

# HIPAA-strength Enterprise Portals

## Examples and Architecture

Steve Flammini  
Chief Technology Officer  
Partners HealthCare  
Boston, MA

# Overview

- Who is Partners HealthCare?
- Approach
- Enterprise Portal Examples
- Architecture
- Conclusions

# Partners HealthCare System

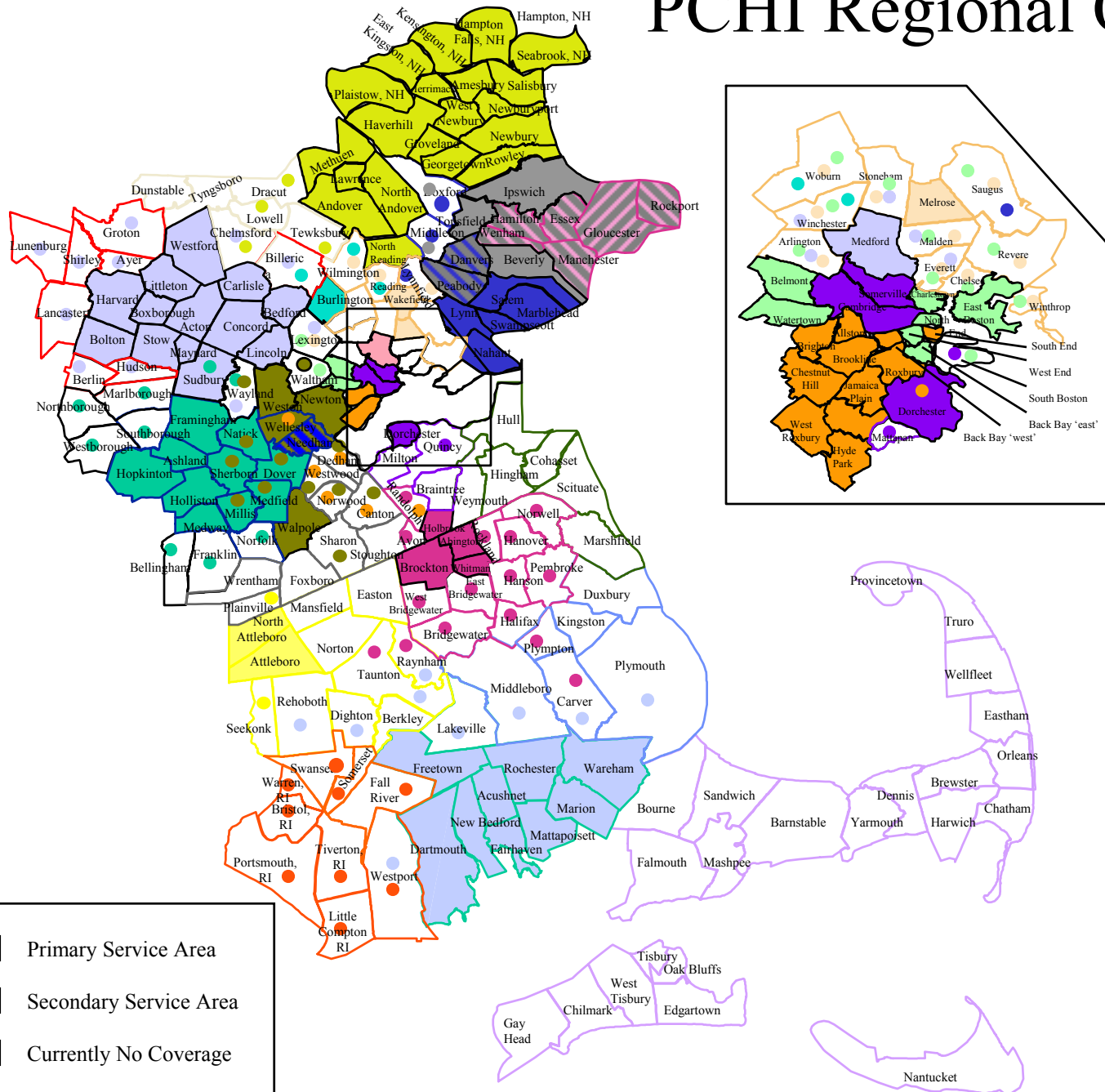
- Created in 1994 through affiliation of Massachusetts General and Brigham & Women's Hospitals
- Patient care
  - Two academic medical centers
  - Four community hospitals and two specialty hospitals
  - Joint cancer care venture with Dana Farber
  - Mental health network
  - Non-acute care network
  - Network of more than 1000 primary care physicians and 1200 community specialists
  - Total of more than 5000 physicians serving 2.2 million patients in Eastern Massachusetts

# Partners HealthCare System

- Research
  - Largest non-university based non-profit private medical research enterprise in United States
- Education
  - Principal teaching affiliate of Harvard Medical School
- Revenue
  - \$4.0 billion
  - \$760 million in research expenses

# PCHI Regional Organization

## Regional Service Organizations:



- Partners - MGH
- Partners - BWH
- Metro North
- North Central
- North Shore
- Cape Ann
- Merrimac Valley
- Rte 2 West
- Near North
- Cambridge/Somerville
- Metro West
- Neponset Valley
- Boston South
- South Shore
- Tri County
- North Bristol
- Plymouth
- Fall River
- New Bedford
- Cape & Islands
- Newton-Wellesley
- Northeast
- Greater Lowell

# Approach

- Internal Development of Enterprise-Class Systems
- Enterprise Apps must be 'portalized'
- Multi-Tier Architecture, Emphasizing Abstraction between data, presentation, and logic. (Loose Coupling)
- Increasing role of XML / Web Services in Service-Oriented Architecture
- Back-End Integration / Aggregation of Legacy Systems
- Foundational Enterprise Elements: Directories, EMPI, CDR, CPR

# Approach

- Extranet Security Architecture
  - HTTPS
  - Multiple Authentication Factors
  - Roles-based access structures
  - Audit Trails

October 31, 2001

- ▶ About PCHInet
- ▶ Contact Us
- ▶ Feedback
- ▶ Help
- ▶ Site Map



## New Drugs for Alzheimers

Tom Lee, M.D.  
PCHI Chief Medical Officer

The American Academy of Neurology's new guidelines for the management of Alzheimer's Disease encourage earlier detection and earlier treatment to slow the progression of the disease. The only class of agents that has been approved by the FDA for Alzheimer's disease are the acetylcholinesterase inhibitors (AChEIs). [Click Here For Complete Article](#)

[Click here for Feature Article Archive](#)  
[Click here for PCHIfocus](#)  
[Click here for latest Pharmacy Tip](#)

## In The News

- ▶ [New Anthrax Antibiotic \(Dr. Zane, BWH\)](#) (Channel 7)

## Key Resources

### My Patients

- ▶ [Clinical Records](#) - Patient Info for BWH & MGH

### References

- ▶ [Partners Drug Formulary Look Up Tool](#)
- ▶ [HPHC Quality Criteria](#)
- ▶ [Patient Instructions](#) - Clinical Info for Patients
- ▶ [Merck Manual](#) - Medical Reference Info
- ▶ [PCOI](#) - MGH Clinical/Administrative Resources
- ▶ [CDC](#) - Travel Guidelines
- ▶ [Clinical Topics](#) - Partners Medical Reference
- ▶ [September 11th Resources](#)

### Communications

- ▶ [Physician Search](#) - PCHI & Partners MD Search
- ▶ [Telephone Directory](#) - PCHI/PHS Phone

### My Office

- ▶ [NoAH](#) - PCHI's online Referral Mgmt System



File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search Favorites History Mail Print Edit

Address  http://healthcare.partners.org/pchinet/communication/index.htm Go  Links >>

PCHI.net

Communications

References

My Patients

My Office

My Links

October 31, 2001

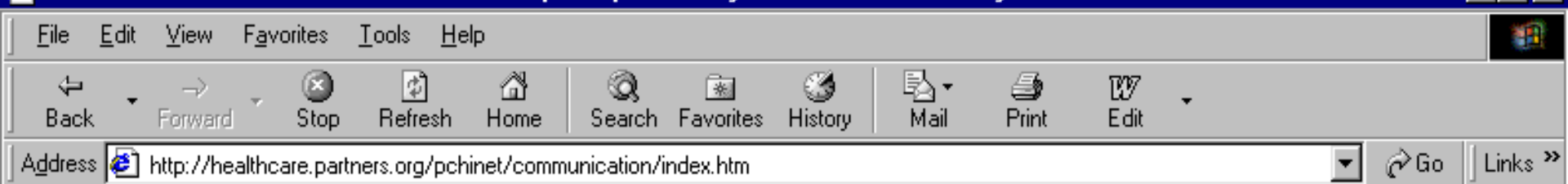
- Email
- Medem Pt Web Access
- PCHI Committees
- Physician Search
- RSO Leadership
- Telephone Directory
- Tertiary Access
- Verizon Online
- ??? Questions

## PCHI Physician Search Results:

Search Criteria: Specialty=Cardiovascular Disease, RSO=New Bedford (Hawthorn)

MD Name	Phone Number	Email Address	Location
<a href="#">Alexander Altschuller</a>	(508) 996-3991	<a href="mailto:Aaltschuller@pchi.partners.org">Aaltschuller@pchi.partners.org</a>	North Dartmouth
<a href="#">William Caplan</a>	(508) 996-3991	<a href="mailto:Wcaplan@pchi.partners.org">Wcaplan@pchi.partners.org</a>	North Dartmouth
<a href="#">Eric Levine</a>	(508) 996-3991	<a href="mailto:Elevine@pchi.partners.org">Elevine@pchi.partners.org</a>	North Dartmouth
<a href="#">Paul Vivino</a>	(508) 996-3991	<a href="mailto:Pvivino@pchi.partners.org">Pvivino@pchi.partners.org</a>	North Dartmouth

[Back to Search](#)



PCHI.net

Communications

References

My Patients

My Office

My Links

October 31, 2001

- ▶ Email
- ▶ Medem Pt Web Access
- ▶ PCHI Committees
- ▶ Physician Search
- ▶ RSO Leadership
- ▶ Telephone Directory
- ▶ Tertiary Access
- ▶ Verizon Online
- ▶ ??? Questions

**William Edward Caplan, M.D.**  
**New Bedford (Hawthorn)**  
*Primary Care & Specialist*

**Phone:** (508) 996-3991

**Fax:** (508) 961-0803

**E-mail:** [Wcaplan@pchi.partners.org](mailto:Wcaplan@pchi.partners.org)

**Affiliation:** Hawthorn Medical Associates

**Office** 237 A State Rd.

**Address:** North Dartmouth, MA 02747

**Specialty:** Internal Medicine, Board Certified  
 Cardiovascular Disease, Board Certified

**Language:** French, Portuguese

**Hospital**  
**Affiliation:** St. Luke's Hospital

**Clinical Background**

**MD Degree:** Boston University 1977



[late new search](#)

Search results:

[Previous](#)

[Next](#)

Displaying matches 1-10 of 116 for 'Partners Personnel Lookup'

Name	Department	Description	Number
<a href="#">Williams, Alexander</a>	<a href="#">MGH / Orthopaedics</a>	Office	617-726-3171
		Pager PHS	<a href="#">24604</a>
<a href="#">Williams, Alexander L.</a>	<a href="#">MGH / Orthopaedics</a>	Office	617-726-2784
<a href="#">Williams, Alpina (Dutchess)</a>	<a href="#">PHS / Finance / Accounts Payable</a>	Office	617-582-1241
		Clinic	617-724-5600
<a href="#">Williams, Alton, MD</a>	<a href="#">MGH / Psychiatry</a>	Voice Mail	000-134-0306
		Pager PHS	<a href="#">37335</a>
<a href="#">Williams, Amy B.</a>	<a href="#">NSMC / NSCH / Pediatric Rehabilitation Services / Occupational/Physical Therapy</a>	Office	978-354-2746
<a href="#">Williams, Aretta</a>	<a href="#">BWH / Medicine, Department Of</a>	Office	617-732-6040
<a href="#">Williams, Asbourne</a>	<a href="#">MGH / Nutrition and Food Services</a>	Office	617-724-4038
<a href="#">Williams, Barbara J., BWH - Dietary</a>	<a href="#">BWH / Dietary Departments</a>	Office	617-732-8899
		Office	617-568-4403
<a href="#">Williams, Berry M.D.</a>	<a href="#">Health Care Affiliates / East Boston Neighborhood Health Center</a>	Pager Other	617-546-1632
<a href="#">Williams, Brenda M, RN</a>	<a href="#">MGH / Nursing - Clinical Nursing Services / IV Therapy</a>	Office	617-726-3631

[Previous](#)

[Next](#)

Incorrect or missing information? Click here and let us know: [isppdedits@partners.org](mailto:isppdedits@partners.org)



[Link to search results](#) | [Initiate new search](#) | [Go to Who's Who entry](#) **NEW**

Williams, Lawrence

Page ID: [16760](#)

Page Status: In Hospital - On Page

[Send a Page](#)

[More...](#)

Mail Distribution Lists

Institutions:	<input checked="" type="checkbox"/> PHS	<input checked="" type="checkbox"/> BWH	MGH	DFCI	NWH	Affils-Other	BWH Research	DFCI Research
	SRH	NSMC	McI	PCHI	FH	Health Affils	MGH Research	

Institution: PHS  
Department: [Information Systems / Application Development / Systems Programming](#)  
Title: Lead System Designer  
Email: [lwilliams@partners.org](mailto:lwilliams@partners.org)

Inf	Description	Number	Fax	Location	Comments
	Office	617-732-9027	617-732-9254	BS	
	Mobile Phone	617-967-8341			

Location key:  
850 Boylston St., Chestnut Hill, MA 02467 (BWH)

[Click here for more detailed access to this entry, if you are authorized \(requires Partners network logon\)](#)

Correct or missing information? Click here and let us know: [isppdedits@partners.org](mailto:isppdedits@partners.org)  
Questions? [See Frequently Asked Questions](#)

October 31, 2001

- ▶ Clinical Research
- ▶ Clinical Topics
- ▶ Disease Management
- ▶ Explain
- ▶ HPHC Quality Criteria
- ▶ Journals & References
- ▶ Medical Guidelines
- ▶ Merck Medicus
- ▶ OVID
- ▶ Patient Instructions
- ▶ PCHIfocus
- ▶ PCOI
- ▶ PDA Sites
- ▶ Pharmacy
- ▶ Specialty Resources
- ▶ ??? Questions

## PCHIfocus.

[Click Here Past Focus Articles](#)

### ***When to Get (and Not Get) a Knee MRI***

***Week of October 26, 2001***

PCHI is currently conducting a review of knee MRI cases throughout the Network, and, in doing so, is using a set of criteria for "absolute indications" developed by a committee of orthopedic surgeons and rheumatologists from Brigham and Women's Hospital:

1. Concern for tumor, avascular necrosis, or pigmented villonodular synovitis (PVNS).
2. Unexplained joint line pain, nocturnal pain, inability to weight bear without pain for 4-6 weeks.
3. Mechanical symptoms (catching, locking, and "giving way") for greater than 4-6 weeks, not explained on plain radiographs or physical exam.
4. Desire to undergo arthroscopy for an elective mechanical lesion.

When an MRI might not be needed...

File Edit View Favorites Tools Help































Back Forward Stop Refresh Home Search Favorites History Mail Print Edit
Address  http://phsweb21/webresults/asppages/labs.asp?SESS=u377274983194970 Go  Links >>

user	Cynthia Bero (CLB3)		Labs	
patient	Claus,Santa C,SRMD 	01/26/1910 (91 yrs.) M	0000004 (MGH)	
<a href="#">Select</a> <a href="#">Labs</a> <a href="#">Summary</a> <a href="#">Patient Abstract</a> <a href="#">Help</a> <a href="#">Feedback</a>				

Data currently retrieved from: ☒ MGH ☒ BWH ☒ FH ☒ DFCI ☒ ALL  Expand All**Chemistry**

-   [Lytes/Renal/Glucose](#)
-   [General Chemistries](#)
-   [Blood Gases](#)
-   [Liver Function Tests](#)
-   [Cardiac Tests](#)
-   [Lipid Tests](#)
-   [Anemia Related Studies](#)
-   [Thyroid Studies](#)
-   [Endocrine Studies](#)
- [Fetal Lung Maturity](#)

Start	<a href="#">Page 2&gt;&gt;</a>				
Test Name	MGH 11/01/01 11:32	MGH 10/25/01 09:41	MGH 10/25/01 03:37	MGH 10/16/01 08:40	MGH 10/10/01 07:43
<a href="#">NA</a>	137	9000 [T]			160 [TC]
<a href="#">K</a>	5.2 [T]	98.5 [T]	1.5 [T]	4.5	
<a href="#">CL</a>					
<a href="#">CO2</a>					
<a href="#">BUN</a>					
<a href="#">CRE</a>					
<a href="#">GLU</a>	147 [T]	9000 [T]			
Start	<a href="#">Page 2&gt;&gt;</a>				

 <72 hours
  <one week
  < one month
  < six months
  < one year
  > one year

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search Favorites History Mail Print Edit

Address http://ppd.partners.org/scripts/phsweb.swl?APP=demoPCHIRef&amp;SESS=8803&amp;ACTION=ADDREF

Go Links &gt;&gt;

## Create a referral

[Referral](#) | [Status](#) | [Reports](#) | [Review](#) | [Change RSO/Group](#) | [Admin](#)  
[Lookup patient](#)**PATIENT**

Patient Name

Date of Birth 09/25/1997

**PAYOR**

Payor

TAHP

Patient Payor ID

1234567890

**PCP**

Name

Meisheid, Paige

Payor ID

150572

**SPECIALIST**

Source Favorite providers Reset

Name Mankarious, Leila (load all)

Specialty Ear, Nose &amp; Throat

Location Boston

Payor ID 151589

Email Fax 617-573-3167

**REFERRAL**

Type Consult/Evaluation

Start Dt 10/31/2001

End Dt 10/31/2002

Visits 1

Reason sleep apnea

ICD-9 1

ICD-9 2

**PROBLEM/ISSUE**Parents report bouts of sleep apneal.  
Please assess.**PERTINENT INFO**

Enlarged tonsils Recurrent URIs.

**OTHER**☒ Lab Note☒ Referral Note☒ Treatment Plan Note

Alt-F: File referral

Alt-C: Clear

user

patient

Steven Flammini

BH

Medications

Claus,Santa C,SRMD

01/26/1910 (91 yrs.) M

0000004 (MGH)

Partners

Healthcare

Select

Desktop

Patient Chart: Medications

Custom

Reports

Signature

Results

Help

Feedback

Active Meds

Inactive Meds

Non-Meds

Inactive Non-Meds

Add New Multi Renew

Pharmacy Info Multi D/C

	Medication	Status	Rx	Strength	Dose	Freq	Route	Qty	Days	Ref	Start Date	End Date	Orig Date
<input checked="" type="checkbox"/>	Ibuprofen	Active	Rx	800MG	1 Tablet(s)	TID PRN	PO	90 TAB			09/20/01		07/27/01
<input checked="" type="checkbox"/>	Insulin lente	Active	Rx		Alternating		SC	12 CAP			08/22/01		08/02/01
<input checked="" type="checkbox"/>	Zantac	Active	Rx	150MG	1 Tablet(s)	BID	PO	21 TAB	1		08/22/01	8/23/01	08/22/01
<input checked="" type="checkbox"/>	Zantac	Active	Rx	150MG	1 Tablet(s)	BID	PO	1 TABL			08/22/01		08/22/01
<input checked="" type="checkbox"/>	Advil	Active	Rx		1 Tablet(s)	TID	SL	12 TAB	7		07/19/01	08/23/01	07/19/01
<input checked="" type="checkbox"/>	Amoxicillin	Active	Rx	500MG	1 Capsule(s)	TID	PO	30 CAP	10	0	09/21/01	10/01/01	07/23/01
<input checked="" type="checkbox"/>	Celebrex	Active	Rx	100MG	1 Capsule(s)	BID	JTUBE	15 CAP			08/23/01		07/25/01
<input checked="" type="checkbox"/>	Insulin regular	Active	Rx		SlidingScale		SC	30 BOT	1		08/02/01	09/27/01	08/02/01
<input checked="" type="checkbox"/>	Prednisone	Active			Taper		PO	60 TAB	10		08/02/01	8/12/01	08/02/01
<input checked="" type="checkbox"/>	Tylenol	Active			Alternating		PO	TABLE			09/21/01		08/22/01
<input checked="" type="checkbox"/>	Tylenol liquid	Active	Rx		Variable		GTUBE	1 TABL	1	1	08/22/01	09/27/01	08/22/01
<input checked="" type="checkbox"/>	Coumadin	Active	Rx	5MG	50000 Tablet(s)	QPM	PO	1 TABL			09/21/01		08/22/01
<input checked="" type="checkbox"/>	Tylenol	Active	Rx	650MG	1	Q4H	PR	22			09/21/01		08/22/01
<input checked="" type="checkbox"/>	Tylenol with ...	Active	Rx		1-2 TAB	Q4H	PO	120 CA	2	2	08/23/01		08/23/01
<input checked="" type="checkbox"/>	Atenolol	Active		100MG	1 Tablet(s)	QD	PO	TABLE			09/21/01		09/14/01
<input checked="" type="checkbox"/>	Motrin	Active		400MG	1 Tablet(s)	TID	PO	9 TABL			09/26/01		09/26/01
<input checked="" type="checkbox"/>	Atenolol	Active	Rx	50MG	1 Tablet(s)	QD	PO	90 TAB	90	5	09/28/01	12/26/01	09/14/01
<input checked="" type="checkbox"/>	Corticaïne	Active	Rx		TOPICAL	QD	LOTIO	1 TUBE	160		09/27/01	3/5/02	09/27/01
<input checked="" type="checkbox"/>	Digoxin	Active	Rx		0.0625 MG	QD	PO				10/01/01		10/01/01
<input checked="" type="checkbox"/>	Digoxin	Active	Rx		0.0625 MG	QD	PO				10/01/01		10/01/01
<input checked="" type="checkbox"/>	Insulin regular	Active	Rx		Variable		SC	30 TUB			10/04/01		08/02/01
<input checked="" type="checkbox"/>	Tylenol #3	Active	Rx		1-2	Q4H	GTUBE	11 CAP			10/04/01		08/03/01
<input checked="" type="checkbox"/>	Warfarin sodium	Active	Rx		2 MG	QD	IV	20 TAB	10		10/06/01	10/16/01	10/06/01
<input checked="" type="checkbox"/>	Clopidogrel	Active	Rx		75 MG	QD	PNGT	750 TA	10		10/06/01	10/16/01	10/06/01
<input checked="" type="checkbox"/>	Plavix	Active	Rx		75 MG	QD	PNGT	1000 T	1000		10/06/01	7/2/04	10/06/01
<input checked="" type="checkbox"/>	Heparin	Active	Rx		5000 UNITS	BID	IV	1 TABL	1		10/09/01	10/10/01	08/31/01
<input checked="" type="checkbox"/>	Celebrico	Active	Rx	0.6MG	1 Tablet(s)	QD	PO	1 TABL	e		10/09/01	10/16/01	09/05/01



LAYOUT

Default (W=1495/L=3348)

ankle jo...

ankle jo...

ankle jo...

foot LAT

foot AP

foot AP

1x1

Scale: 25%

R



1.05 seconds to load images

Internet

3Com

Palm III

http://132.1... ◀ History

Partners HealthCare Wireless LMR  
Claus, Santa M 1/15/1901  
MGH:0000004

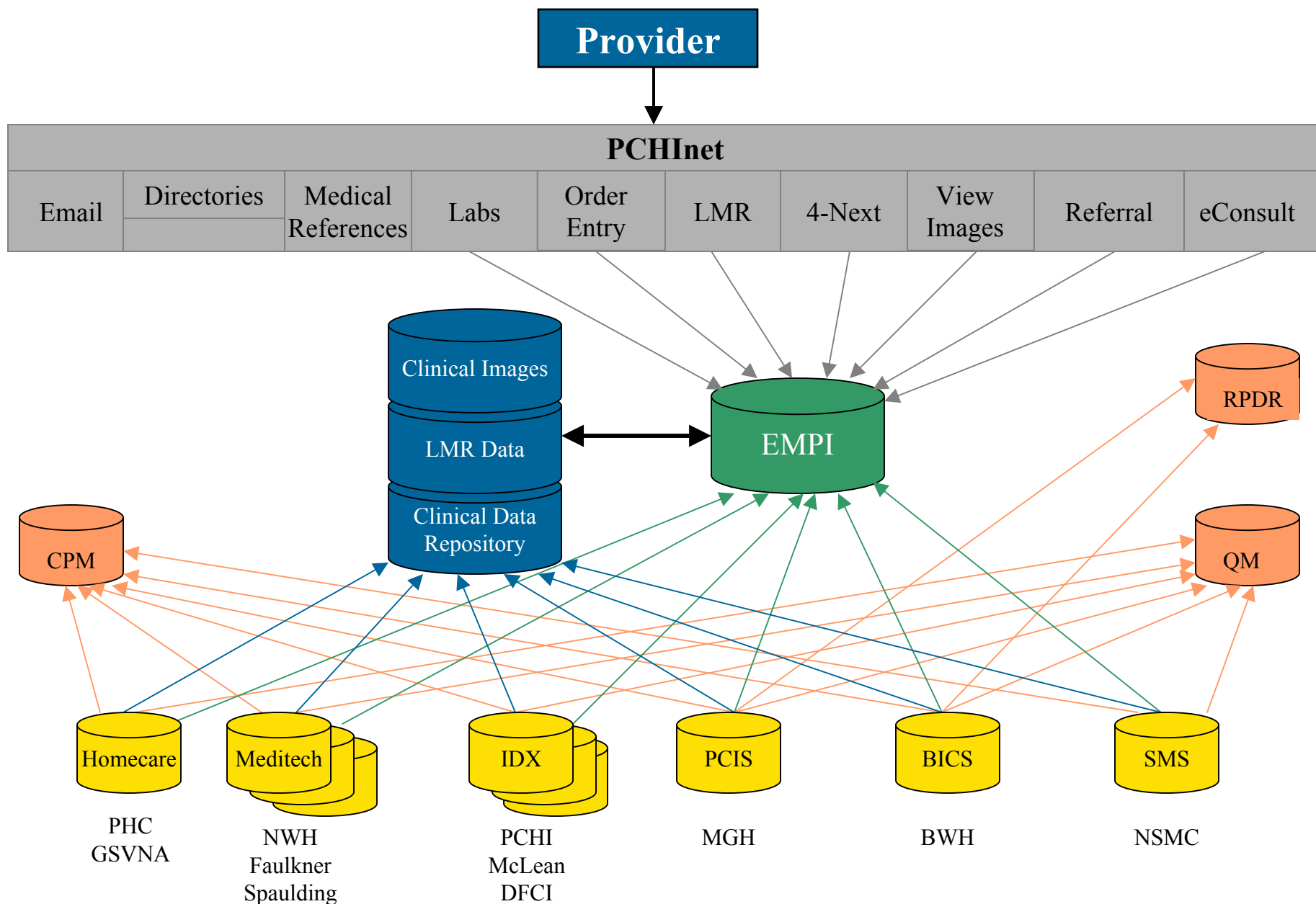
Medication: Bactrim SS PO

Dose: ▼ 1 TAB  
Freq: ▼ BID  
For: ..... day(s)  
PRN: .....

OK◀



# Enterprise Portal Architecture



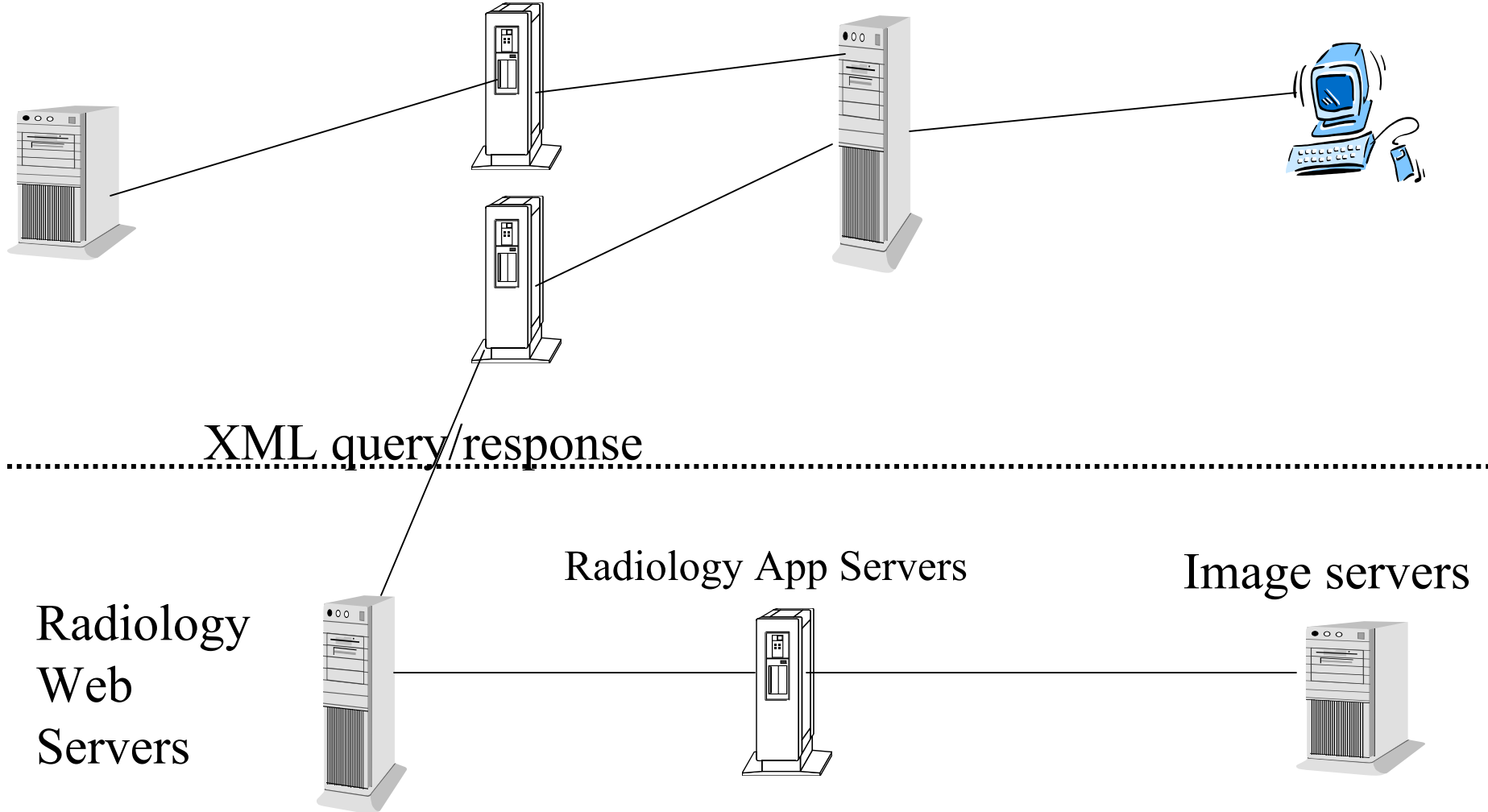
# Example: CPR / PACS interoperability

CPR  
Database  
servers

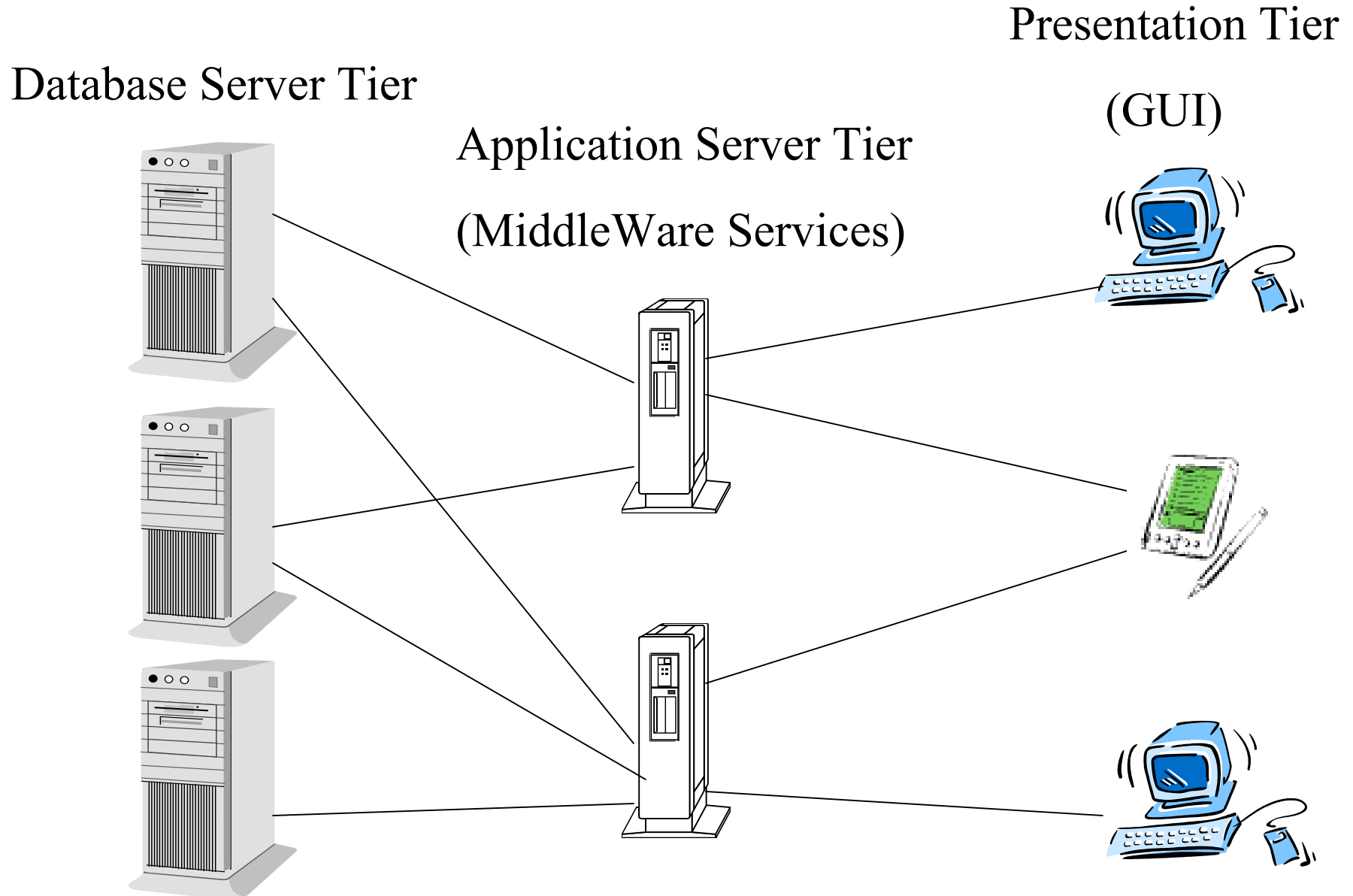
App Servers

Web Servers

Computerized  
Patient Record



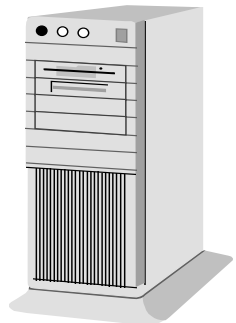
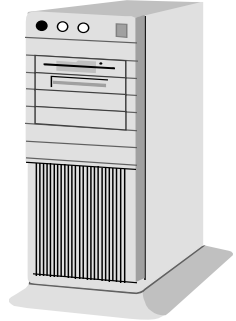
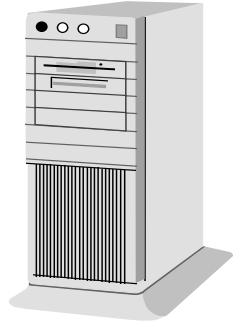
# Simplified Application Platform Overview



# Multi-Tier App Environment

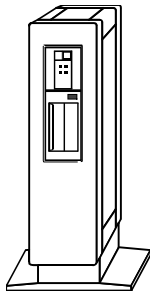
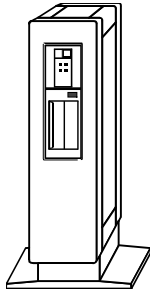
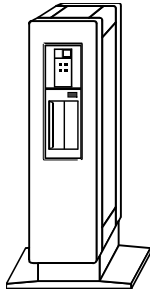
DB Servers /

Legacy Platforms

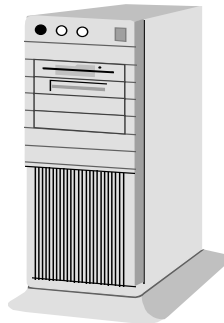
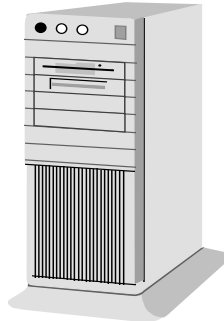


XML, pooled IP, proprietary

App Servers

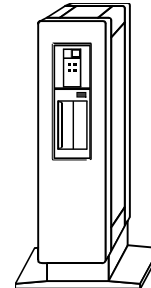
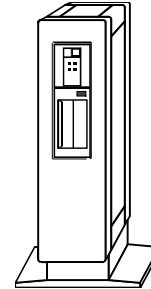


Web Servers



ISAPI, IP, XML

Content  
Switches



CISCO  
CS11050

IP / VLAN

Presentation



HTTPS, TCP/IP

# Conclusions

- Agile, multi-tier architecture is essential for portalization.
- Enterprise Portals consist of only web-enabled apps.
- Portals will deliver to multiple classes of end user devices.
- Robust Architecture for Secure Extranet Access.
- Emphasis on Integration Elements: Directories, CDR, EMPI, CPR