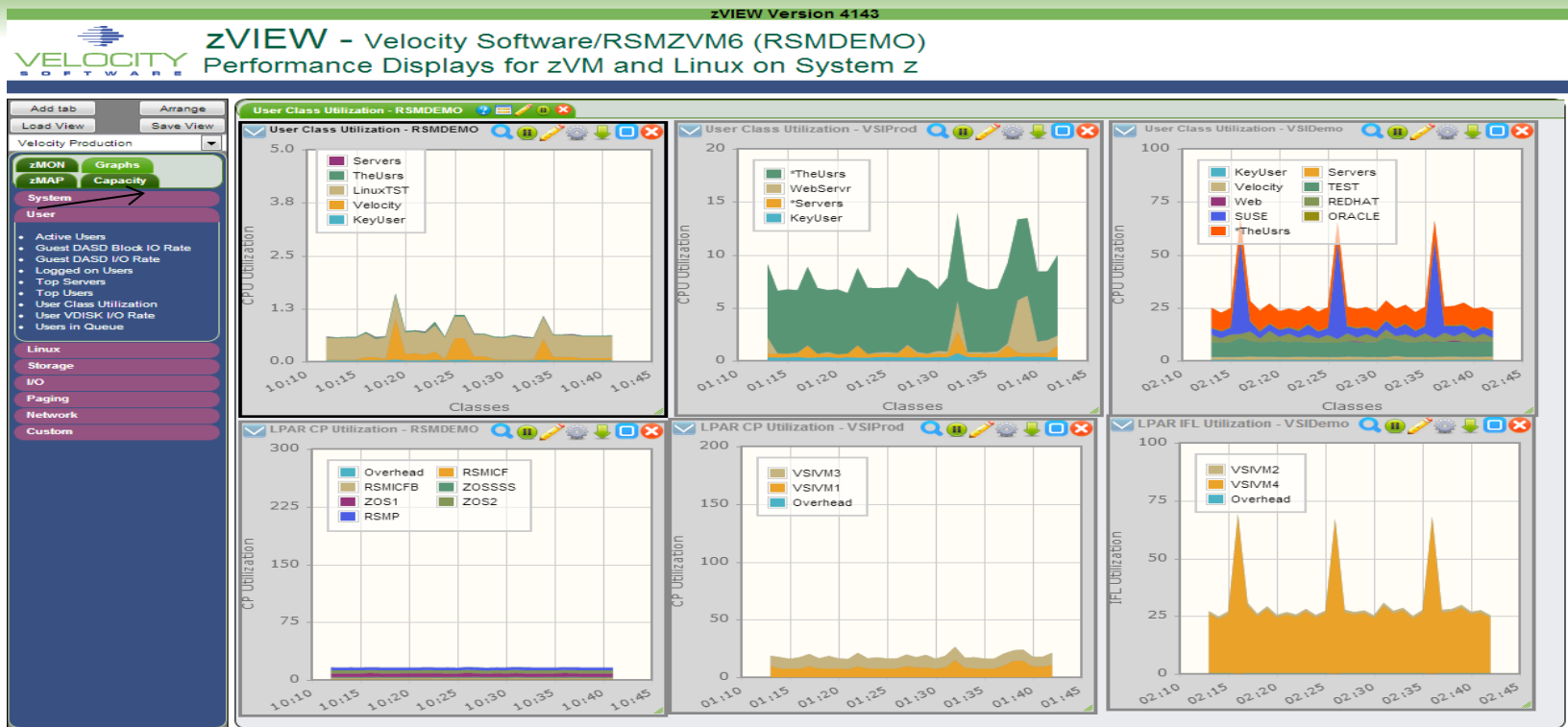
zVIEW Version 4310



zVIEW - Velocity Software - VSIVM4 (DEMO)
Performance Displays for zVM and Linux on System z



Multiple System RealTime View (3 LPARs)



Data from multiple lpar's visible on "Single pane of glass"

zPRO – on-prem cloud

Challenges with z/VM: “we want cloud”

- Lack of z/VM skills
- Old style interface (3270)
- Linux on hardware seems easier
- KVM seems easier (but z/VM performs and scales better)

zPRO Objectives – build on native webserver capability

- Modernize the z/VM Platform
- Simplify z/VM management
- Server life cycle management
- Provide Systems programmers with simple to use management tools
- Provide end users simple access
- RESTFUL APIs.....

z/VM Challenges (for all sites)

Directory Management

- Often bottleneck in creating/modifying servers
- Who is allowed?

Operations

- Starting / Stopping servers
- Who can do it? Server owners

Systems Management

- See available resources
- See servers / server ownership

zPRO for end users

- **z/VM Cloud Server Management**
 - Clone (provision), modify, start, stop, move, delete servers
 - Linux w/Oracle, Websphere, etc – any z/VM guest
 - Define server expirations (**life cycle management**)
 - Useful for LAB, test or proof-of-concept servers
 - Selective resource controls and quota management
 - Hierarchical control from global, to group, to user to server
 - SSI / LGR (live guest relocation) support

zPRO Server Management web page

Lpars....

The screenshot displays the zPRO Server Management web interface. On the left is a sidebar with navigation options: Auto Arrange, Refresh All, Close All, Administration, Create Servers, Manage Gold Images, Manage zPRO Users, Reports, Server Management, Add a LINK, Add a Minidisk, Change a Minidisk, Change a Server's Password, Change Virtual Machine CPUs, Clone a Minidisk, Manage Guest Access, Manage Owned Servers, Relocate a Server (LGR), Set Virtual Machine Owner, View CP Directory Entry, and View Resources. The main area has tabs for DEMOSYS, CUSTOMER, and DEVELOPMENT. An arrow points to the DEVELOPMENT tab with the text 'Lpars....'. The 'Set Virtual Machine Owner' dialog box is open, showing a table of virtual machines. The 'Add a Minidisk' dialog box is also open, showing fields for Add to Server, Virtual Address, DASD Pool, Device Type, Cylinders / Blocks, and Access Mode. The 'Change a Server's Password' dialog box is open, showing fields for User Id, New Password, and Verify password. All three dialog boxes have a 'Process Request' button at the bottom.

Sel	Virtual Machine	SysID	Owner
<input type="checkbox"/>	\$DASD\$	VSIVM4	unassigned
<input type="checkbox"/>	\$EMPTY	VSIVM4	unassigned
<input type="checkbox"/>	BCLOUD	VSIVM4	unassigned
<input type="checkbox"/>	BLAKEMC	VSIVM4	unassigned
<input type="checkbox"/>	BLAKES11	VSIVM4	unassigned
<input type="checkbox"/>	BLURCV	VSIVM4	unassigned
<input type="checkbox"/>	CAVMM01	VSIVM4	unassigned
<input type="checkbox"/>	CAVMM02	VSIVM4	unassigned
<input type="checkbox"/>	CENTFBA	VSIVM4	unassigned
<input type="checkbox"/>	CENTOS66	VSIVM4	unassigned
<input type="checkbox"/>	CONSERVE	VSIVM4	unassigned
<input type="checkbox"/>	CONSPORT	VSIVM4	unassigned
<input type="checkbox"/>	DANIEL	VSIVM4	unassigned
<input checked="" type="checkbox"/>	DAVEL2	VSIVM4	ADMIN
<input checked="" type="checkbox"/>	DEMOBLK	VSIVM4	BARTON

End user Enterprise Functions

zPRO dialogs present a list box to select on which system to perform the function.

DEMOSYS

CUSTOMER

DEVELOPMENT

Clone a Virtual Machine

?

🖨

✕

Target System

✓ Select target...

DEMOSYS

CUSTOMER

DEVELOPMENT

New ID

Password

Verify Password

Account No.

N/A

No. Cpus

1

Memory Size

1

G

Days to expiration

2

☐ Auto Start Server

Optional (blank field for no email):
Email address to send notification to

rich@velocitysoftware.com

Your Return Email address

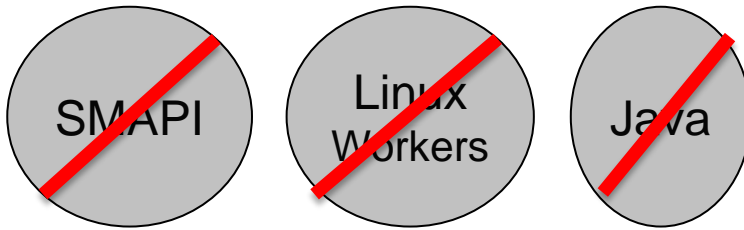
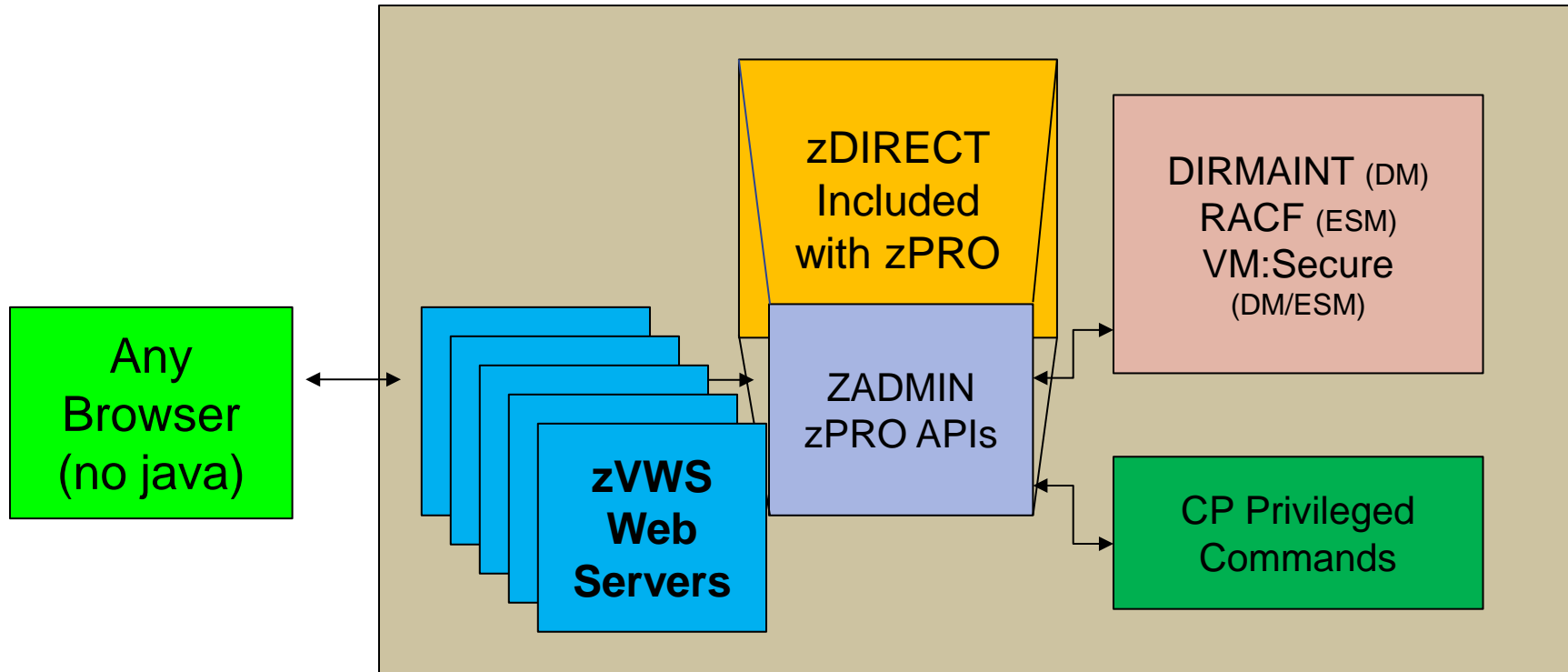
rich@velocitysoftware.com

Process Request

zPRO support for platform

- **Utilizes the zVWS *native* z/VM web server**
 - UI is completely browser-based
 - (no Java!, nothing installed on workstation)
 - **Installs in about 10 minutes onto zVPS managed LPAR**
- **Authentication support via zVWS**
 - VM / LDAP / AD / your own
- **Extensible**
 - Can define and “plug in” site-defined services
 - Easily tailored by z/VM systems programmers
 - **RESTFUL APIs**
- **Provides directory management**
 - zDIRECT provides Directory Management - with or without RACF


zPRO's Structure – Simple!



zDIRECT




- Updates directory
- Non-intrusive
- Multi-user
- No “oops”

Auditing











 **zPRO Enterprise Cloud Management** VSIVM4

DEMOSYS **CUSTOMER** DEVELOPMENT

Audit Log



X Search Criteria

	01/07/2020 - 06:15:31.335888	DEMOSYS -System- ZPRUNQUO: Processing 43 server entries from EXPIRING ZPFILE
	01/07/2020 - 06:00:38.695411	DEMOSYS RKSDEV ZPFINCLN: User RKSSVR10 located: IP - 1 THIS 10.0.0.13
	01/07/2020 - 06:00:38.692489	DEMOSYS RKSDEV ZPFINCLN: User RKSSVR10 located: OSA - DECREASE 0
	01/07/2020 - 06:00:38.689946	DEMOSYS RKSDEV ZPFINCLN: User RKSSVR10 located: MDISK - 1
	01/07/2020 - 06:00:38.687198	DEMOSYS RKSDEV ZPFINCLN: User RKSSVR10 located: VCPUS - 1
	01/07/2020 - 06:00:38.684618	DEMOSYS RKSDEV ZPFINCLN: User RKSSVR10 located: VSTOR - 256 MB
	01/07/2020 - 06:00:38.681980	DEMOSYS RKSDEV ZPFINCLN: User RKSSVR10 successfully cloned by Rich Smrcina from golden image GOLDRL74
	01/07/2020 - 06:00:38.538976	DEMOSYS RKSDEV ZPFINCLN: RKSSVR10 has been autostarted
	01/07/2020 - 06:00:38.523102	DEMOSYS RKSDEV SENDACK: Results of sending email for RKSSVR10 to rich@velocitysoftware.com - ZPEmail 0
	01/07/2020 - 06:00:38.286316	DEMOSYS RKSDEV ZPFINCLN: Invoking DEMOACK for RKSSVR10 with NEWLN XU RKSSVR10 QUIET Rich Smrcina EMAIL=rich@velocitysoftware.com

RKSDEV
Settings

Change Password
Job Queue
Audit Log
Show Notifications
Report Bug
Diag Console
About zPRO
Logout

- **zPRO Focus:**

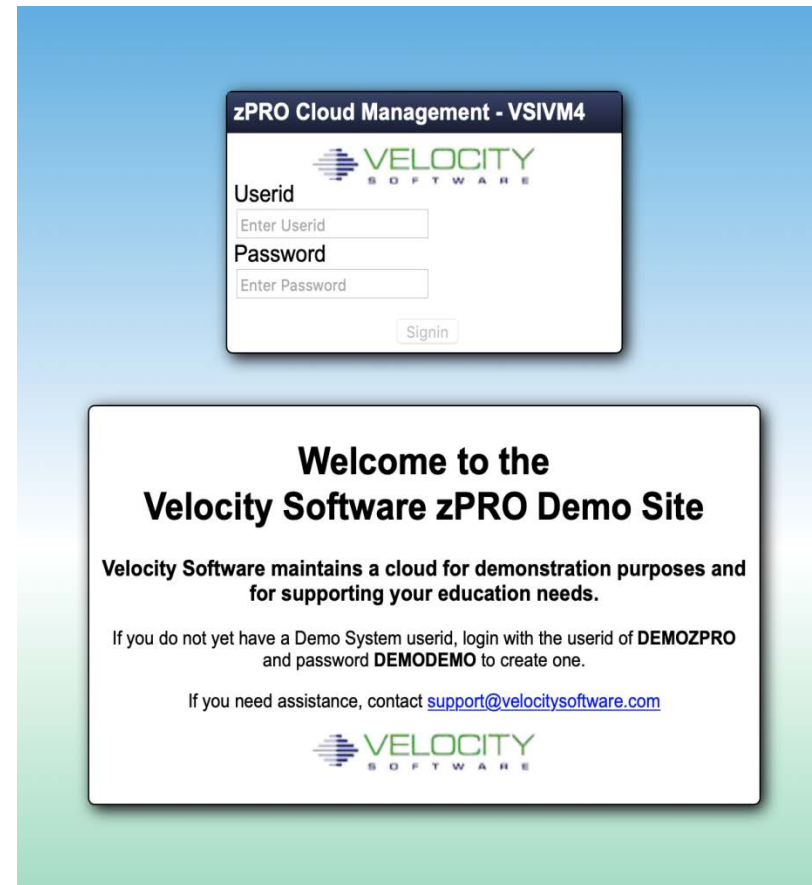
- **Simplifying access** and acceptance of the mainframe for new, younger and possibly less skilled team members through a browser-based interface
- Providing a **On-Prem cloud-based** facility for mainframe **training**, especially around cloud and guest management (supports Linux, CMS, z/VSE)
- Simplifying daily tasks by **empowering** end-users to manage their own guests while *you* still control authorities and resources (Functional Decentralization)
- Simplifying z/VM systems management for Systems Programmers

Velocity's zPRO Cloud Demo Site

- To register:
<https://demo.velocitysoftware.com/zpro/>
 - Userid: **demozpro**
 - Password: **demodemo**
- Check your email for your login info

Our Cloud Demo site will allow you to register for your own userid. You can then use that userid to create, manipulate and use a selection of servers through zPRO.

It is a full zPRO system that is running the same code we ship to our customers. **Note** that Demo userids only have access to a subset of zPRO functions and are limited in authorizations.



Cloud on z with zPRO is VERY easy

- Native web server (zVWS)
- Easy interface
- Very reliable

zPRO Installs in minutes

Tailoring:

- Choose directory manager (DirMaint, VM:Secure, zDIRECT)
- Assign existing servers
- Define IP addresses
- Define disk pool
- Define users, groups