

Kentucky Cancer Registry

Monitoring Electronic Report Flow

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Kentucky Cancer Registry

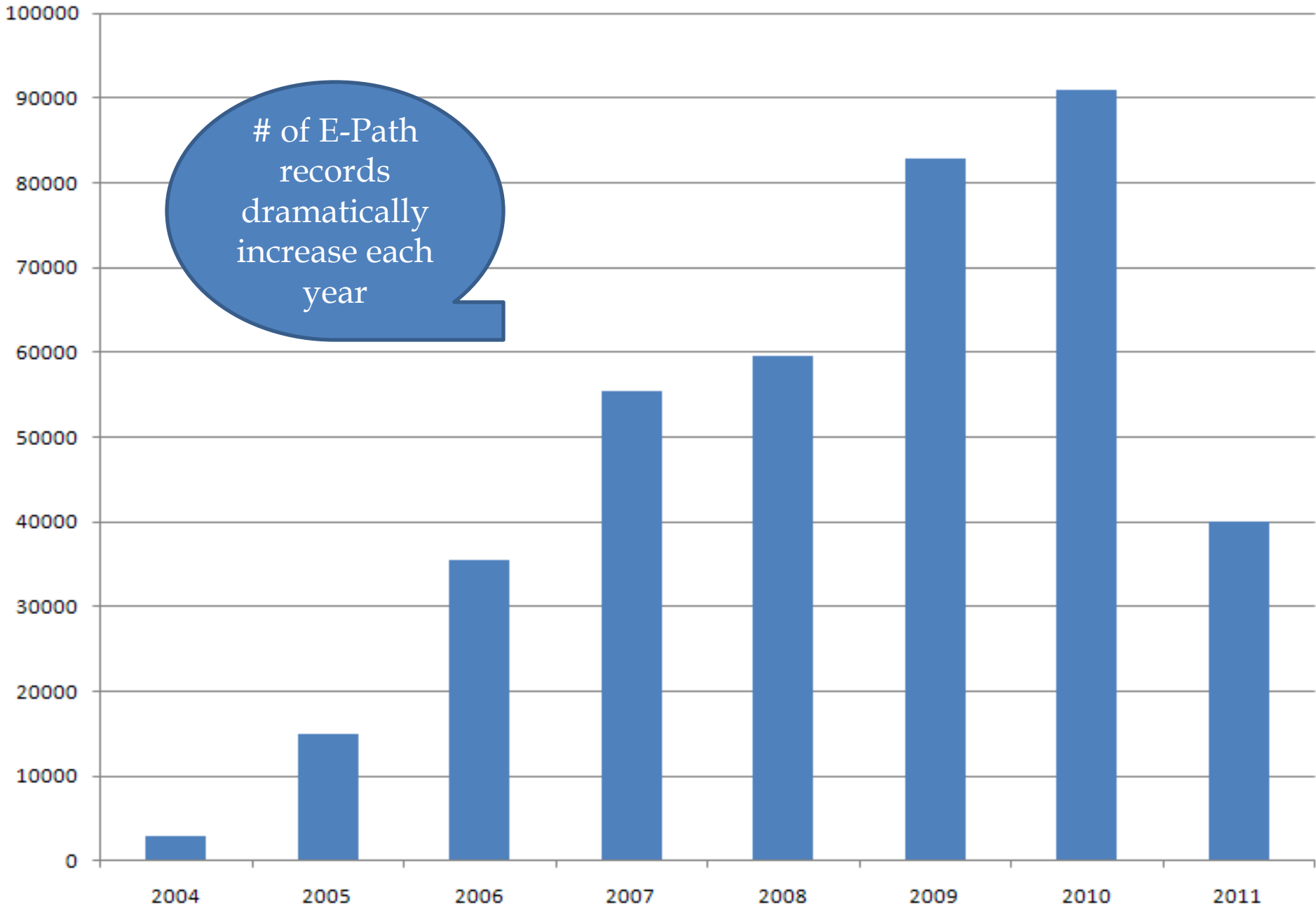
Overview

- Electronic Pathology(E-Path) Reporting
- E-Path Reporting Dilemma
- Early Monitoring Solution
- Current Architecture
- E-Path Monitoring Application
- E-Path Notification System
- Conclusion
- Screencast Demo

Electronic Pathology(E-Path) Reporting

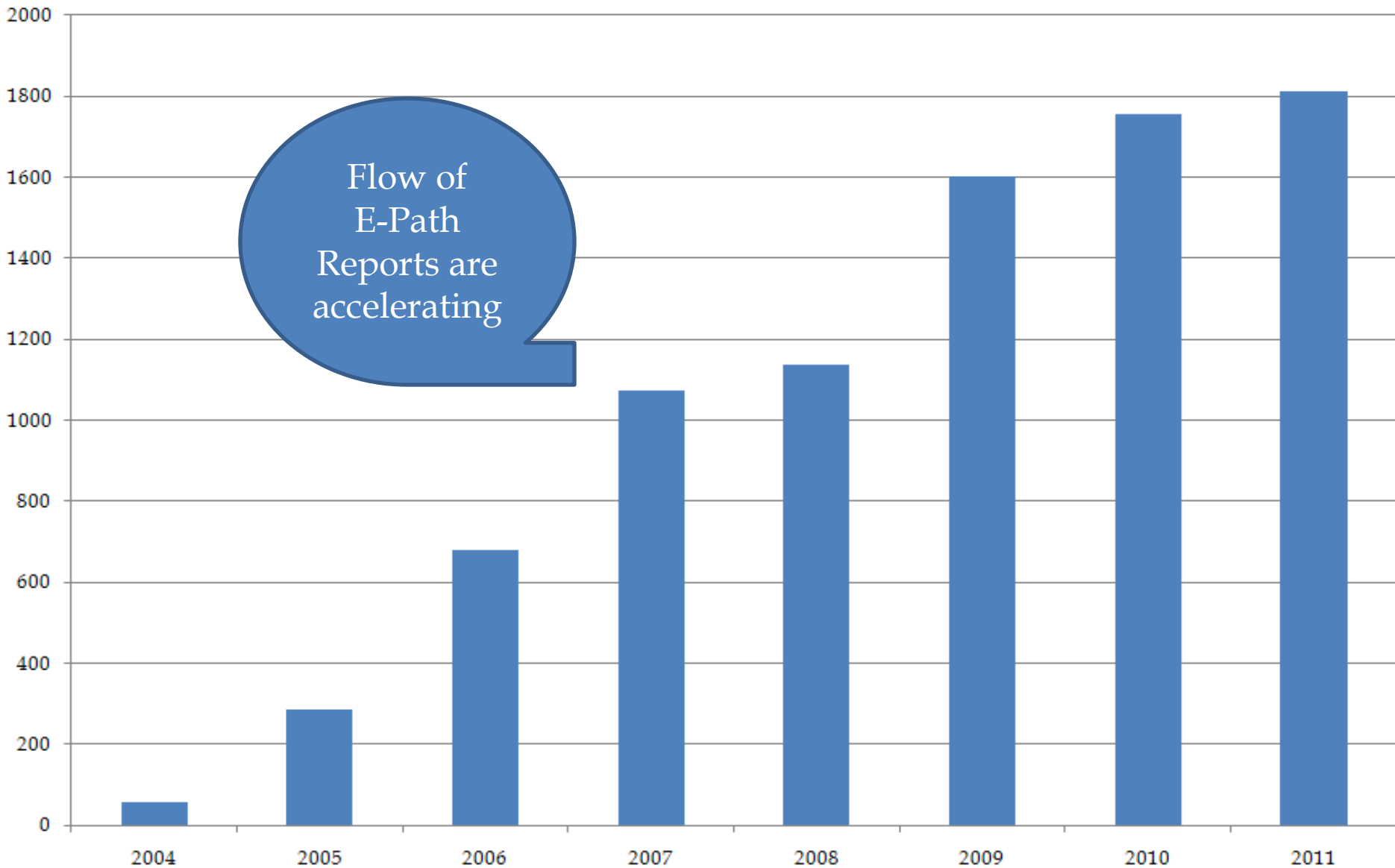
- E-Path Reporting began in 2004 through Artificial Intelligence in Medicine
- PHIN-MS followed in 2009
- 93 of 100 KY hospitals using E-Path reporting
 - 96% of large hospitals
 - 95% of small hospitals
- Most in-state and out-of-state freestanding labs use E-Path reporting
- Over 382,000 E-Path records received

E-Path Reports per Year



of E-Path records dramatically increase each year

of E-Path Reports A Week Per Year



E-Path Reporting Dilemma

- Facilities send reports through messaging systems (A.I.M and PHIN-MS)
- Report flow may drop between facilities and KCR.
 - Data connection may drop
 - Reporting facility server fails
 - Some labs manually send reports and forget
 - A Lab relocates
- KCR Operations Staff need to take immediate action to reestablish connection to the reporting facility
- It's vital to have a way of analyzing facilities' report flow

E-Path Monitoring Demand

- KCR needed a tool which monitored the flow of E-Path reports from each reporting facility
- Automated emailing system established.
- KCR operations staff received daily emails of the report volume of each facility

Sample Daily E-Mail Report

Number of Pathology Reports on Tuesday June 21, 2011

Baptist East: 17

Central Baptist: 5

Ephraim McDowell RMC: 5

Jewish Hospital: 14

Jewish Hospital – Shelbyville: 1

Kings Daughters MC: 19

KOSAIR: 1

LABCORP – Park Duvall Comm. Health Ctr.: 1

MCBG: 3

Murray Calloway: 8

NORTON: 6

OMHS: 15

Pikeville Medical Center: 4

...

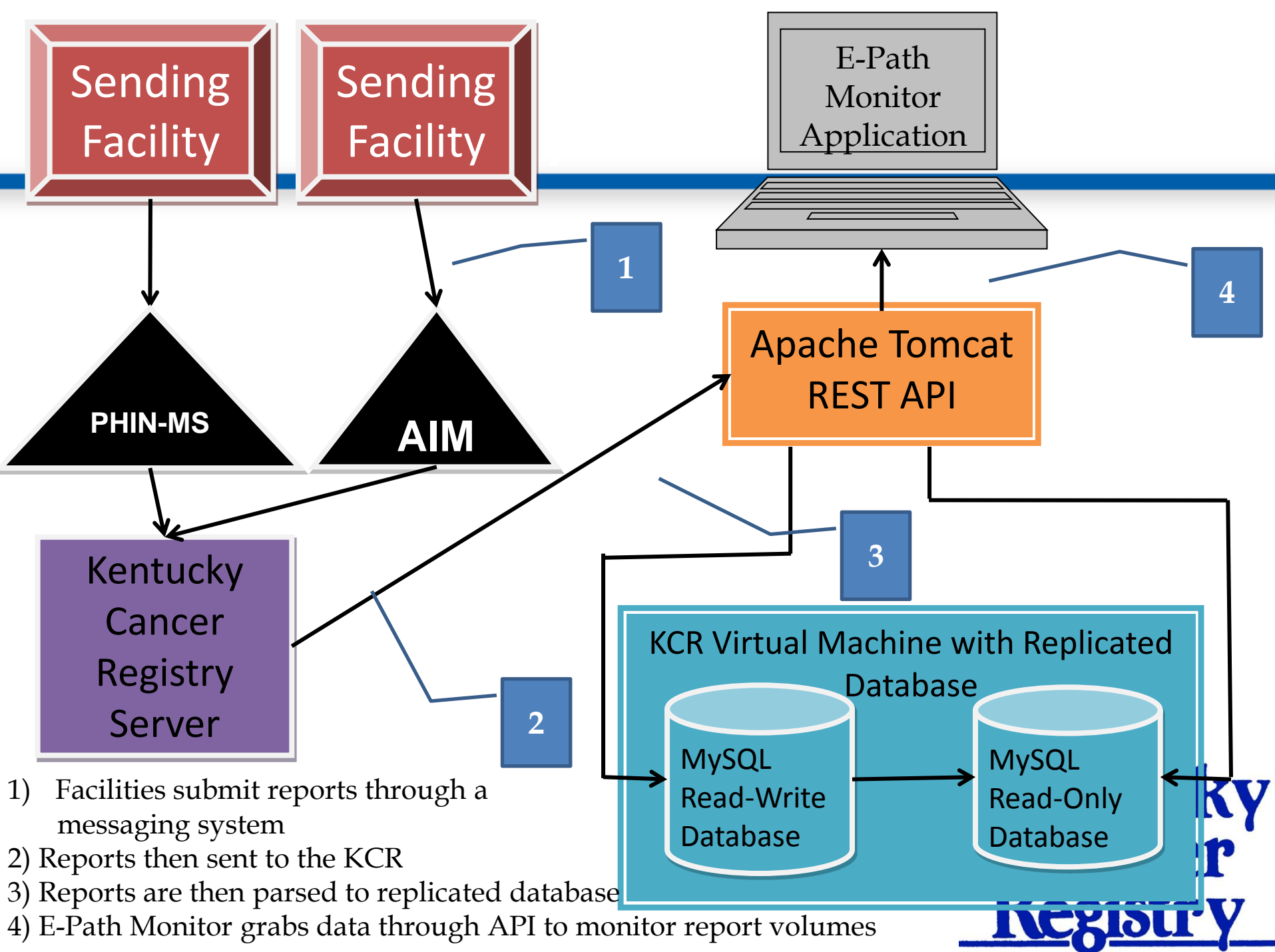
Not a great way to
visualize report
flow

Daily Emails are
annoying

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Current Architecture

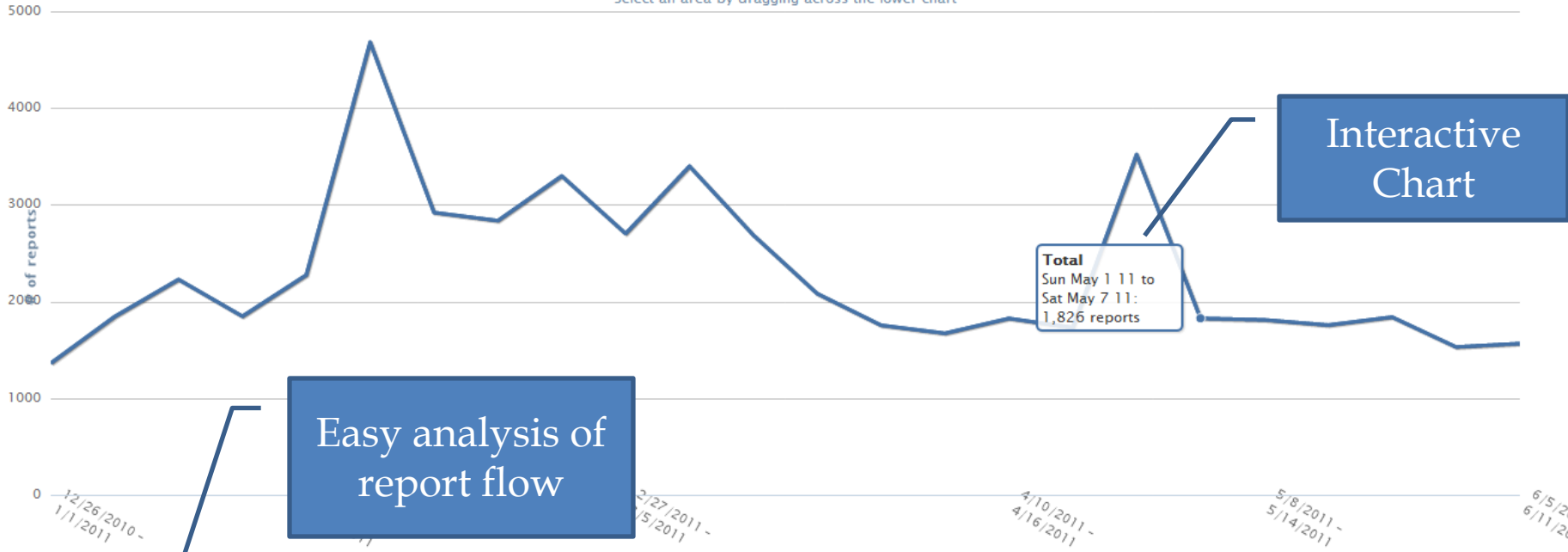
- KCR parses incoming E-Path reports into a replicated database.
- REST API in place to retrieve E-Path information from KCR database
- A web application can use this data to analyze the report flow from facilities to the KCR



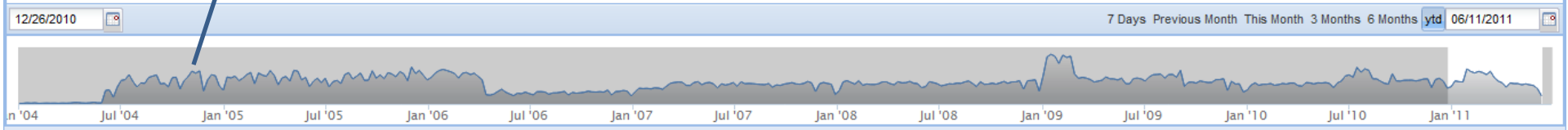
ePath Monitor Feed

KCR Load Date Report Flow

Select an area by dragging across the lower chart



Easy analysis of report flow



Results Threshold Settings

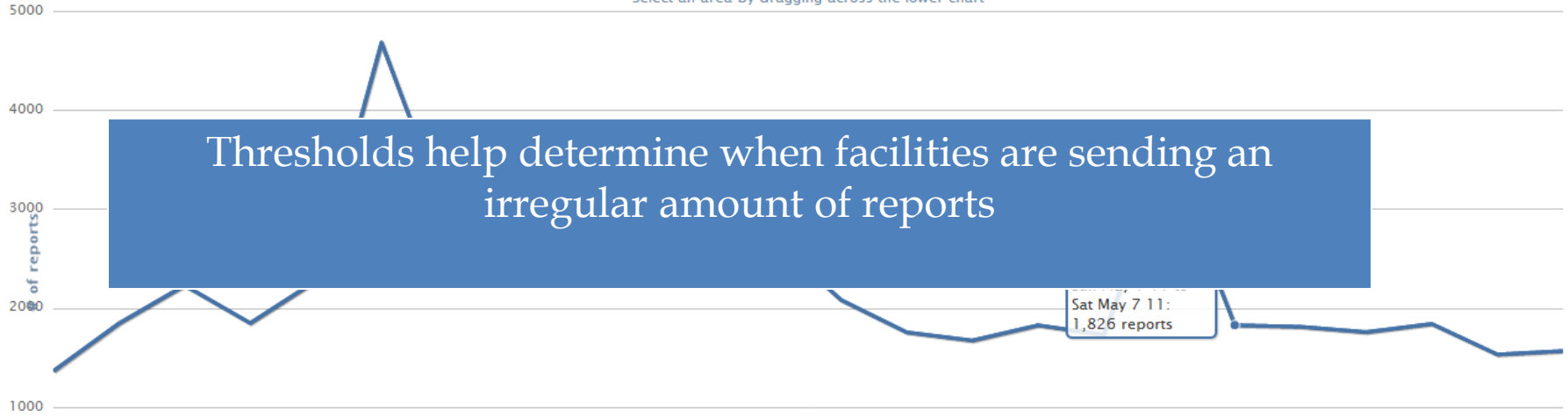
Show All In Chart | Show None In Chart By Day **By Week** By Month

Sending Facilities	Last Problem	Show In Chart?	2/2011	4/24/2011 - 4/30/2011	5/1/2011 - 5/7/2011	5/8/2011 - 5/14/2011	5/15/2011 - 5/21/2011	5/22/2011 - 5/28/2011	5/29/2011 - 6/4/2011	6/5/2011 - 6/11/2011
Total	Not Set	<input checked="" type="checkbox"/>		3520	1826	1810			1530	1565
	5/29/2011 - 6/4/2011	<input type="checkbox"/>		27	41	29			59	15
	5/29/2011 - 6/4/2011	<input type="checkbox"/>		461	0	91			0	0
	5/29/2011 - 6/4/2011	<input type="checkbox"/>		129	127	120			101	110
	5/29/2011 - 6/4/2011	<input type="checkbox"/>		0	0	0			0	0
	5/29/2011 - 6/4/2011	<input type="checkbox"/>		0	0	0			0	0
	5/29/2011 - 6/4/2011	<input type="checkbox"/>		84	109	81			76	82
	5/29/2011 - 6/4/2011	<input type="checkbox"/>		69	62	63	80	70	57	59
	5/8/2011 - 5/14/2011	<input type="checkbox"/>		19	26	17	21	24	26	21
	5/29/2011 - 6/4/2011	<input type="checkbox"/>		12	21	16	12	9	9	14
	5/29/2011 - 6/4/2011	<input type="checkbox"/>		36	36	23	34	31	29	24
	5/29/2011 - 6/4/2011	<input type="checkbox"/>		16	11	3	11	0	21	6

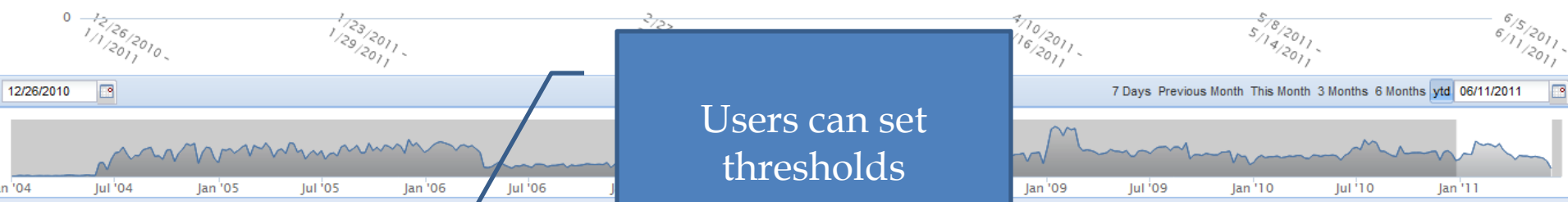
Easy to detect problems

KCR Load Date Report Flow

Select an area by dragging across the lower chart



Thresholds help determine when facilities are sending an irregular amount of reports



Users can set thresholds

Results **Threshold Settings**

Weekly Thresholds by Insert Date

Sending Facilities	Min Weekly Threshold	Max Weekly Threshold	Email Me
Ameripath	10	32	Yes
Associated Path	1	100	Yes
Baptist East	10	50	Yes
BioReference Laboratories, Inc	13	42	No
Bostwick Laboratories	1	7	Yes
Central Baptist	0	2	Yes
Clinical Path Associates	16	28	Yes
CPA Norton	<input type="text" value="20"/>	<input type="text" value="35"/>	<input type="checkbox"/>
Dianon			Yes
Ephraim McDowell RMC			Yes
Frankfort RMC	1	2	Yes
Jewish Hospital	1	2	Yes

When report volume breaks threshold, users receive email

E-Path Monitor Weekly E-Mail

The following facilities had weekly E-Path counts that were outside their minimum or maximum thresholds for the week [Jun 1, 2011 - Jun 7, 2011](#):

Sending Facility	Weekly Count	Minimum	Maximum
Owensboro Medical Health System	5	1	2
Clinical Path Associates	2	16	28
Ameripath	9	10	32
RMC Trover	56	1	2
Saint Claire RMC	10	1	2
Associated Path	0	1	100
Bostwick Laboratories	0	1	7
Central Baptist	103	0	2
Western Baptist	62	1	2

Link to E-Path
Monitor App

Table of facilities
that broke
threshold range

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Conclusion

- E-Path Monitor App is an easy-to-use tool for E-Path report flow monitoring:
 - Chart allows to see dips and spikes in report volume
 - Automated weekly email informative and less cumbersome
 - Link in email to E-Path Monitor allows for less work to view important data

Future Enhancements

- Expanding past E-Path report flow
 - Electronic Medical Records (EMRs)
- Setting automatic/default thresholds:
 - Gaussian distribution
 - Machine Learning with Hidden Markov Models

Special Thanks

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Questions & Demo