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A Long Time Ago, We Wanted a “VM Home Page”

- **For what?** Marketing material, technical publications, downloads, …

- **Hey, let’s use what we know… and already have available right here**
  - HTML is just another markup language – we know markup -- we’ll just write it with XEDIT
  - We’ll need site automation, but we have Rexx and CMS Pipelines
  - We’ll need a decent file system, but the CMS Shared File System is perfect for this
  - We had a shareware web server that ran on CMS
  - We had a T1 Internet connection, a spare modest System/390, and VM/ESA

- **We built ourselves a small web server running on VM and CMS**
  - A CMS Shared File System server to hold the site’s content
  - Two disjoint TCP/IP stacks:
    - One side facing the Internet, for customers
    - The other side facing toward IBM, for an internal shadow of the content, for browsing performance
  - Two sets of CMS-based web servers, pulling content from SFS
  - An APPC/VM connection to our production VM system, where the content developers worked

- **This structure:**
  - Demonstrated how customers could adapt their VM systems to new uses
  - Let us safely maintain and serve content, in a manner that **updates are visible immediately**
IBM Systems & Technology Group

How We Started, Spring 1996

edslink4.eds.com - - [07/May/1996:13:08:22 -04.00] "GET /newmini.gif HTTP/1.0" 200 -

Intranet HTTP daemons

TCP/IP

SFS

GDLVMWEB

Internet HTTP daemons

TCP/IP

Selectives port opening kept out unwanted traffic

Disjoint TCP/IP stacks separated red from blue

GDLVM7

CMS users maintaining site content

9221-200, 128 MB
Two 8232 LAN CSs

APPC/VM

IBMers browsing
w3.vm.ibm.com:90

blue zone

Customers browsing
www.vm.ibm.com

red zone

Customers browsing
www.vm.ibm.com
We Even Did *This* Once

We did this to let a content owner in Dallas use her Dallas VM user ID to update her content on www.vm.ibm.com.

This also served as an APPC exercise for us.
Hi, We’re From Corporate, and We’re Here to Help You

- **TCP/IP**
  - **GDLVMWEB**
  - **SFS**
  - **GDLVMGRN**
  - **GDLVM7**
    - CMS users maintaining site content
  - **AppC/VM**

**Blue Zone**
- IBMers browsing w3.vm.ibm.com:90

**Red Zone**
- Customers browsing www.vm.ibm.com

**Yellow Zone**
- Firewall separates red from yellow
- LPARs separate yellow from blue
- Cisco firewall

**Internet HTTP daemons**
- SFS
- GDLVMGRN
- GDLVM7
- GDLVMWEB

- **Intranet HTTP daemons**
- TCP/IP
The CMS Shared File System is the Key

<table>
<thead>
<tr>
<th>URI</th>
<th>SFS Directory</th>
</tr>
</thead>
<tbody>
<tr>
<td>/</td>
<td>VMHOME:EWEBADM.VMPAGE</td>
</tr>
<tr>
<td>/zvm610</td>
<td>VMHOME:EWEBADM.VMPAGE.ZVM610</td>
</tr>
<tr>
<td>/devpages</td>
<td>VMHOME:EWEBADM.VMPAGE.DEVPAGES</td>
</tr>
<tr>
<td>/devpages/bkw</td>
<td>VMHOME:EWEBADM.VMPAGE.DEVPAGES.BKW</td>
</tr>
<tr>
<td>/perf</td>
<td>VMHOME:EWEBADM.VMPAGE.PERF</td>
</tr>
<tr>
<td>/perf/tips</td>
<td>VMHOME:EWEBADM.VMPAGE.PERF.TIPS</td>
</tr>
<tr>
<td>/events</td>
<td>VMHOME:EWEBADM.VMPAGE.EVENTS</td>
</tr>
</tbody>
</table>
What The Content Developer Sees

Content developers on GDLVM7 just use CMS tools to do their work.

Notice the files of filetype HTML in this FILELIST snapshot.
Programmatically Generated Content

The z/VM 5.4.0 source code

A Rexx exec that processes our source

VMDBK HTML
VMHOME:EWEBADM.VMPAGE.PUBS.CP540
Known to you as /pubs/cp540/vmdbk.html
If You Insist… Content Development with PC Tools

But nobody here does this, because we’re VMers.

The z/VM NFS and Samba servers are CMS programs. They take care of the authentication and ASCII-EBCDIC concerns.
A Web Page is Both Look-and-Feel and Content

To write their content, our authors fill in an HTML template.

The template implements the corporate-mandated look and feel for ibm.com.

Our automation can refresh all of the site’s HTML files with a new template whenever we want.

The automation uses CMS tools, such as Rexx and CMS Pipelines.

This lets us immediately deploy corporate-mandated look-and-feel changes with no effort from content developers.
Inside the HTML File

<html>
<head>
<meta...
<meta...
...
</head>
<!-- BEGIN HEADER -->
... I own this ...
<!-- BEGIN CONTENT -->
... Pam owns this ...
<!-- END CONTENT -->
... I own this ...

A pipeline takes this apart:
1. Extracts the red parts that Pam owns
2. Reassembles the red stuff into the new blue stuff that came from Corporate
3. Rewrites the HTML file
Kinds of Content on www.vm.ibm.com

- Marketing materials: announcements, brochures, ...
- Formal product literature: manuals and reports
- Listings and descriptions of available z/VM patches
- Informal product literature: many “hints and tips” articles
- Detailed references: data structure descriptions
- Conference calendar
- Electronic seminar support materials
- Any z/VM developer can have a personal page

- We can refresh any of this immediately
Some Advantages of a CMS-based Web Server

- Nobody tries to attack you, because they’re all busy attacking Windows, or Apache on Linux.

- Even if they try to attack, their tricks don’t work, because they’re written to assume a different daemon.

- Your web server daemon runs in a class G virtual machine, and it has no write authority to SFS. Even if hackers break the server, they’re fenced.

- Want to do CGIs? It’s Rexx and Pipelines. Simple, simple, simple.

- It’s very easy to access your corporate data.

- CMS is a very lightweight guest. Those 40 years of tuning and evolution go a long way.
Health Monitoring

Health monitors send alerts via best way

Daily heartbeat via SMTP

Modem SMS if outage

HTTP liveness checker

to Internet

Cisco firewall
Activity Display

This is just a little activity display to show what the CMS web servers are doing.

It’s a gee whiz display, mostly.
Speeds and Feeds

- IBM z900, 2064-116, 32 GB, 16 engines, 2 small OSAs, ESCON
  - It’s a little big for the job, but we would have scrapped it otherwise!
- Three z/VM partitions, each one 2-3 GB and 4 engines
- One IBM 2105-F20 DASD server, holding about 100 2-GB volumes
- Web daemons: 40 yellow, 16 blue, each a 64 MB CMS
- About 15,000 HTML pages, 650 PDFs, and 500 downloads
- About 4 GB of site content
- About 25,000 HTTP transactions per day
- Performance: CPUs 1%, memory 2%, DASD 1.5 msec, mostly cached in z900 memory
Summary

- We used what we had
- We built something that’s both useful and usable
- Rock-solid System z and z/VM let me sleep at night
  - Systems run unattended almost all the time
  - I can’t remember the last unplanned outage
- Good example for our customers
- Shepherding the site is my privilege and pleasure