The Supreme Court of Virginia Linux and System z – Bringing the Future to Justice

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Disclaimer

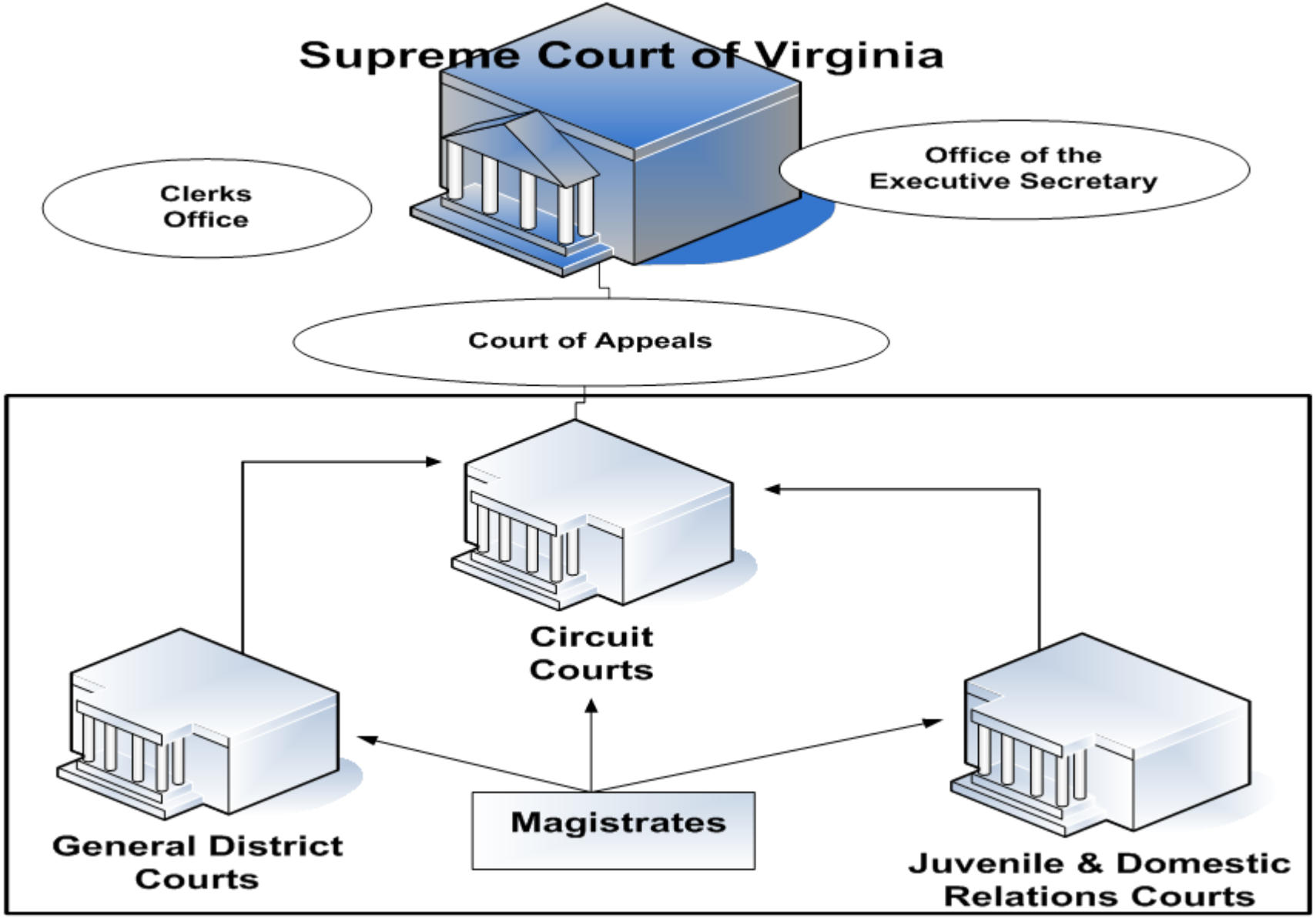
- The information and opinions found herein are for informational purposes only and not necessarily those of the Office of the Executive Secretary or the Supreme Court of Virginia and should not be considered an endorsement.

Agenda -

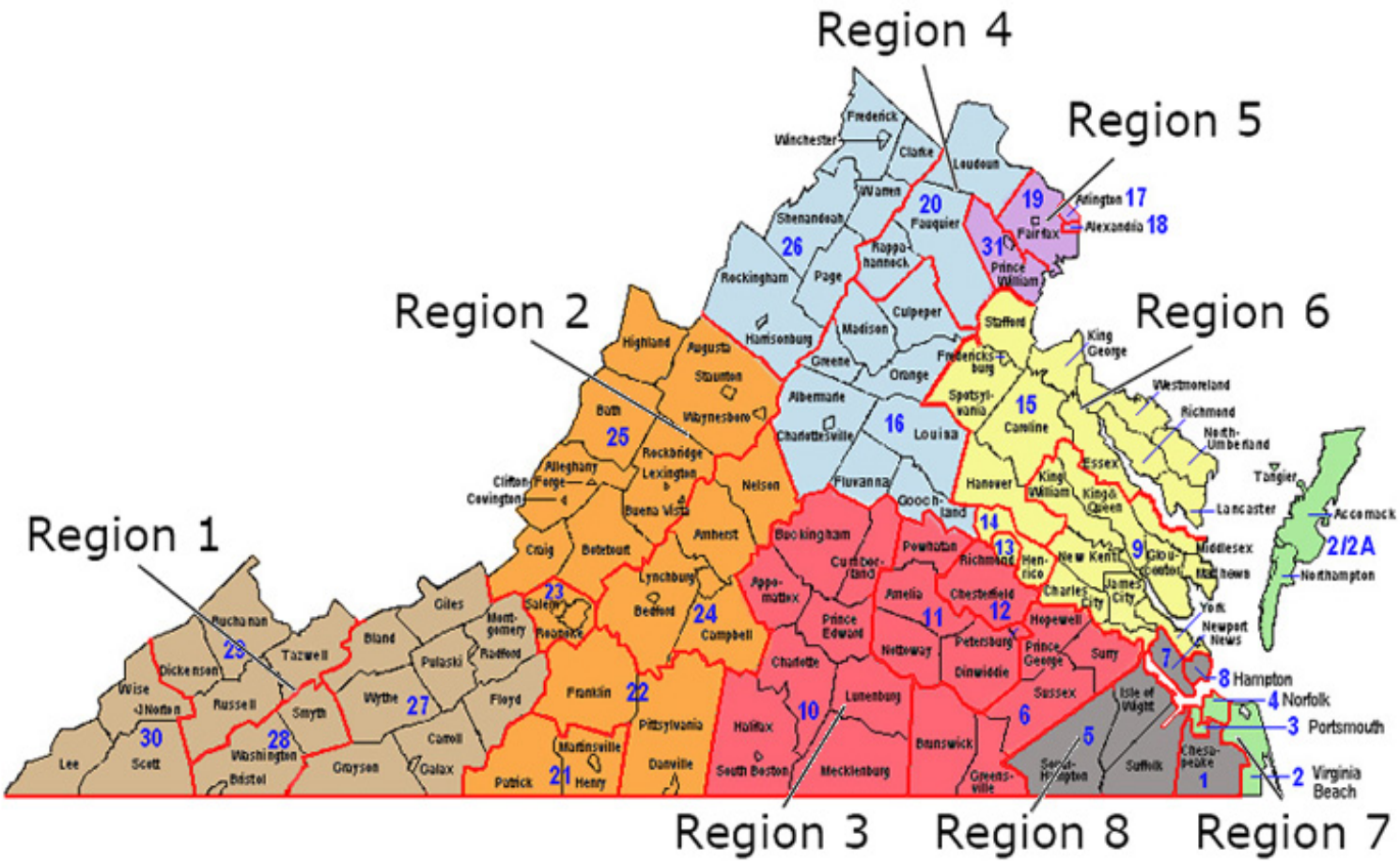
- Quick Overview of the Supreme Court of Virginia
- How we got to where we are today
- Where the OES is going in the future

Mission Statement -

“ The Department of Judicial Information Technology’s mission is to support Virginia’s Judiciary by providing and maintaining reliable, effective, innovative and timely technology for the courts’ business processes.”


Supreme Court of Virginia
Clerks Office
Office of the Executive Secretary
Court of Appeals
Circuit Courts
General District Courts
Magistrates
Juvenile & Domestic Relations Courts

The Commonwealth of Virginia



The ‘Supporting’ Cast

- 2 – zVM/zVSE System Engineers
- 3 – Database Administrators
- 1 – Production Control Specialist
- 2 – Linux Systems Administrators
- 8 Cobol Developers (fte)
- 35+ Java Developers (contract)
- 9 Operations (fte)

Case Management System (CMS)

- Supports 325 Courts with over 5000 internal and 3,500 external users
  (3 Circuit courts are currently not using our CMS system)

  2013 included 3.6 Million New Cases and 3.3 Million New Hearings

- **Circuit** - main application is driven by WebSphere (java)
  Forms & Batch support still maintained in zVSE/CICS (Cobol)

- **J&DR** - WebSphere (8.5) application. Batch is supported by zVSE/CICS

- **General District** - running traditional zVSE/CICS application (currently in Java rewrite)
  Financial Management System (FMS) – running in CICS

- **Supreme Court** - running traditional zVSE/CICS application

- **Court of Appeals** – recently converted to WebSphere

Other Applications supporting Case Management

- Records Management System (RMS) – Unix application
- Case Imaging System (CIS) – Unix application
- eMagistrate System (eMag)* 125 Offices/240 workstations
- *2007 ComputerWorld Honors Program Laureate

  The eMagistrate System was our first venture (2004) into Linux under VM (2004). It is now a fully integrated WebSphere application complete with Video conferencing, State Police and other agency interfaces.
- Video Docketing Application (across all CMS apps)
- Conference Registration Application
- eLeave Application
- eFiling (VJEFS- Virginia Judicial Electronic Filing System)
  - Winner of the Governor's 2013 Commonwealth Technology Award
- eCollections (VJCS – Virginia Judicial Collections System)

Current Systems Environment

Courts Processor

zBC12 2828(M02)
2 CPs & 8 IFLs
2 z/VM 6.3 LPARS
240 GB memory
8 z/VSE 4.3 guests
2 z/VSE 5.2 guests
76 Linux guests

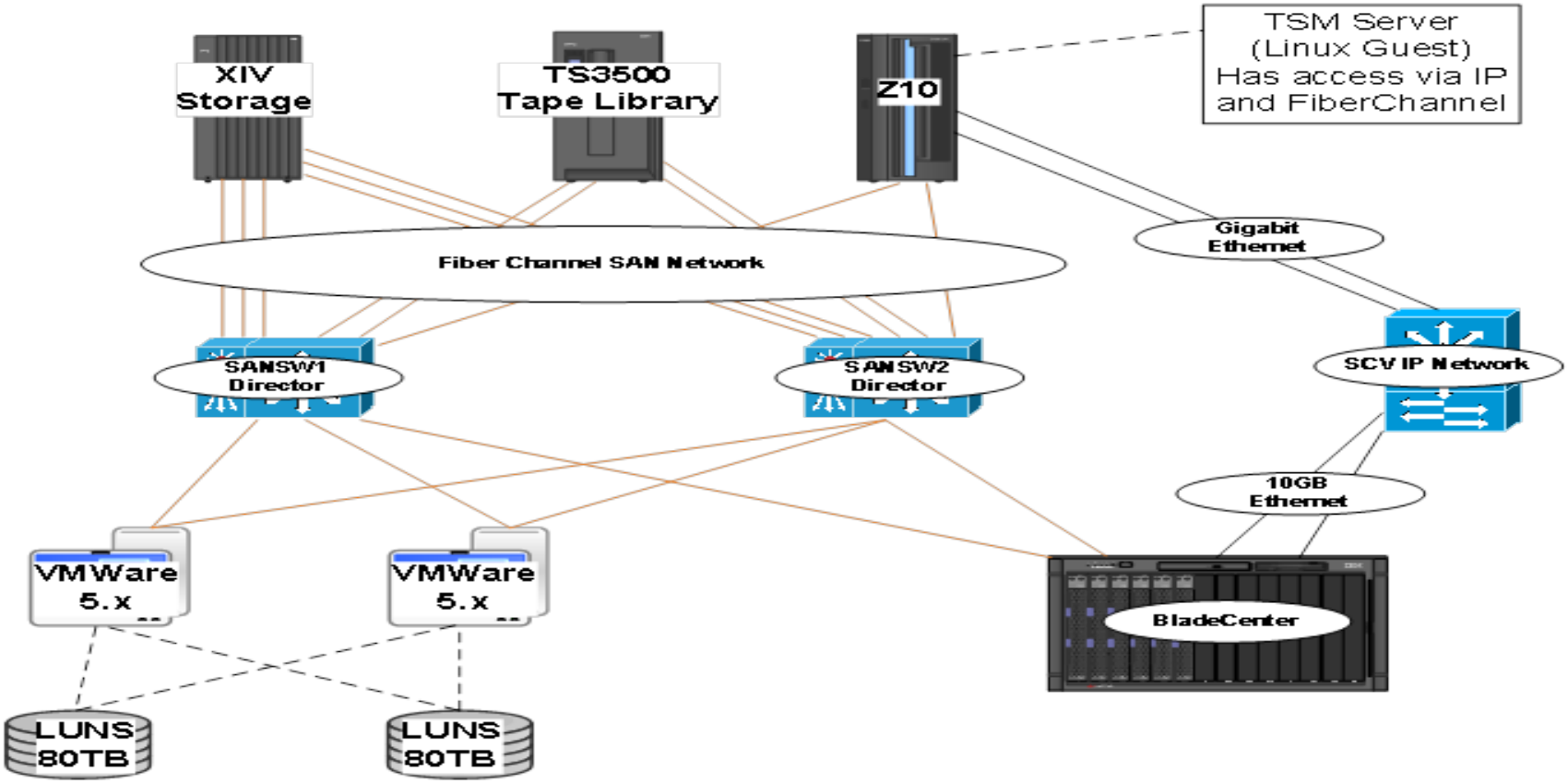
- SLES 10 SP2
- SLES 11 SP2
- WAS 6.1 (31-bit)
- WAS 7.x (64-bit)
- WAS 8.5.1 (64-bit)
- DB2 8.2 & 9.5
- Oracle 11G-r2

CJIS Processor

zBC12 2828(M01)
1 CP & 8 IFLs
2 z/VM 6.3 LPARS
240 GB memory
4 z/VSE 4.3 guests
80 Linux guests

- SLES 10 SP2
- SLES 11 SP2
- WAS 6.1 (31-bit)
- WAS 7.x (64-bit)
- WAS 8.5.1 (64-bit)
- DB2 8.2 & 9.5
- Oracle 11G-r2

Storage Network Architecture



OEM Applications

- Barnard Software, Inc. (TCP/IP)
- Velocity Software, Inc. (Performance Monitoring)
- CSI International, Inc. (EPIC Tape)
- Computer Associates, Inc. (Hidro, TPX and EzTrieve)
- MacKinney Systems, Inc. (ListCat Plus)
- ASG Software Solutions (ZEKE Job Scheduler)
- DBI Software Inc (DB2 Performance Analyzer)

Public Online Services
www.courts.state.va.us

- Internet access to District and Circuit Court records averages 373,000 searches per day
- Access to all standard Public-use Court forms for print (pdf) and submission
- Online payment of traffic and criminal offenses (currently District courts only)

  Fiscal Year 2013 (ending June 2013) – 538,421 payments received totaling $80,010,874.76

  This represents 44% of payments received for all General District courts

- Circuit case post pay scheduled to come on line sometime July-Sept 2014

z/Linux - What Started it All

- Magistrate system was a PC-based standalone system deployed in 200+ locations (2003)
- Sneaker-net automation
- Limited information with no statewide availability
- Massive effort to incorporate statewide system updates, especially when laws impacting system went into effect.
- Brought on IBM contract services for needs review and recommendations.
  - Write the application in a current, serviceable language (suggested Java)
  - Use WebSphere Application server as apache/application base
    - Intel or Windows
    - (I later suggested Linux on the mainframe)
  - Use DB2 for the data repository

The Process

- Contractors brought in to write the application. Development environment consisted of pc's using RAD Developer and Intel servers running WebSphere and DB2
- Application worked out, but the cost of moving forward became a major discussion.

While they chatted…….

- Built a Linux guest on the existing 9672-rb6 (no IFL)

- Decided on SUSE/Linux (SLES 8)
  - quicker 'out of the box' deployment. Seemed better equipped to address mainframe
  - WebSphere 5.1 certified on SLES8
  - Novell support available (State contract)

The Decision

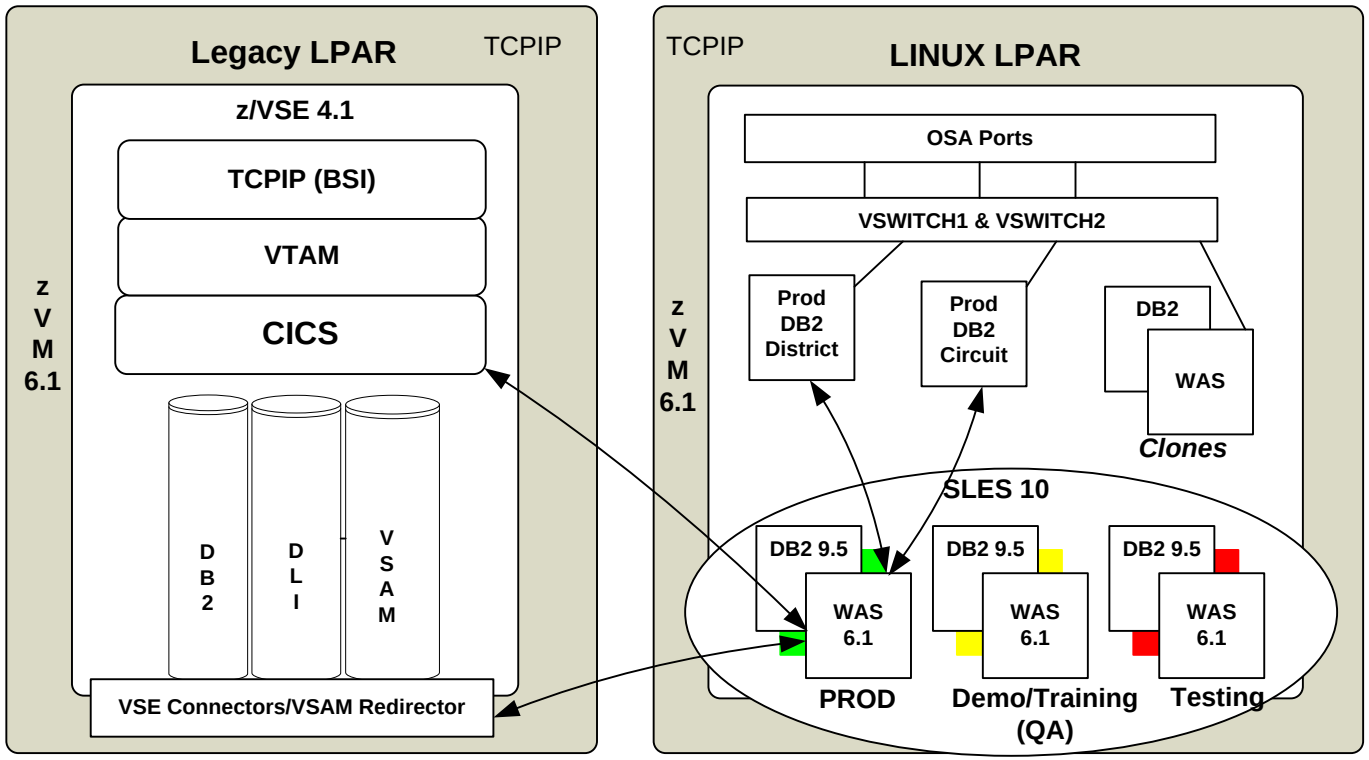
Linux on the Mainframe

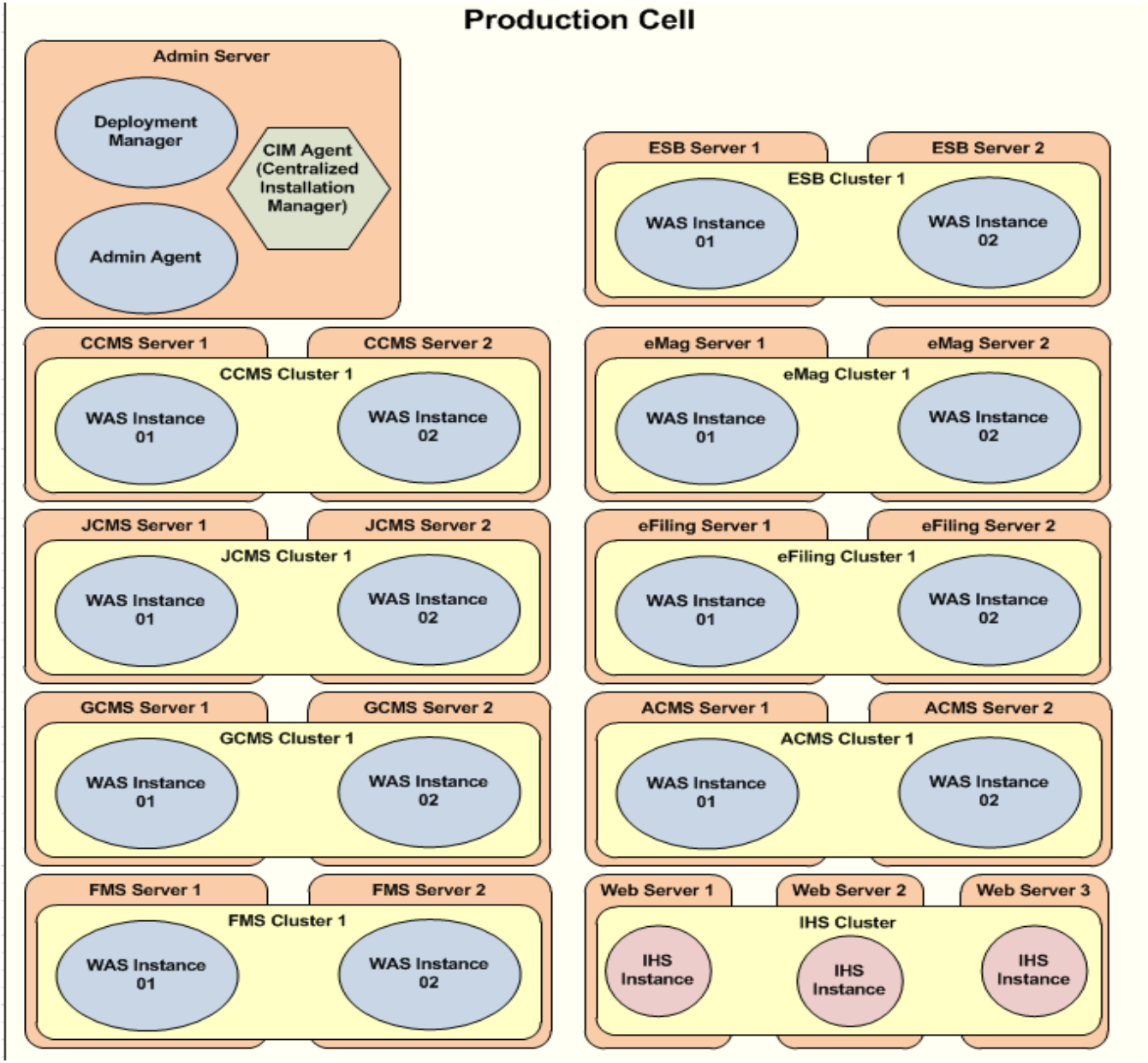
- **Leveraging experience and knowledge of existing staff**
  - 25 years experience in IBM mainframe and hypervisor technologies
- **Scalability of the VM, Linux and the zSeries platforms**
- **Stability of mainframe hardware and operating systems**
- **Cost savings in licensing**
  - The control process mandated multiple servers to support development testing, demo/training and production
  - Licensing costs for one IFL equaled that of one Intel processor
    - Needing 6-8 Intel servers would increase costs 6-8 times over what the Linux/IFL solution provided.
- The admin and maintenance efforts to support the mainframe systems were estimated to be much less than the same efforts for multiple Intel boxes

Initial Challenges

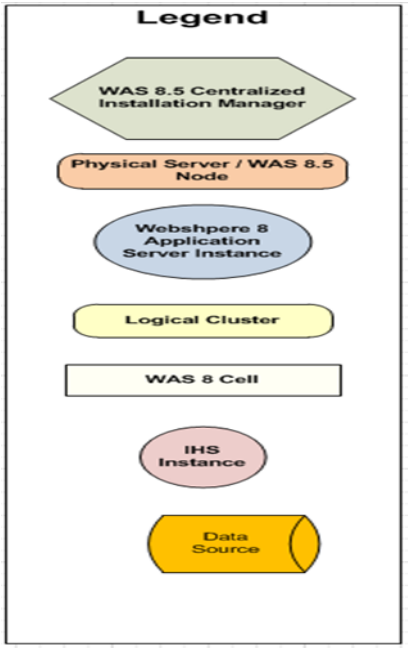
- Intel processes ran much (as in way) faster than the same workload on the 9672
  - Memory leaks in the SUSE 5.1 (mainframe) source did not help
- Continued battle between ‘mine runs faster’ vs ‘mine runs cheaper’
- Managed to get approval to upgrade the 9672 to z890 with 1 IFL
  - Upgraded WebSphere to 6.1
  - Upgraded to VM 6.1
- Better throughput speeds, still a bit slower, but still extremely more cost effective in both hard and soft dollars.

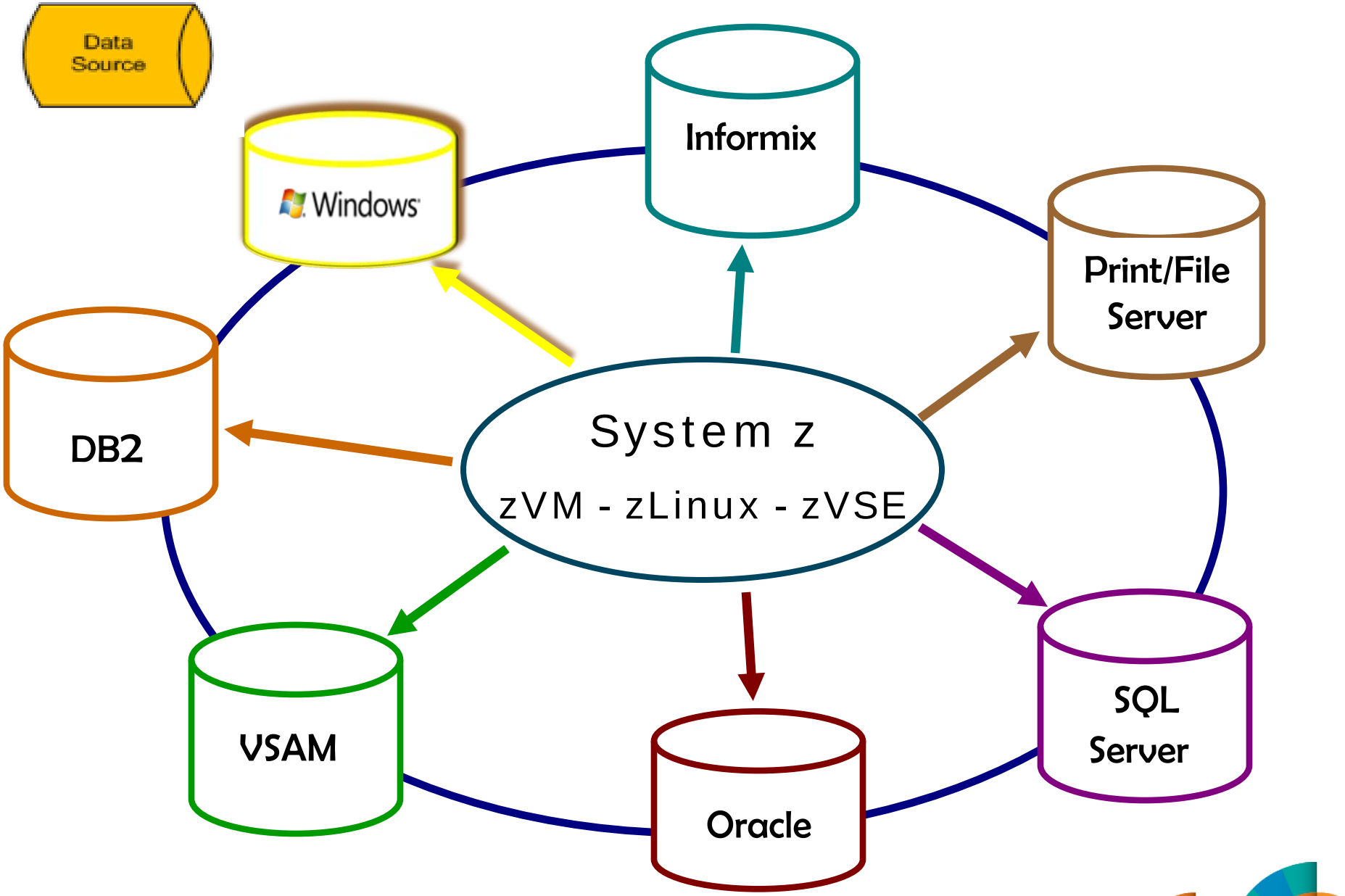
Simple in the beginning……..





Not so much now……..



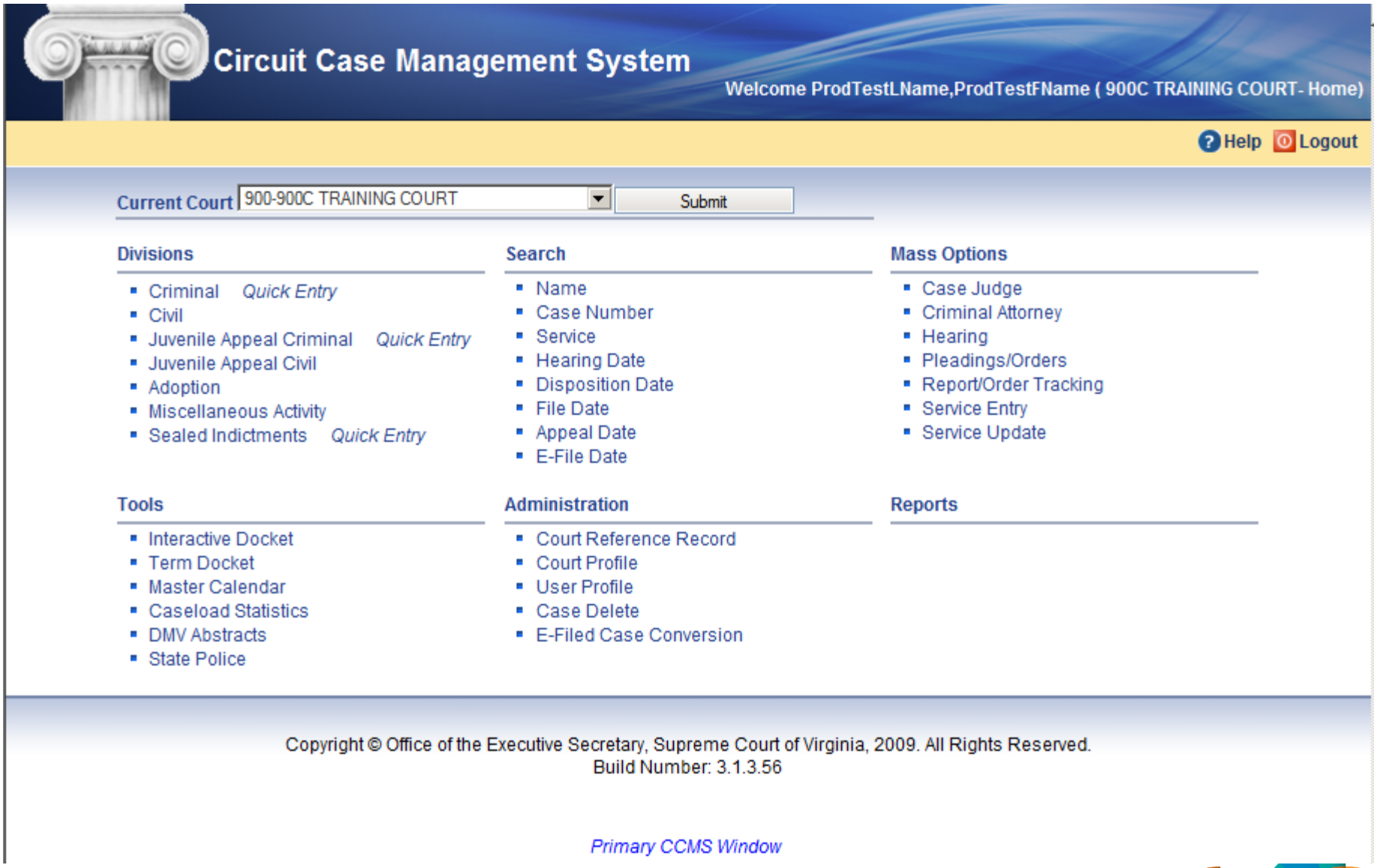

Data Source
Windows
Informix
Print/File Server
DB2
System z
zVM - zLinux - zVSE
VSAM
Oracle
SQL Server

From this……

```
U                        CRIMINAL CASE INQUIRY/UPDATE                    CCMSP122
                                                                          900CR
CASE CR00000169-02     FILED 081005   COMM BY REIN     LOC COMMONWEALTH OF VA
DC DATE 050199 CSE __________-00  TRAF (Y/N) N  DMV N  JUDGE JMB     CO-DEF N
                                        SSN           DOB    RACE SEX  ST  SN
DEF  HAGENS, CURTIS LYNCH            123 - 45 - 6789  02131950   W   M   C  ____
R-ADDR 101 E. CANAL ST.                 RICHMOND, VA 23219              JUR ___
M-ADDR ____________________________  ____________________________________
AKA ____________________________     AKA ____________________________________
OL 123456789              OL ST VA  TAG ________   CMV N   HAZMAT N   CDL _
DEF ATTY ____________________________  ATTY TYPE N  ADD ATTY IND N
COMMONWEALTH ATTY EDC    AGENCY _____
     CHARGE                    CODE SECTION    MD B FM C OFF DT ARRESTD DOC #
PROBATION VIOLATION            19.2-306        _  _ M  _ 081005  081005 _______
VCC _________ OTN _______________
BAIL: TYP ____   AMT ____________________  PD _  DT 000000  SURETY ______________
REMARKS ____________________________________________________________________

                              - HEARINGS -      JR
NBR   DATE    TIME   TYPE    DURATION      JUDG  CTRM  PLEA  J  RSLT
01    081505  0900AM SC    __M  __H  __D   JMB   _____   __   _  _____
02    070108  0900AM SENR  __M  __H  __D   _____ _____   __   N  SENT
  R=DIVISION MENU                              PRODUCE SUMMARY SHEET _
  N=NEXT CASE      U=CASE INQ/UPD              E=CASE ENTRY       S=HEAR SEARCH
  X=NAME INDEX     H=H/D INQ/UPD   K=CD CITE   D=DISPLAY PREVIOUS PERSONAL DATA
```

To this……


Circuit Case Management System
Welcome ProdTestLName,ProdTestFName (900C TRAINING COURT- Home)
Help
Logout
Current Court
900-900C TRAINING COURT
Submit
Divisions
Criminal Quick Entry
Civil
Juvenile Appeal Criminal Quick Entry
Juvenile Appeal Civil
Adoption
Miscellaneous Activity
Sealed Indictments Quick Entry
Search
Name
Case Number
Service
Hearing Date
Disposition Date
File Date
Appeal Date
E-File Date
Mass Options
Case Judge
Criminal Attorney
Hearing
Pleadings/Orders
Report/Order Tracking
Service Entry
Service Update
Tools
Interactive Docket
Term Docket
Master Calendar
Caseload Statistics
DMV Abstracts
State Police
Administration
Court Reference Record
Court Profile
User Profile
Case Delete
E-Filed Case Conversion
Reports
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Build Number: 3.1.3.56
Primary CCMS Window

Circuit Case Management System

Welcome ProdTestLName,ProdTestFName (900C TRAINING COURT- Search)

Divisions | Search | Mass Options | Tools | Administration | Reports

Home | Help | Logout

* Required field

Search

* Search Type: Name * Division: Civil Cases: Active Inactive Both

Name: TEST

Syntax: lastname, firstname **Example:** Smith, John
Syntax: partial_lastname **Example:** Smi

Search

Criminal | Civil | Juvenile Appeal Criminal | Juvenile Appeal Civil | Adoption | Miscellaneous | Sealed Indictments

Case #	Party	Name	Name	Judgment	Concluded By
CL10000006-00	D	TEST, DEFENDANT	TEST, PALMER	---	---
CL10000014-00	P	TEST, ONE	JESUS, RAUL	---	---
CL10000006-00	P	TEST, PALMER	TEST, DEFENDANT	---	---
CL10000017-00	P	TEST, TEST	SMITH, R	---	---
CL11000013-00	P	TEST, TEST	ME, JO	---	---
CL12000065-00	D	TEST, TESTING	TESTING, TEST	---	---
CL12000066-00	D	TESTING, SMOKE	SMOKE, TESTING	---	---
CL12000065-00	P	TESTING, TEST	TEST, TESTING	---	---
CL12000070-00	P	TESTING, TEST	BOND, JAMES	---	---
CL12000033-00	D	THE BEST PLUG	GRIMSTAD, LUCIUS	O	DIS

C HD S PO RO CS Other Options: Please select one value P N

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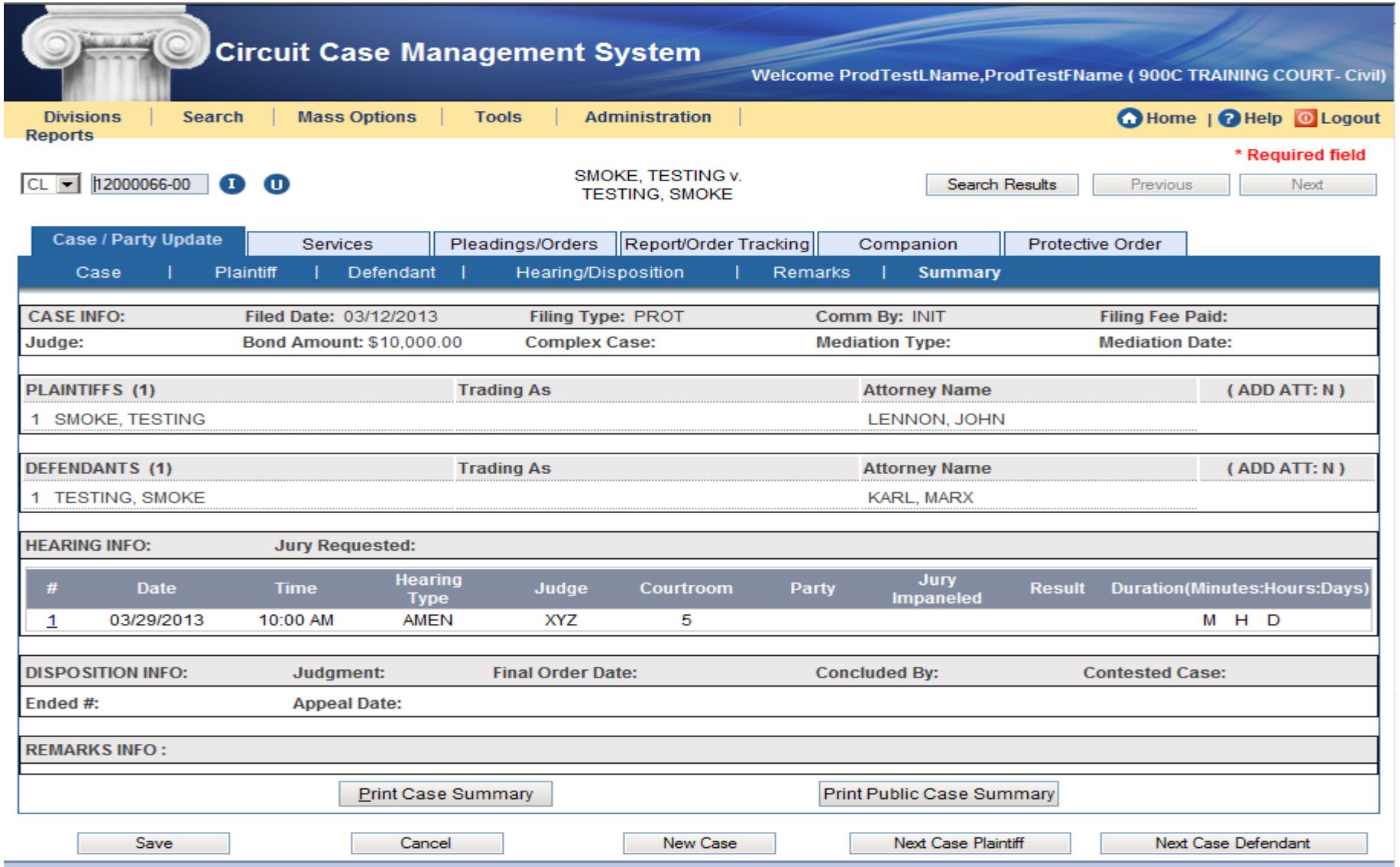
Build Number: 3.1.3.56



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Build Number: 3.1.3.56

Challenges then, now and beyond……..

- Various versions of WebSphere, DB2, z/VM, z/Linux, zVSE etc etc.
- Maintaining consistencies with base code, updates and patches (internal and external)
- Supporting several single node and complex clusters through project lifecycles
- User demand for more complex application integration (like eFiling)
- Continued requests to multiply, thrive, flourish, boom, increase, bloom, burgeon, grow, mushroom…….
- zVM/zVSE environment support structure is sound…….

How are we handling the continuing Linux Proliferation challenge?

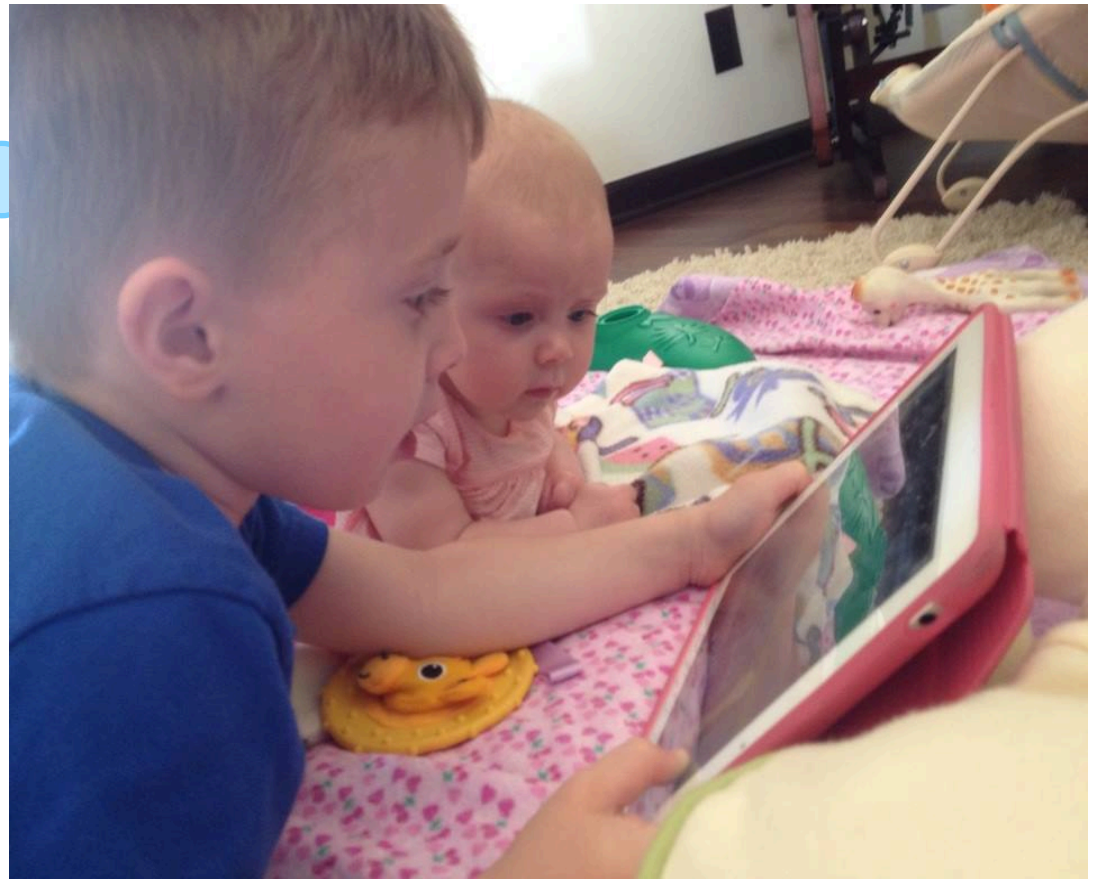
Application Challenges

- Legislative changes required
- Political climate
- Interfaces with other applications and agencies
- Payment processing (existing and future opportunities)
- Response time for requests to update environments (including desktop apps)
- Development silos
- Legacy-centric full-time staff versus contract java developers
- Responding to User change requests
  (enhancements, defects, BYOD, Data access, etc)

System Platform Challenges

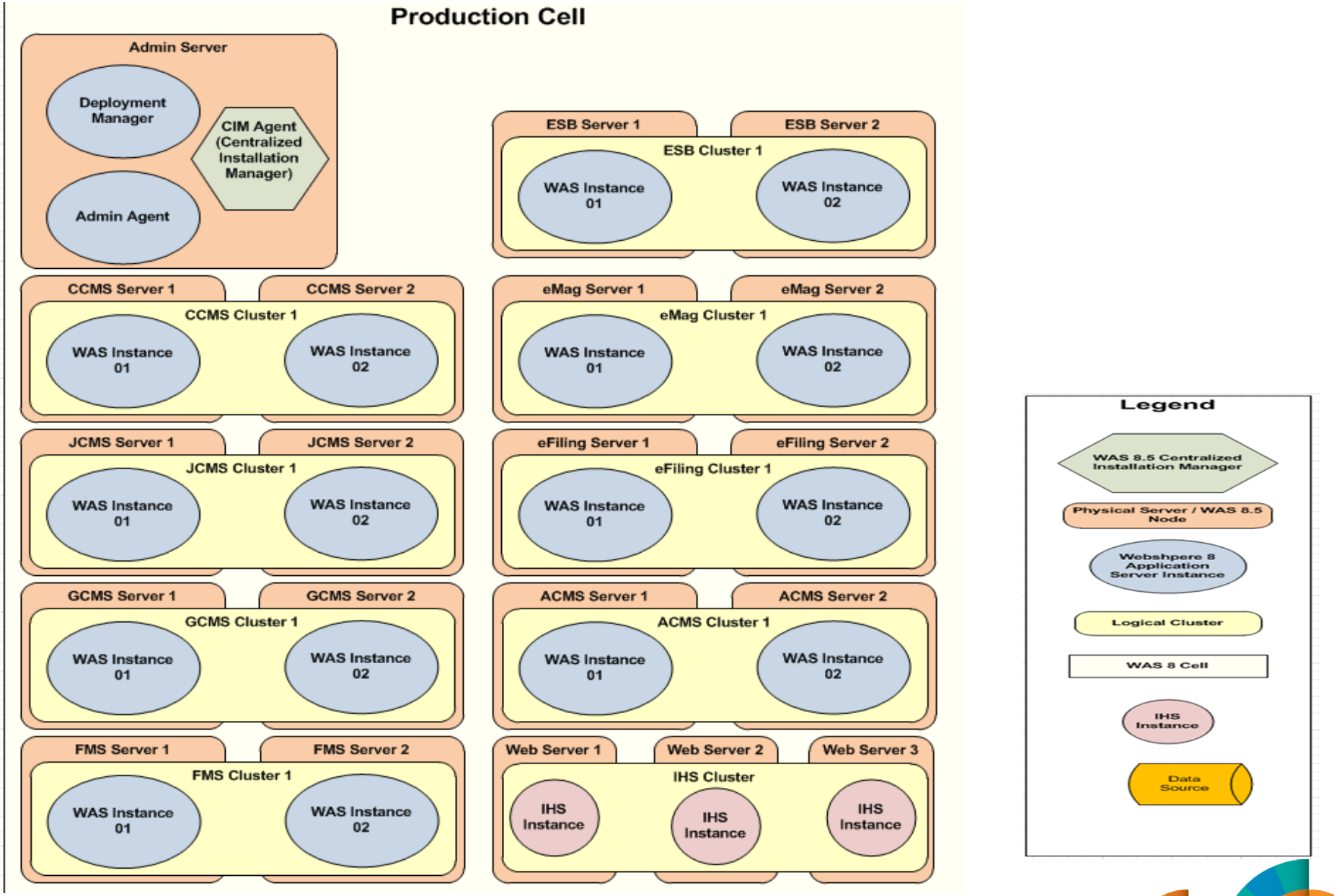
- Hardware limits versus growth (and cost)
- Maintaining expertise i.e. Linux admins, VM/VSE System Programmers, application programmers, etc.
- Developing expertise in project management (Top down)
- Continuity between platforms and environments especially during hardware or software migrations
- Full regression testing requirements to support browser layers
- We continue to work on organized planning and communication…….

Planning and Coordination Disciplines

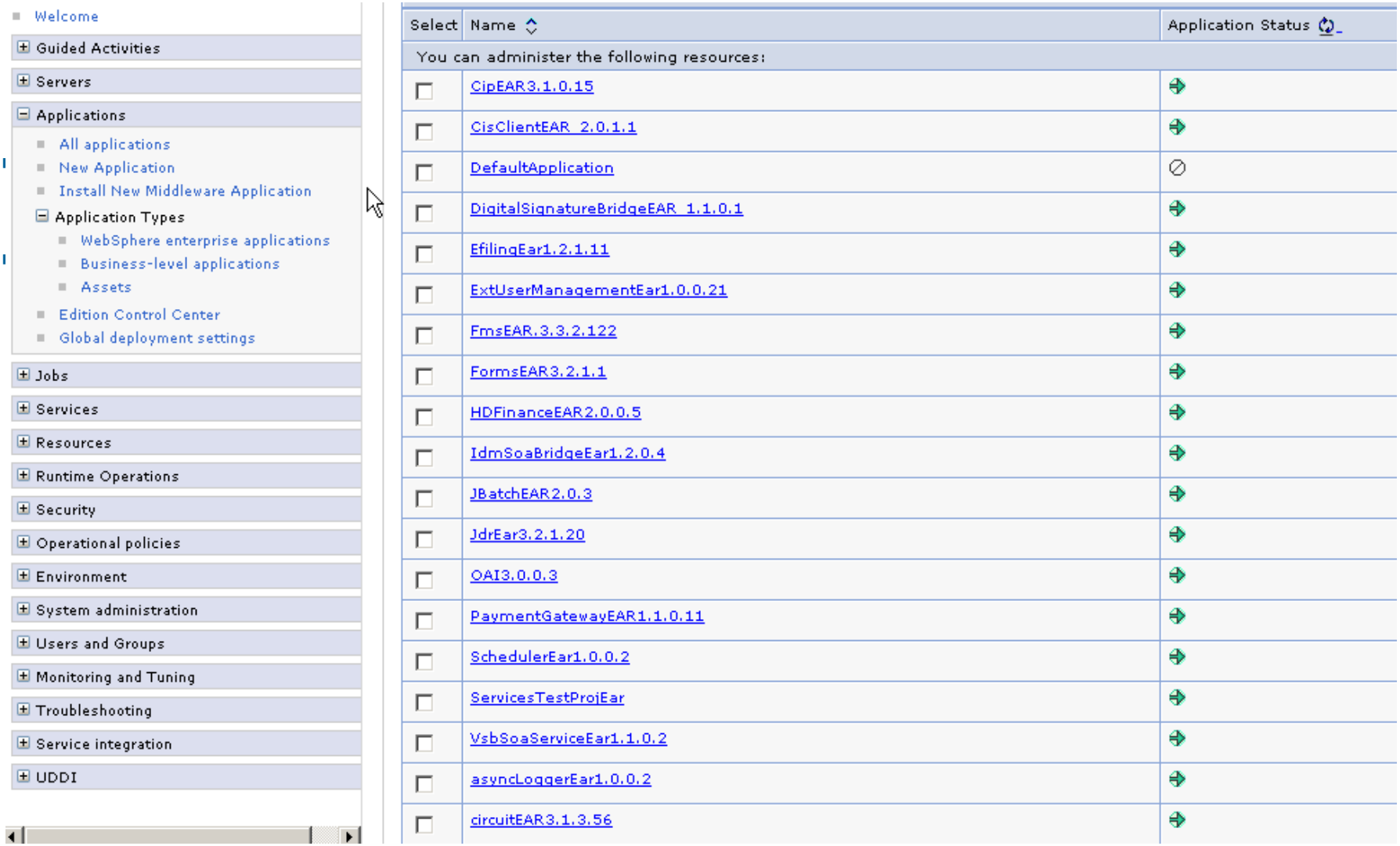


Doing more with less…….

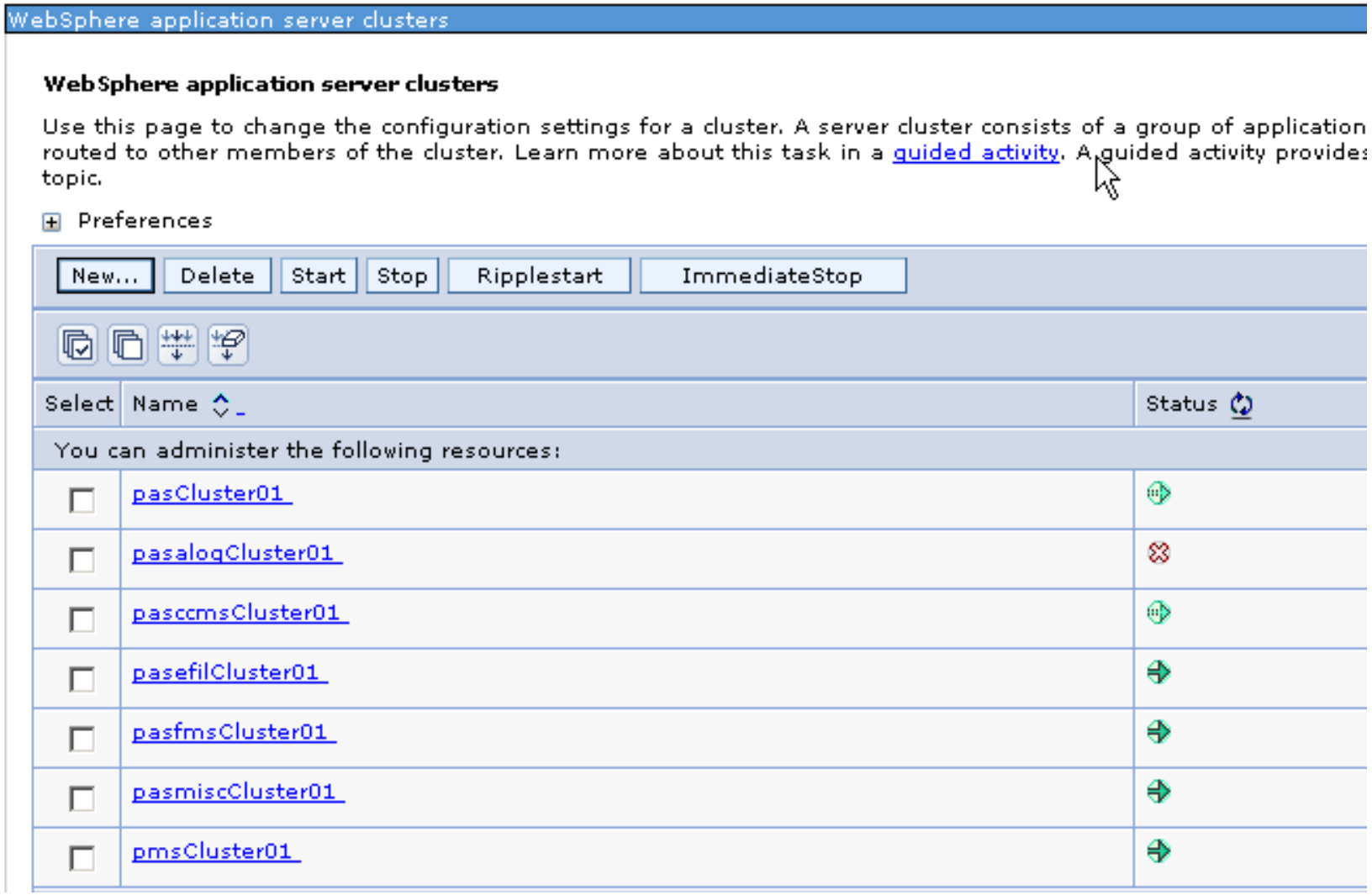
- Certified ‘clones’ for ND, Application and Apache(web) servers
  ‘*if you always do what you always did,*
  you will always get what you always got….’
- Utilize jython scripting for standard customization of clusters, datasets and WebSphere settings
- TADDM assists with change awareness and documentation
- Solid backup and recovery infrastructure using Hidro and TSM
- Building on Project Management Office (PMO)
- Rational Software Architect for WebSphere
- Rational Application Developer
  – Utilizing TortoiseSVN as a code repository
- Maximizing benefit from Performance Monitor (Velocity)
- Leverage JXBrowser technology to eliminate redundant browser compatibility issues


Production Cell
Admin Server
Deployment Manager
CIM Agent (Centralized Installation Manager)
Admin Agent
ESB Server 1
ESB Server 2
ESB Cluster 1
WAS Instance 01
WAS Instance 02
CCMS Server 1
CCMS Server 2
CCMS Cluster 1
WAS Instance 01
WAS Instance 02
eMag Server 1
eMag Server 2
eMag Cluster 1
WAS Instance 01
WAS Instance 02
JCMS Server 1
JCMS Server 2
JCMS Cluster 1
WAS Instance 01
WAS Instance 02
eFiling Server 1
eFiling Server 2
eFiling Cluster 1
WAS Instance 01
WAS Instance 02
GCMS Server 1
GCMS Server 2
GCMS Cluster 1
WAS Instance 01
WAS Instance 02
ACMS Server 1
ACMS Server 2
ACMS Cluster 1
WAS Instance 01
WAS Instance 02
FMS Server 1
FMS Server 2
FMS Cluster 1
WAS Instance 01
WAS Instance 02
Web Server 1
Web Server 2
Web Server 3
IHS Cluster
IHS Instance
IHS Instance
IHS Instance
Legend
WAS 8.5 Centralized Installation Manager
Physical Server / WAS 8.5 Node
Webshpere 8 Application Server Instance
Logical Cluster
WAS 8 Cell
IHS Instance
Data Source

WebSphere Application Server Network Deployment



WebSphere Application Clusters –



WebSphere Application Servers –

Flexibility in controlling nodes, run weights, start up priorities etc

Application servers

Application servers

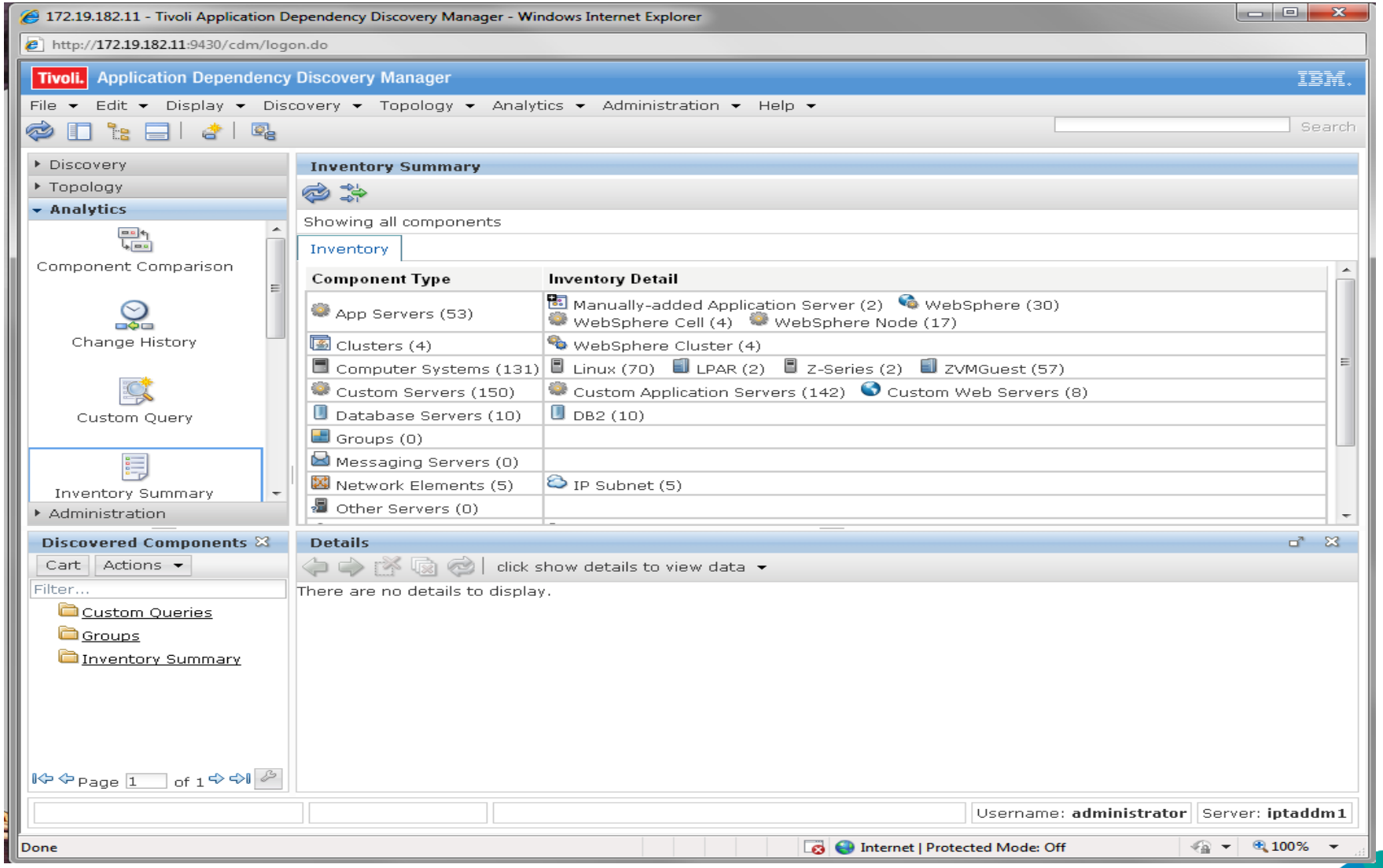
Use this page to view a list of the application servers in your environment and the status of each of these servers. You can also use this page to change the status application server.

Preferences

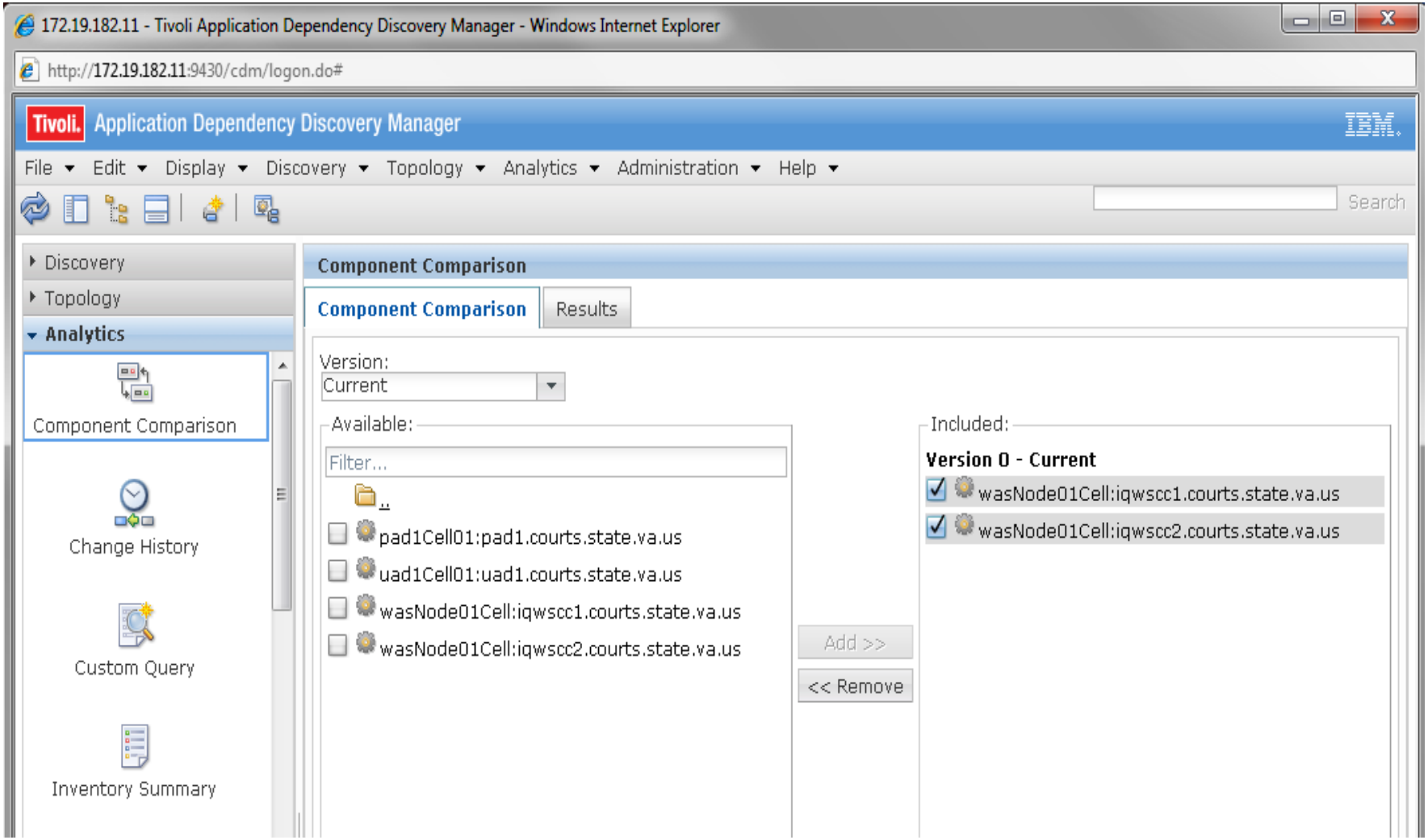
New... | Delete | Templates... | Start | Stop | Restart | ImmediateStop | Terminate

Select	Name	Node	Host Name	Version	Cluster Name	Status
You can administer the following resources:						
☐	pasServer01	pas1Node01	pasjcms1	ND 8.5.0.0	pasCluster01	▶
☐	pasServer02	pas2Node01	pasjcms2	ND 8.5.0.0	pasCluster01	?
☐	pasServer03	pasjcms3Node01	pasjcms3	ND 8.5.0.0	pasCluster01	▶
☐	pasalogServer01	pasalog1Node01	pasalog1	ND 8.5.0.0	pasalogCluster01	▶
☐	pasalogServer02	pasalog2Node01	pasalog2	ND 8.5.0.0	pasalogCluster01	?
☐	pasccmsServer01	pasccms1Node01	pasccms1	ND 8.5.0.0	pasccmsCluster01	▶
☐	pasccmsServer02	pasccms2Node01	pasccms2	ND 8.5.0.0	pasccmsCluster01	?
☐	pasccmsServer03	pasccms3Node01	pasccms3	ND 8.5.0.0	pasccmsCluster01	▶
☐	pascip1	pascip1Node01	pascip1	ND 8.5.0.0		▶
☐	pasefilServer01	pasefil1Node01	pasefil1	ND 8.5.0.0	pasefilCluster01	▶
☐	pasefilServer02	pasefil2Node01	pasefil2	ND 8.5.0.0	pasefilCluster01	▶

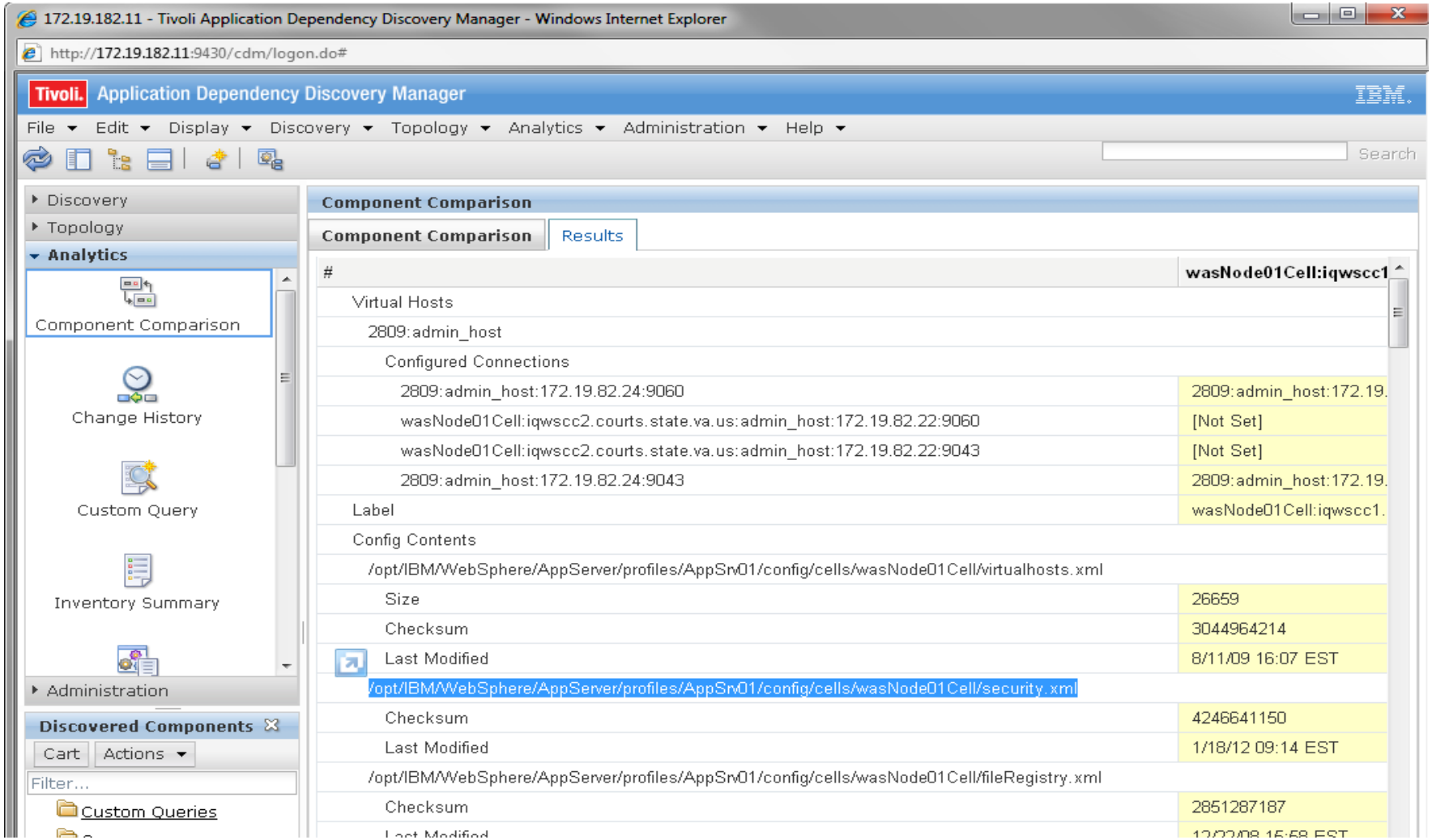
Tivoli Application Dependency Discovery Manager (TADDM)



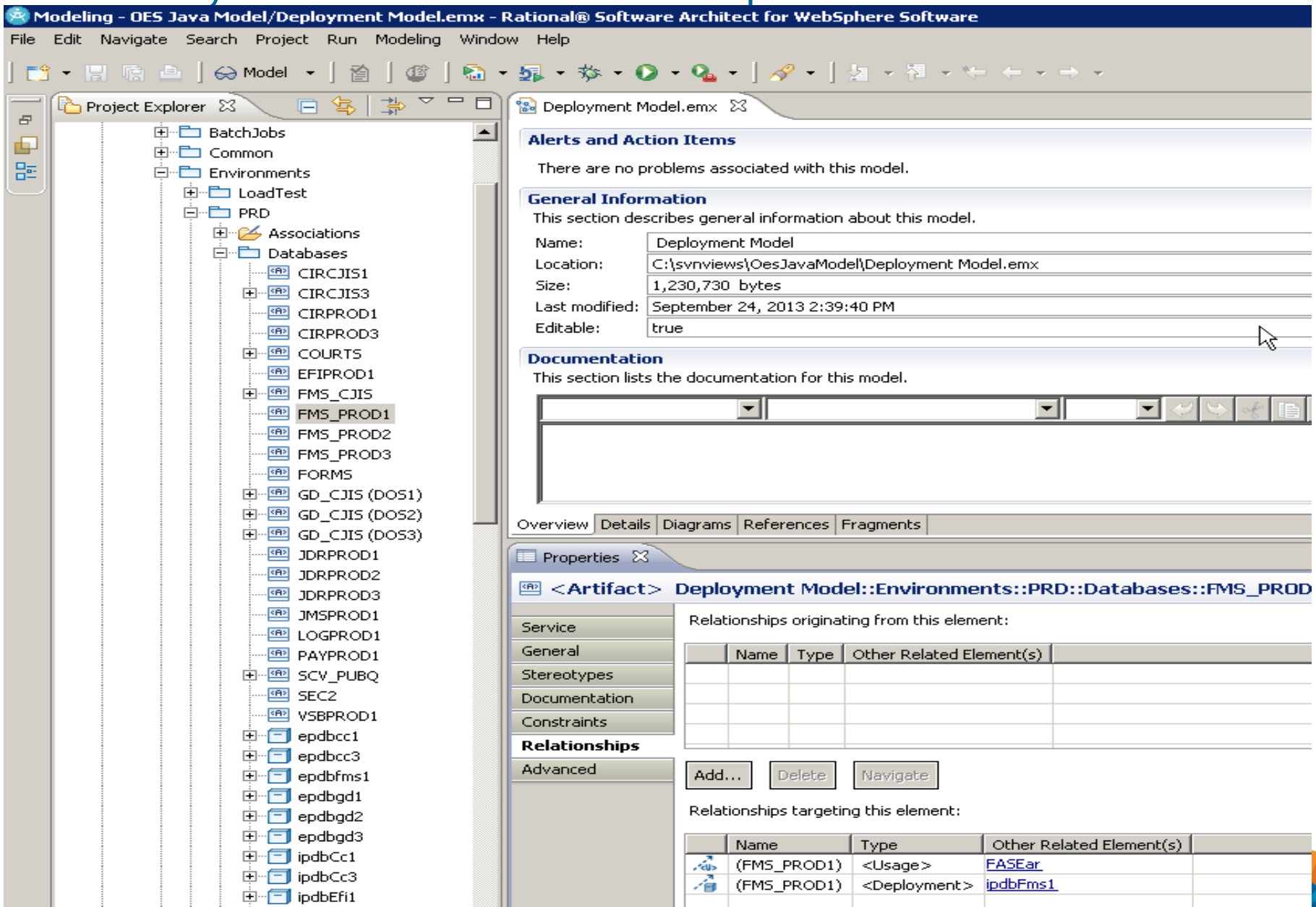
TADDM - WebSphere Component Comparison



TADDM – Discover run against the security.xml file from one WebSphere App Server to another…



Rational System Architecture for WebSphere



Applications running in Linux on System z
play very nice with others……

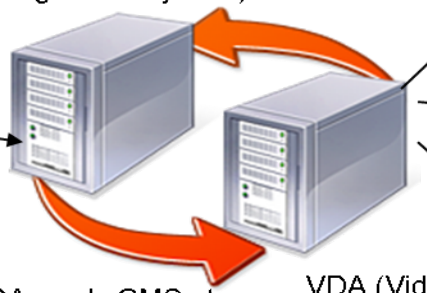
Some examples of current System z applications
running in concert with other environments…….

Application Integration using zLinux and System z

Overview of Video Docketing Application (VDA)

1. Clerk adds cases to CMS

CMS (Case Management System)



VDA (Video Docketing Application)

2. VDA reads CMS at start up each day. Any new cases added to CMS are updated in the VDA by timed refreshes
.

3. Lobby monitors display all cases scheduled. Each monitor shows a portion of the alphabet

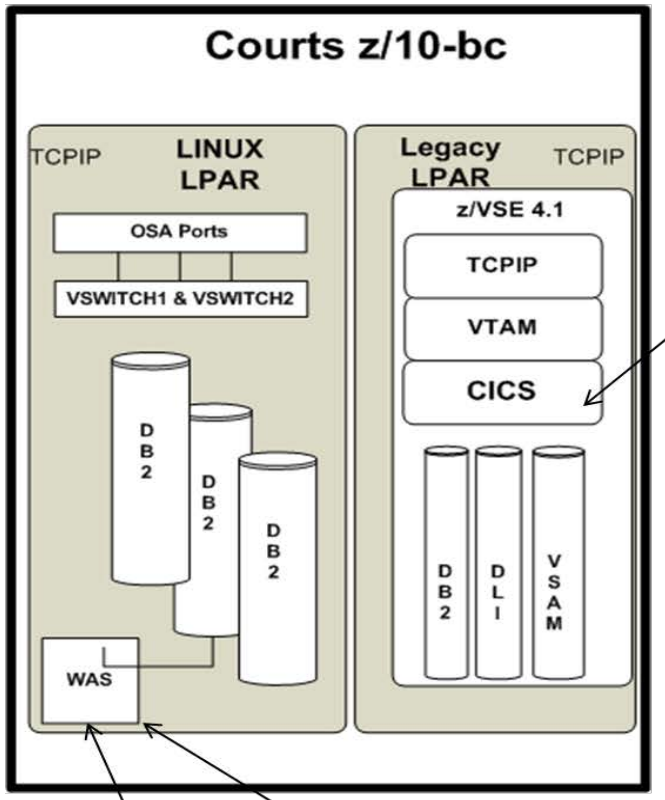
4. Monitors outside each courtroom display only those cases for that courtroom

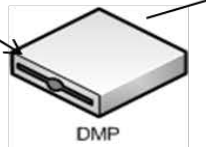
5. Monitor in attorney waiting room displays all cases in defendant order

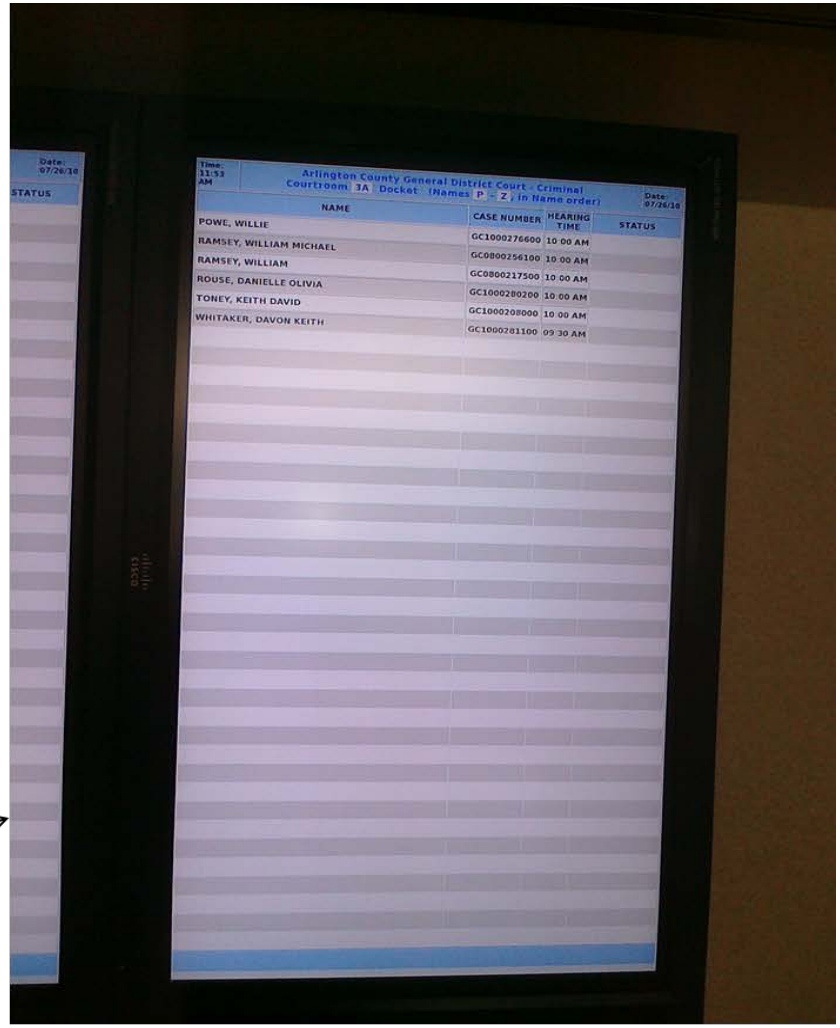
6. As clerks in the courtroom update case status on VDA (To be called, Report Now, Concluded, etc.), monitors reflect status

Video Docketing Application –

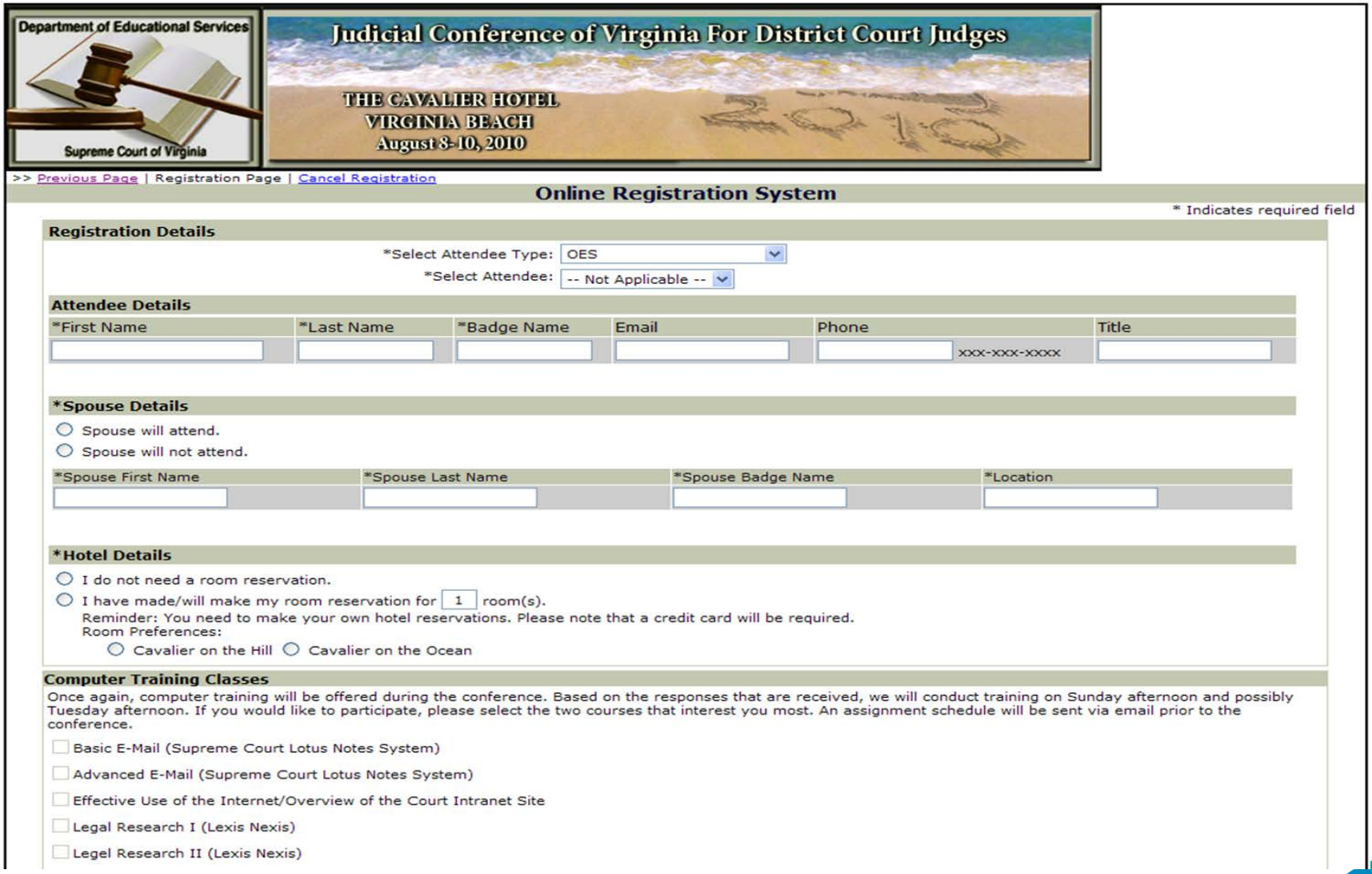
Video Docket –



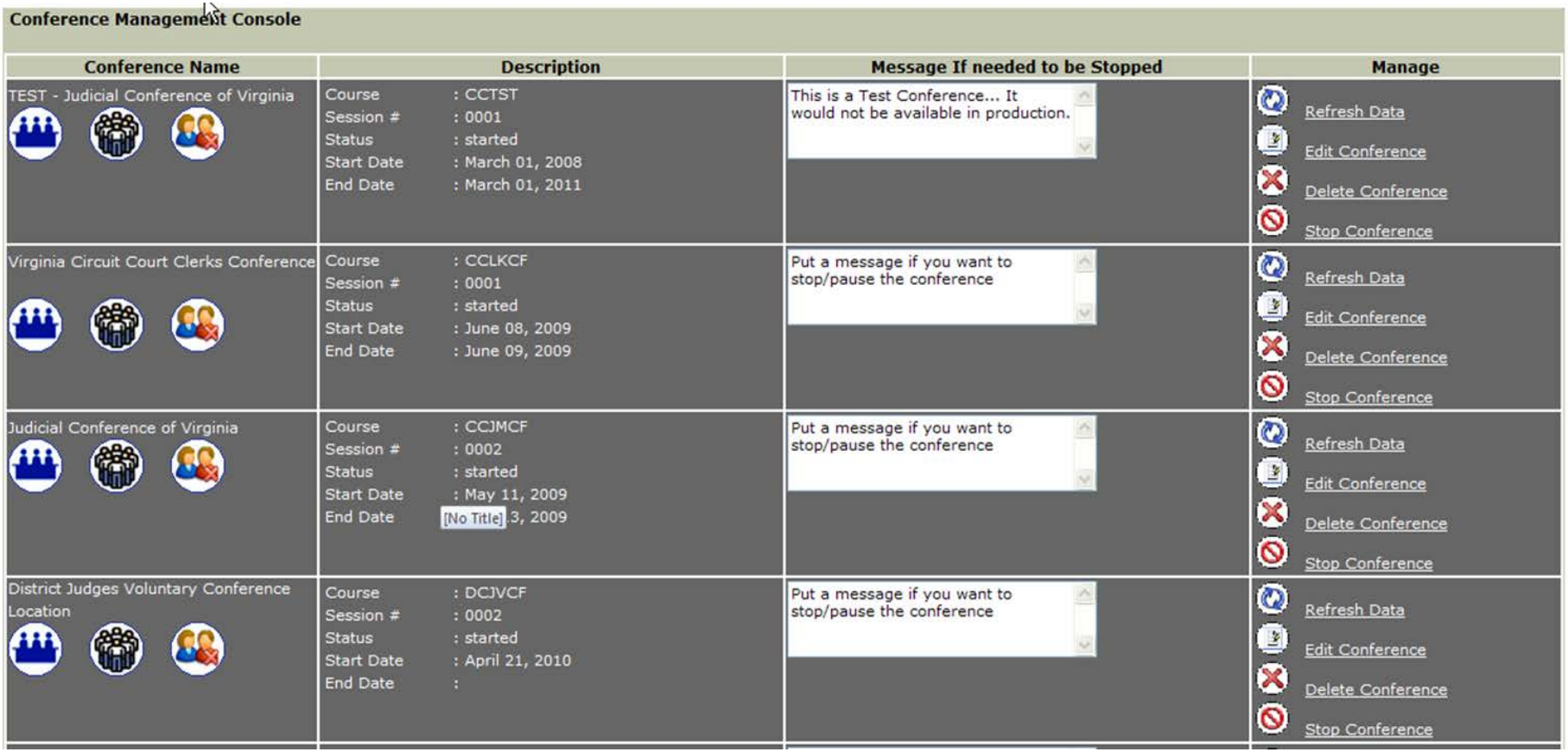




Judicial Conference Online Registration System



WebSphere application (System z) accessing Oracle database (running on HP) with interaction with Active Directory running in a Windows Server environment



Human Resources eLeave Application

What's Next?

- Continue to exploit WebSphere 8.5 in clustering environment\
- Migrate DB2 databases to latest supported version (10.x)
- Complete zVSE 5.2 migration
- Continue the eFiling implementation with added feature and functionality
- Bring General District and Financial applications online for user checkout and eventual production deployment
- Expand use of Message Broker/ Service Bus
  - Expand BYOD services for all application stacks
  - Rebuild portal services for internal and service unit integrations
- Continue to learn and share from peers (like you!) in an effort to provide the Commonwealth of Virginia the best possible Judicial system available

In conclusion

- Maximize the application products purchased
- Maximize the support offered by your software maintenance arrangements
- Take advantage of the social environments i.e. listservs, linkedin groups etc
- Develop and enforce standards relative to provisioning, change control, implementation etc.
- Don’t be afraid to try…….

Questions, comments, suggestions……complaints ?????

Thank you for allowing me to share the SCV's successful exploits of z/VM, z/Linux and z/VSE

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