

JBoss innovation
AWARD WINNER
2006

JBoss World
LAS VEGAS
2006

Justice Served: Business Case

No-Migraine Migration Using JBoss AS

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Introduction

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- Prime Sponsor and ICJIS Project Director

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Business Presentation


High Level

- E-Government
 - ✓ Problems
 - ✓ Solutions
 - ✓ Architecture (and with open source)
- ICJIS
 - ✓ Overview, timeline, business case
 - ✓ Legacy environment
 - ✓ Key challenges
 - ✓ Business benefits
- Why we chose JBoss ☺

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E-Government

California Problem Overview

- Fewer Resources (staff and material)
 - ✓ Y2K dotcom crash: "Bubble" budgets
 - ✓ Unreliable property tax revenues
- More Demand for Services 
 - ✓ California pop. growth rate is ~1.5%/yr
 - ✓ County population increasing 4-5%/yr
 - ✓ 37+ million, ~560K/yr increase recently
http://www.lao.ca.gov/2000/calfacts/2000_calfacts_demographics.html

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E-Government

California Problem Overview

- Aging IT Infrastructure
 - ✓ Much big iron in counties, municipalities
 - ✓ Primitive PC LANs, stovepipe apps
- E-Government: cultural dissonance
 - ✓ Profound shift from past practice
 - ✓ E-Commerce isn't that old
 - ✓ "Cross-the-counter" mindset
 - ✓ Little incentive to change

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E-Government

Solutions

- External enterprise teams
 - ✓ Experience injection
 - ✓ Architectural blueprint for new systems
 - ✓ Private sector best practices
- App automation
 - ✓ Workflow, EDM, automated reporting in the back office
 - ✓ Self-service public facing apps

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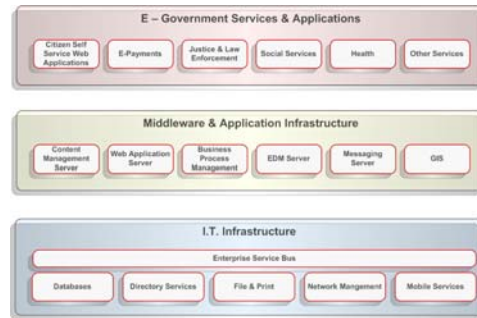
E-Government Solutions

- Modern architecture
 - ✓ Web apps, leading enterprise patterns
 - ✓ JBoss AS and JEE platform
 - ✓ Red Hat Enterprise Linux
 - ✓ Commodity hardware with redundancy
 - ✓ Open source leverage
- Incremental E-Government
 - ✓ Phased Introduction of Key Apps
 - ✓ Public-facing pilots

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E-Government Architecture

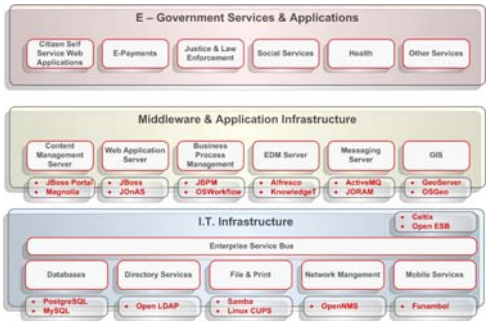


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E-Government

This is Your Architecture on Open Source



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ICJIS

Overview

- Delivers justice info to:
 - ✓ 20+ departments and agencies
 - ✓ Geographically diverse locations
 - ✓ Local, state, and federal entities
- Interfaces to leading vendor systems:
 - ✓ Mugshot
 - ✓ Fingerprint
 - ✓ Computer-aided dispatch (CAD)

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ICJIS

Overview

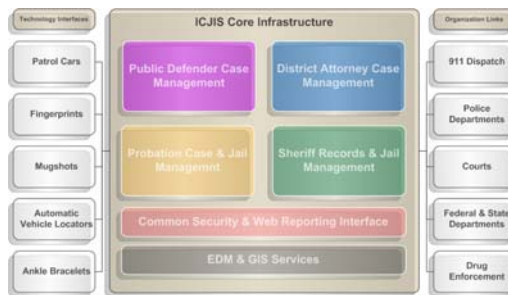
- Accessible anywhere (subject to firewall and security controls)
- Mission critical for:
 - ✓ Major County justice departments
 - ✓ 9 municipal police agencies
- Common justice data repository
- Enhances justice business processes

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ICJIS

System Overview



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ICJIS Timeline

Jun 2002	Project approved by Board
Jun 2002	MOU approved by agencies
Jul-Dec 2002	Requirements, Use Cases, Joint Application Design
Nov 2002	Data standards defined
Dec 2002	High-level architecture defined
Jan-Oct 2003	Major module and subsystem development
Nov-Dec 2003	System integration testing and qualification
Jan 2004	ICJIS.DA in production
Feb 2004	ICJIS.SD in production
Apr 2004	mainframe retired
Jul 2005	ICJIS.PD in production
3Q 2006	ICJIS.PB to production

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ICJIS

Business Case

- Eliminate Mainframe Costs
- Reduce Support Costs
- Fulfill CIO's open source strategic direction
- Deploy modular, well structured system with potential for long service life
- Implement open interfaces to support external COTS technologies



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ICJIS

Business Case

- Integrate data between departments and reduce redundant data entry
- Operate on a commodity, standard IT infrastructure
- Support Federal and State IT architectures, standards
- Standardizes interfaces, user functions to minimize training

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Legacy Environment

How Bad Was It?

- Sheriff and DA apps were:
 - ✓ mainframe, COBOL, terminal-based
- Public Defender:
 - ✓ Old PC RBASE app with only a few screens
- Probation: PC client-server app
 - ✓ Front end developed in Access
 - ✓ Commercial RDBMS backend
- Minimal integration

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Legacy Environment

How Bad Was It?

- No common data standards
- High cost, low performance
- Limited maintenance options
- Disconnect between mainframe programmers and departments

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Key Challenges


- First major enterprise web apps
- First joint public/private sector team
- Complex data migration/conversion
- Define a completely new architecture (and get it right)
- Tight timeline and budget

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ICJIS

Key Challenges (Last, but **NOT Least)**




- Transition seamlessly in 24/7 mission-critical environment:
 - ✓ All for naught if this failed
 - ✓ Incremental, iterative development model helped immensely
 - ✓ Active user involvement was critical
 - ✓ Data migration: practice makes perfect
 - ✓ Formal case management process to gate go-live

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ICJIS

Business Benefits


- Dramatically reduces support effort and cost; 50%+ reduction
- Software licensing reduced from \$600K to \$40K annually
- Commodity hardware:
 - ✓ \$60K v. \$4 million for replaced mainframe
 - ✓ Incremental expansion
- Better software reuse (30%+ shared across ICJIS apps)
- High uptime (99.9%+)

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ICJIS

Business Benefits


- Streamlined justice business processes
- Provide software patches to 1500 users in seconds
- Wider system access (office, external agencies, patrol car)
- More departmental involvement in own apps
- Enhanced search
- Enhanced security services
 - ✓ Departments control own configurations
 - ✓ Enhanced session manager
 - ✓ Extensive auditing
 - ✓ Web-based admin

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ICJIS

Business Benefits


- Better data sharing across departments
- Eliminated mainframe costs
- Reduced support costs
- Delivered on CIO's strategic direction
- Modern, maintainable, modular architecture
- Viable evolutionary path with expected long service life
- Low cost commodity hardware infrastructure
- Open source leverage!


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JBoss AS

Why We Chose It...and Rely Upon It.

- Excellent standards compliance
- Excellent features
- Met architectural requirements
- Met performance requirements
- Responsive support available
- Good documentation
- Matched up well v. \$\$\$ app servers
- Key developers with positive JBoss history
- Performed well during development
- Met or exceeded IT infrastructure requirements
 - ✓ Scalability, 24/7 reliability



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Justice Served: Techwise

No-Migraine Migration Using JBoss AS

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Introduction

- Allen Gates
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- Technical Lead on ICJIS Project
- See bio (or lets talk over a Sam Adams ;))
http://www.jbossworld.com/agenda_tuesday_schedule.htm#migration

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Tech Presentation

High Level

- Criminal justice systems overview
- Migration challenges
- Tool stack
- Development overview
- Architectural overview
- Key core subsystems
- Technical benefits
- Future

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Integrated Criminal Justice

Records Management: Sheriff/Police

- Party Search / Management
- Crime Incident Reporting
- Warrants
- Registrants (Sex, Arson, Narcotics)
- Restraining Orders
- Investigations
- Crime Analysis (including GIS)
- ID Corrections
- Interfaces, e.g. 911 Dispatch, Mobile Data
- Reports, e.g. incident reports, state stats

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Integrated Criminal Justice

Jail Management: Sheriff/Police

- Booking
 - ✓ Positive Identification, e.g. via Party Search, AFIS
 - ✓ Inmate Property
- Inmate Location (facility, cell, moves)
- Facility and Inmate Accounting
- Inmate Classification and Medical
- Inmate Holds
- Jail Alternative Programs
- Court prep
- Interfaces, e.g. mugshot, fingerprint
- Reports, e.g. headcount, shift change

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Integrated Criminal Justice

Case Management: DA/Public Defender

- Case Intake
- Charging
 - ✓ Priors and enhancements
- Event History and Scheduling
 - ✓ Hearing and non-hearing
- Subpoenas
- Case Status and Outcomes
- Interfaces, e.g. Court, DA/PD
- Conflicts Checks
- Reports, case by type, prosecution stats

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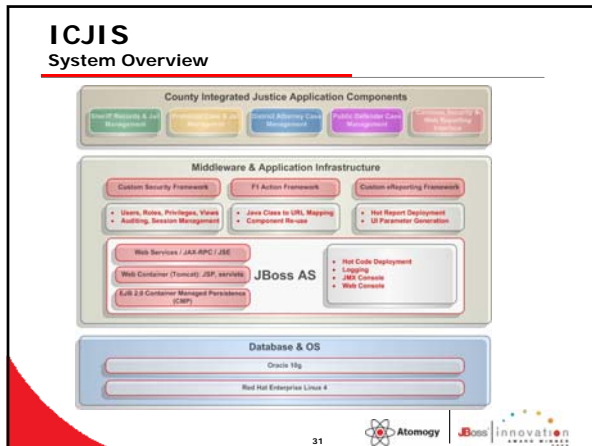
Integrated Criminal Justice

Probation

- Referrals
- Juvenile Hall
 - ✓ Most booking and custodial functions
- Intake
- Investigations
- Supervision
- Placement
- Interfaces, e.g. mugshot, fingerprints
- Reports, e.g. caseload, probationer status

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- ## System Migration Data Factors
- Legacy logical, physical data models
 - ✓ Inadequate model rules (naming, typing)
 - ✓ Missing abstractions (new entities needed)
 - ✓ No database-enforced referential integrity
 - ✓ Excess de-normalization
 - ✓ Inadequate doc (history, assumptions)
 - Data
 - ✓ Unstructured / freeform data
 - ✓ Required normalization to DOJ standards
 - ✓ RI anomalies
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- ## System Migration Cultural Factors
- Public/private partnership and distributed core/departement development **vs.** central IT
 - Formal version control and build processes **vs.** ad hoc
 - Incremental, iterative, architecture-centric **vs.** waterfall, monolithic accretion
 - Formal case/priority management **vs.** ad hoc
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System Migration Crossing the Language Chasm

1	2	Java	21.314%	+3.82%	A	
2	1	C	17.490%	-0.81%	A	
3	4	C++	16.939%	+1.01%	A	
4	5	PHP	16.220%	+1.02%	A	
5	6	Visual Basic	9.584%	+1.92%	A	
6	7	Perl	6.000%	-4.52%	A	
7	7	SQL	5.271%	+0.50%	A	
8	9	Python	3.942%	+0.54%	A	
9	11	JavaScript	2.191%	+0.75%	A	
10	9	Delphi/Kylix	1.765%	-0.41%	A	
11	12	SAS	1.479%	+0.24%	A	
12	10	PL/SQL	1.011%	-0.44%	A	
13	13	29	Visual FoxPro	1.001%	+0.72%	A
14	15	14	Lotus/Dotame	0.892%	+0.08%	A
15	14	COBOL	0.664%	-0.32%	B	
16	25	9	ColdFusion	0.589%	+0.14%	B
17	20	11	VB.NET	0.500%	+0.27%	B
18	18	15	Ada	0.489%	-0.19%	B
19	27	8	D	0.479%	+0.11%	B
20	30	16	Ruby	0.456%	+0.14%	B

← ++Java.

← --COBOL.



TIOBE Programming Community Index, May 2006
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- ## Development Approach
- Pretty Good Agility (PGA)
 - ✓ Keep It (Fairly) Simple
 - ✓ Iterative, incremental, frequent delivery to users
 - ✓ XP Lite, e.g. no team-programming
 - ✓ Proven enterprise tools
 - Tight schedule precluded:
 - ✓ Cross-training Dept. Staff by osmosis
 - ✓ Major unrelated initiatives
 - ✓ Scope creep
 - Not a setting for skunkworks R&D
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- ## Project Tool Stack
- Eclipse 2.x, 3.x
 - ✓ Indispensable
 - ✓ Useful features too numerous to mention, but:
 - ✓ auto-completion, auto-imports, refactoring, cross-project search, references, occurrences in file,...
 - CVS (on RH Linux)
 - ✓ Old Reliable for distributed development
 - ✓ Chief lack: atomic commits
 - Tortoise CVS (<http://www.tortoisecvs.org>)
 - ✓ Excellence in simplicity
 - ✓ CSDiff a great add-on diff tool (<http://www.componentsoftware.com/Products/CSDiff/>)
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Project Tool Stack (cont.)

- Apache Ant 
 - ✓ Essential build and deploy tool
 - ✓ Must-have for PGA development
- ERwin® Data Modeler
- DBVisualizer (<http://www.minq.se/products/dbvis/>)
- Middlegen (<http://boss.bekk.no/boss/middlegen/>)


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Project Tool Stack (cont.)

- Red Hat Enterprise Linux 
 - ✓ cron
 - ✓ bash, .bashrc, alias
 - ✓ ssh, scp
 - ✓ iptables
 - ✓ vim
 - ✓ tar, bzip2
 - ✓ grep, find, sed, perl
 - ✓ lsof, ipconfig, netstat
 - ✓ xterm, cut, less, which
 - ✓ ad infinitum...Red Hat rocks for enterprise

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ICJIS

Open Source Leverage



- ✓ JBoss AS (clearly)
- ✓ Apache Tomcat
- ✓ Eclipse
- ✓ Quartz
- ✓ JDOM
- ✓ Jtds (JDBC driver for proprietary DB ;)
- ✓ Element Construction Set (ECS)
- ✓ Apache Axis and Jakarta Commons
- ✓ Middlegen and JAG
- ✓ numerous others...

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ICJIS

Engine Room

- Red Hat Enterprise Linux
 - ✓ 8 dual-CPU 2U servers (2/department)
- JBoss AS
 - ✓ 4 production instances
 - ✓ Numerous development and test instances
- Oracle 9i/10g

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Data Modeling

- Don't take legacy model as a given.
 - ✓ Accretion of past residue and kludges.
 - ✓ No DB RI? No way.
 - ✓ Quality data migration becomes critical.
 - ✓ Migrate early! Migrate often!
- Weak data model is like quicksand.
- Keep the model up to date.
- Use a formal tool.
(SQL DDL is not a tool ;)

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Presentation Tier

Overview

- Mainstream use of JSP, servlets
- Servlet controller per major module
- JSP per screen, but with reuse via:
 - ✓ Standard control group components
 - ✓ include directive (translation time)
 - ✓ jsp:include action (request time)
 - ✓ custom "taglets"

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Presentation Tier

F-One Web/Presentation Framework

- Custom, lightweight web framework developed by Atomogy
- Request-based, action and POJO-centric
- Simple, powerful, 80/20 rule
- Single controller servlet FOneDispatcher (mainly delegates to Dispatcher POJO)
- Page objects bound to URL's (web.xml, fone_config.xml)
- Actions registered with page objects (in Java)

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Persistence Tier

Overview

- JBoss EJB CMP. Verdict: Excellent. Strong.
 - ✓ Excellent scalability
 - ✓ Excellent reliability
- Used EJB 2.0 features:
 - ✓ Local interfaces were important factor
 - ✓ No Message Driven Beans, no Timers Service.
- Session beans: thumbs up
 - ✓ Relatively coarse-grained
 - ✓ Great vehicle for Session Façade
- Entity beans
 - ✓ When does happy hour start?
 - ✓ We prefer Hibernate.

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Data Tier

Notes and Lessons

- All Synthetic Keys, All the Time
 - ✓ Never leak PK's into business domain!
 - ✓ Many textbooks overemphasize natural and compound primary keys. Just don't.
- Recommend:
 - ✓ Synthetic keys unique per schema
 - Easier debugging
 - ✓ Make PK's Number(20) (big, > 64 bits)

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Application Reporting

Core Subsystem

- Reports implement common interface
- Standard tree/parameter pane UI
- Hot deploy new reports
- Integrated security
 - ✓ Report developer can access (but is never required) to access security
- Automatic auditing
- Consistent and effective

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Application Security

Core Subsystem

- Fine-grained
 - ✓ Protects screens, control groups, controls, and methods
- Dynamic
 - ✓ Hundreds or thousands of users
 - ✓ Many roles
 - ✓ App server restart not an option
- Flexible
- Administered by owners
- Detailed Auditing



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Application Security

Core Subsystem

- Custom session manager
 - ✓ Required: User-variable session timeouts
 - ✓ Longer timeouts, e.g.
 - 911 Dispatchers
 - Records staff in secure areas
 - ✓ Shorter timeouts, e.g.
 - New (probationary period) employees
 - Custodial facilities, e.g. jail, juvenile hall
 - External agencies



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ICJIS

Technical Benefits

- Independence of app architecture from IT infrastructure
- Applications highly scalable
- Supports modern design pattern and object-oriented best practices
- Highly stable and predictable
- Standards based
- Open source leverage
- High functionality, flexible development environment
- Meets needs of demanding 24/7 business

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Professional Open Justice Information SystemsSM PROJISTM Records & Jail Management System

Atomogy's PROJISTM Platform Includes:

- JBoss AS
 - Red Hat
 - EnterpriseDB
-
- Java EE
 - WebWork
 - Hibernate



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Thanks!
Enjoy JBoss World!



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