

## RUNCOM MOBILE'S END-TO-END MESSAGING SOLUTION (MMGS)

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#### What is MMGS?

- Instant Messaging (IM) gateway, connecting to public and private communities
- Email gateway, providing mobile email service





#### Introduction

- IXI Mobile founded in 2000 also doing business under the name of Runcom Mobile
- IXI Mobile develops the Ogo family of mobile devices optimized for messaging applications
- IXI provides end to end messaging solutions for smart phones







#### **A Bit Of History**

• Passed through several generations of devices



- Deployed worldwide with several communities
- Used to work with 3<sup>rd</sup> party messaging gateway providers





#### We want our own solution !

- Control service quality
- Control roadmap features
- Maximum visibility to the system status
- Ability to add unique optimizations for mobile networks
- Self hosting
- Own the IP
- Time to market
- Learn from past experience...
- Royalty free



### **High Level Requirements**

- Keep it simple!
- Huge capacity and throughput (100K's users)
- Scalable, Extendable
- Low spec machines (<3K\$)</li>
- Minimum data replication among clusters for best performance

- (Almost) Zero downtime
- No single point of failure
- Error recovery
- Transparent failovers
- Distributed architecture
- Security
- Log file writing (no DB)
- No Relational Database



#### **Technology and market survey**

- Reviewed several vendor offerings
- Reviewed several technologies
  - 'Standard' C/C++
  - Java based
  - Erlang



### And the winner is... Erlang

- Strengths of Erlang that helped with this decision
  - Native concurrency support
  - Native distributed architecture for scalability and redundancy
  - Reference products
  - Quick POC
  - Short time to market



### **Project steps and progress**

- Proof of concept Functional service after 2 months (!)
- System design, based on POC learnt knowledge
- 7 phases of major deliveries
  - Build → Test → Deploy
  - Each phase ended with a functional tested service
- Production within 10 months from kick off
  - Worlds first MSP3.0 certified GW
- Load testing, Load testing, Load testing ...
  - And still, what you don't test will fail on production ③



### **Architecture Approach – POC Conclusions**

- Focus on GW features
- 3 Tiers
  - Front-end, Router,
    Transport
  - High-Speed RPC System (eTunnel)
- Security
  - No access to core switching & session data
  - Limited access to transport nodes
  - One way firewalls

- Clustering
  - No single point of failure
  - Redundant components
  - In-memory replicated DB (minimal shared data)
  - Internal health system
  - Advanced failover
- Load Balancing
  - Hash based distribution
  - Consistent paths
  - Least connections
  - URL load balancing



#### **Outlined topology**





#### **System Architecture**





#### **Performance Benchmark Measures**

Setup

- Basic cluster built of 11 servers
  - Dual core, 2Gb RAM machines

Instant Messaging performance

- 150,000 Connected users
- 12,600 Messages per second
- 45,000,000 Messages an hour

System resources

• 50%-60% system utilization



#### What Made the Difference?

- High speed socket based RPC eTunnel
- Resource pools (eBalancer)
- Minimal data sharing
- Hash based distribution between layers makes consistent path through layers
- Integration with 3<sup>rd</sup> party load balancer (URL SLB, health)
- Reduce destructive DB operations, especially on replicated tables
- Forced GC
- Network interface pools
- No front end firewalls
- Internal health system integrated with topology manager
- Extensive SNMP MIBs
- Throttling Control concurrency



### **Satellite Systems**

- Authentication
  - Authentication, Authorization & Control over the service delivered
- Reporting
  - Nearly real-time usage reports aggregated to an hour cycle
- Operation and Maintanance
  - Stop / Start, Watch real-time alarms, configuration
  - Traceability and troubleshooting
  - Software update hot patch distribution and loading
  - Central log console
  - Central graphing system
- Real Time Monitoring Infrastructure, OS and App



#### **Authentication UI**

mobile	IXI Authentication Syste	em 1.2			
Logout	Devices				
Devices Devices Operators Operator Profiles	Operator Name All Operator Profile All	DeviceID  IMEI / MEID		IMSI Status All	
Services Service Profiles	1 2 3 4 5 6 7	ew Device    Import Devic	es Export Devices		
Services	Device ID	IMEI / MEID	IMSI Operator	Operator Profile	Status
Capabilities	1932139834	1932139834	IXI	IXI CDMA	Enabled 📝 🎬
	1932142712	1932142712	IXI	IXI CDMA	Enabled 📝 📓
	1932148656	1932148656	IXI	IXI CDMA	Enabled 📝 🗑
	1932154946	1932154946	IXI	IXI CDMA	Enabled 📝 🗑
	1932165993	1932165993	IXI	IXI CDMA	Enabled 🛛 📝 🗑
	1932175601	1932175601	IXI	IXI CDMA	Enabled 🍞 🗑
	1932178319	1932178319	IXI	IXI CDMA	Enabled 📝 🗑
	1932180409	1932180409	IXI	IXI CDMA	Enabled 📝 🗑
	1932181833	1932181833	IXI	IXI CDMA	Enabled 📝 🗑
	1932186197	1932186197	IXI	IXI CDMA	Enabled 📝 🗑
	1932187798	1932187798	IXI	IXI CDMA	Enabled 📝 🗑
	1932190692	1932190692	IXI	IXI CDMA	Enabled 📝 🗑
	1032100723	1032100723	IXI		Enabled 📝 🗐



#### **Reporting system UI**

mobile	М	MGS Reporting System 2.8						
Logout	Usag	je Reports						
Reports	Туре	Traffic Report 🗸 🗸	Start Date	2009-03-01	00:00 🗘	Granulari	ty None 💽	-
Device Logs	Servi	ice MSN-MAIL	End Date	2009-03-12	15:00 🗘	DeviceID		
System Monitor	Cust	omer All 🔽	File Format	XML 🔽				
Configuration				S	Show as Table	e Show	as Chart	Download
	ld	Date	Login	Logout	MsglN N	AsgOUT	SizelN	SizeOUT
	1	2009-03-01						
	2	2009-03-02						
	3	2009-03-03						
	4	2009-03-04						
	5	2009-03-05						
	6	2009-03-06						
	7	2009-03-07						
	8	2009-03-08						
	9	2009-03-09						
	10	2009-03-10						
	12	2008-03-11						
	12	2003-03-12						



#### **Operation & Management UI**



#### IXI Mobile Messaging Gateway 1.3.0.r4048

Monitoring Trace Configuration Software Update

Add New	Monito	Monitoring - All Nodes								
Show All	Status	Name	Туре	Release	Uptime	Memory	CPU	Control		
WV (FE)	✓ Online	xmpp4	xmpp	1.2.74.8	91 d, 22 h, 18 m	26.72 Mb (0.66%)	14.8% (#8)	» 🔳 🥝 🛃		
IMAP (FE)	< Online	хтрр3	xmpp	1.2.74.8	91 d, 22 h, 18 m	27.15 Mb (0.67%)	9.0% (#8)	» 🔳 🤣 🖉		
SMTP (FE) Routers	🗸 Online	xmpp2	xmpp	1.2.74.8	91 d, 22 h, 19 m	27.10 Mb (0.67%)	5.9% (#8)	» 🔳 🤣 🛃		
MSP (BE)	🗸 Online	xmpp1	xmpp	1.2.74.8	91 d, 22 h, 12 m	27.09 Mb (0.67%)	3.1% (#8)	» 🔳 🤣 🛃		
AIM (BE)	🗸 Online	xcode1	xcode	1.1.47.8	91 d, 20 h, 46 m	25.17 Mb (0.62%)	3.1% (#8)	» 🔳 🤣 🞽		
XMPP (BE) POP (BE)	🗸 Online	xcode2	xcode	1.1.47.8	91 d, 20 h, 48 m	35.90 Mb (0.89%)	7.0% (#8)	» 🔳 🤣 🛃		
IMAP (BE)	🗸 Online	xcode3	xcode	1.1.47.8	91 d, 21 h, 5 m	26.92 Mb (0.66%)	9.0% (#8)	» 🔳 🥝 🞽		
XCODE (BE)	🗸 Online	xcode4	xcode	1.1.47.8	91 d, 21 h, 5 m	26.72 Mb (0.66%)	14.8% (#8)	» 🔳 🤣 🛃		
	🗸 Online	wv4	wv	1.6.60,8	91 d, 20 h, 21 m	104.63 Mb (2.58%)	2.0% (#8)	» 🔳 🥝 🎽		
	🛷 Online	wv3	wv	1.6.60.8	91 d, 22 h, 38 m	98.0 <mark>4</mark> Mb (2.42%)	2.0% (#8)	Þ 🖬 🥝 🛃		
	🛷 Online	wv2	w	1. <mark>6.</mark> 60.8	91 d, 22 h, 38 m	102.73 Mb (2.54%)	0.0% (#8)	Þ 🖬 🥝 🛃		
	🛷 Online	wv1	wv	1.6.60.8	91 d, 22 h, 38 m	103.05 Mb (2.54%)	0.0% (#8)	Þ 🖬 🥝 🛃		
	🛷 Online	smtp_be	1 smtp_be	0.0 <mark>.28.3</mark>	91 d, 21 h, 15 m	24.58 Mb (0.61%)	3.1% (#8)	Þ 🖬 🥝 🛃		
	🛷 Online	smtp_be2	2 smtp_be	0.0 <mark>.28.3</mark>	91 d, 21 h, 15 m	24.84 Mb (0.61%)	7.0% (#8)	Þ 🖬 🥝 🛃		
	🛷 Online	smtp_be3	3 smtp_be	e 0.0 <mark>.28.3</mark>	91 d, 21 h, 15 m	24.88 Mb (0.61%)	9.])% (#8)	Þ 🖬 🥝 🛃		
	🛷 Online	smtp_be	smtp_be	e 0.0 <mark>.28.3</mark>	91 d, 21 h, 14 m	24.84 Mb (0.61%)	14.8% (#8)	Þ 🖬 🥝 🛃		
	✓ Online	smtp4	smtp	1.3.70.8	91 d, 20 h, 21 m	51.43 Mb (1.27%)	2.0% (#8)	Þ 🖬 🥝 🛃		



#### **Graph system UI**



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#### **Monitor view**





# Thank you