

Increasing satisfaction for external facilities: *Implementation of a hospital image information distribution solution*

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- We receive orders from smaller hospitals and outpatient clinics
- We perform MRI, CT, and CR exams
- Our reports and images are delivered on paper and on media (e.g. CD).
- In the past, we could not neither receive orders nor return results during holidays or outside our regular working times.

Disadvantage: Several days of waiting time for our referrers

Our solution: the introduction of a system

that allows access on-demand to our exam results - at any time.

History of Central hospital computerization

December, 1998 -

- PACS and inspection reservation system & medical checkup system
Yokogawa Electric Corp.: imageARQS, imageVNUS & HESTIA

September, 2004 -

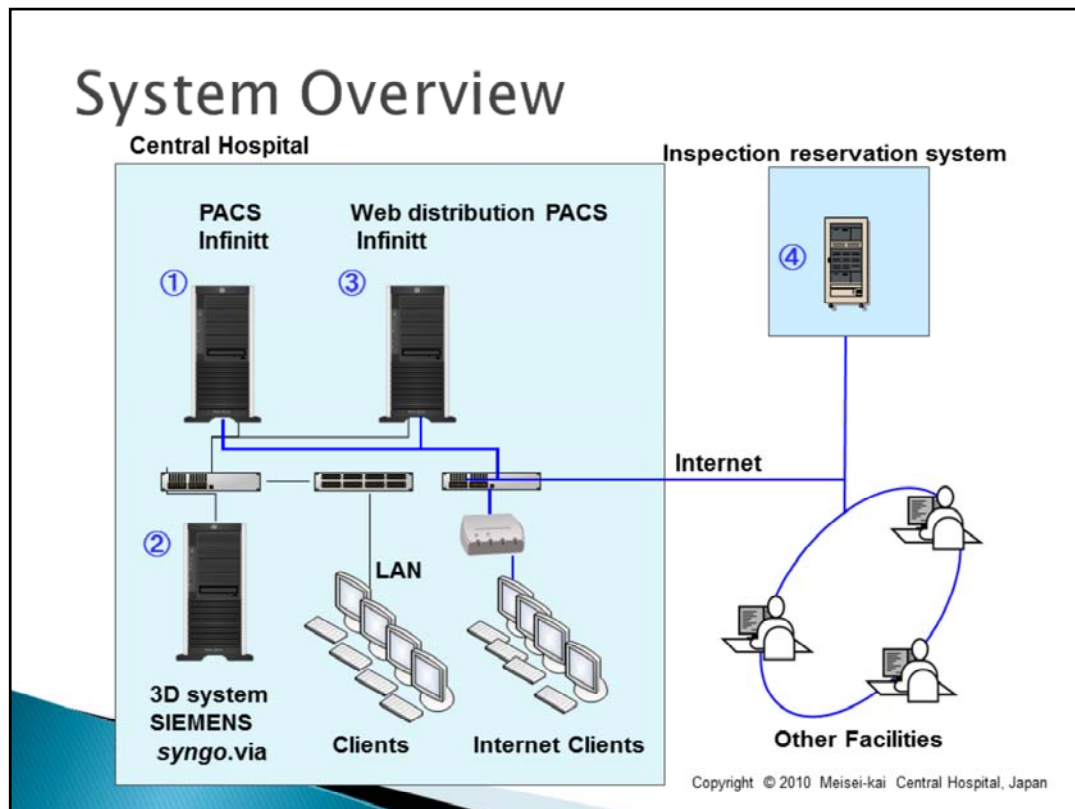
- PACS update (non migration)
Yokogawa Electric Corp. : ShadeQuest & View R

June, 2010 -

- PACS and inspection reservation system update (image & report migration)
INFINITT JAPAN Corp. :INFINITT PACS, DgS Computer Corp.

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In 1998 we introduced an electronic ordering system. However, it could only be used internally. All orders via phone were manually entered into our internal scheduling system by front-desk staff. This June we updated our PACS solution and introduced a new scheduling system.



Our solution consists of 4 main systems:

Internally we use

- an Infinitt PACS system and
- our SIEMENS syngo.via for advanced visualization

Our External referrers use

- The web based image distribution system and
- The web based scheduling system

The externally used systems are located outside our facilities' network.

Advantage:

- Reduced security risks for our internal sensitive data
- Maintenance cost for hosted solution is lower

Let me start with our web based ordering and scheduling system.



The image shows a login screen for the Central Hospital scheduling system. At the top left is the Central Hospital logo and name in Japanese. At the top right is the text 'scheduling system'. The main title '検査予約システム' (Examination Reservation System) is prominently displayed in the center. Below the title is a background image of a doctor wearing a headset and holding a tablet. The login form consists of two input fields: 'ユーザーID' (User ID) with the text 'Seido' and 'パスワード' (Password) with five asterisks. A 'ログイン' (Login) button is located below the password field, with a hand cursor icon pointing to it. At the bottom, there is a copyright notice: '© Central Hospital. All Right Reserved.'

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scheduling system

検査予約システム

ユーザーID

パスワード

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This is the log-on screen.

Each user logs on with user name and password.

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文字サイズ 小 **中** 大 検査予約システム
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MRI CT X-P GF US CF その他

前画面に戻る 最新情報に更新

◀ 6ヶ月前 ◀ 前月へ 2010年10月 当月 翌月へ ▶ 6ヶ月後 ▶

予約したい日付をクリックして下さい

	日	月	火	水	木	金	土
週間表示						1 空	2 空
週間表示	3 満	4 空	5 空	6 空	7 空	8 空	9 空
週間表示	10 満	11 空	12 空	13 空	14 空	15 空	16 空
週間表示	17 満	18 空	19 空	20 空	21 空	22 空	23 空
週間表示	24 満	25 空	26 空	27 空	28 空	29 空	30 空
週間表示	31 満						

Then the modality for the exam is selected.

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週間表示	10 満	11 空	12 空	13 空	14 空	15 空	16 空
週間表示	17 満	18 空	19 空	20 空	21 空	22 空	23 空
週間表示	24 満	25 空	26 空	27 空	28 空	29 空	30 空
週間表示	31 満						

User can choose between a weekly or daily view.



weekly and daily view.

MRI
CT
X-P
GF
US
CF
その他

前画面に戻る
最新情報に更新

1週間前
前日へ
2010年10月7日
今日
翌日へ
1週間後

予約したい時間をクリックして下さい

時間	No.	氏名	性別	コース1	コース2	自賠責	部位	造影	連絡先	部屋	備考
09:00		予約不可									
09:15											
09:30											
09:45											
10:00											
10:15											
10:30											
10:45											
11:00											
11:15											
11:30											
11:45											
12:00		予約不可									
12:15		予約不可									
12:30		予約不可									
12:45		予約不可									
13:00											

Users select a free time slot for the exam.

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MRI CT X-P GF US CF その他

予約日時の入力

予約日時: 2010年10月07日 09:30~

カルテ番号

受診者氏名(カタカナ)※

性別
☐ 男性 ☒ 女性

コース1※

コース2※

撮影部位※

☒ 頭部(含むMRA)
☐ 顔面
☐ 頸部・頸椎

☐ 胸部(肺・胸椎など)
☐ 腹部(肝臓・腎・脾臓など)
☐ 骨盤

☐ 上肢
☐ 下肢

☐ その他の部位

☐ VSRAD
☒ 頭部以外のMRA
☐ 乳腺・心臓

※VSRADは頭部のみ追加可能です。
※1部位のみ選択してください。複数部位の撮影を希望される場合は、セントラル病院放射線科(3467-5131)までご連絡ください。

造影剤
☒ なし ☐ あり ☐ 適宜
[造影検査承諾書](#)
[肝臓特異性造影承諾書](#)

受診者連絡先TEL※

部屋番号

入力者名※

連絡事項など

※は必須項目です

破棄

登録

Then, the order form asking for necessary information is shown.


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MRI

CT

X-P

GF

US

CF

その他

完了お知らせ

予約の登録を完了しました。

予約日時: 2010年10月07日 09:30～

カルテ番号	
受診者氏名(カタカナ)※	SEIDO ERI
性別	女性
コース1※	外来
コース2※	-----
撮影部位/検査項目※	頭部(含むMRA)、VSRAD
造影剤	なし
受診者連絡先TEL※	0123456789
部屋番号	
入力者名	nagao
備考	

デイリー予約に戻る



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After confirming the overview of the order,
the order is finalized.


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最新情報に更新

<< 1週間前
< 前日へ
2010年10月07日
今日
翌日へ >
1週間後 >>

予約したい時間をクリックして下さい

時間	No.	氏名	性別	コース1	コース2	自賠責	部位	造影	連絡先	部屋	備考
09:00		予約不可									
09:15											
09:30	1428	SEIDO ERI	女性	外来	——	なし	頭部(含むMRA).VSRAD	なし	0123456789		
09:45	1428	SEIDO ERI	女性	外来	——	なし	頭部(含むMRA).VSRAD	なし	0123456789		
10:00	1428	SEIDO ERI	女性	外来	——	なし	頭部(含むMRA).VSRAD	なし	0123456789		
10:15											
10:30											
10:45											
11:00											
11:15											
11:30											
11:45											
12:00		予約不可									
12:15		予約不可									
12:30		予約不可									
12:45		予約不可									
13:00											
13:15											

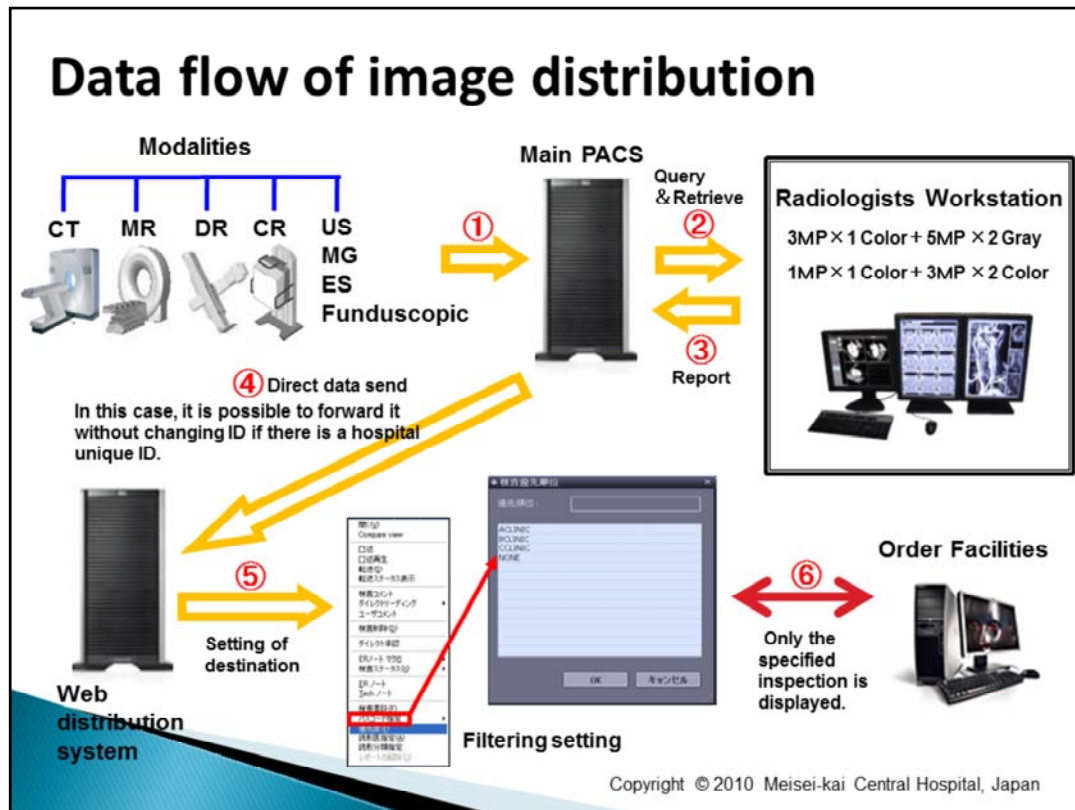
The finally confirmed order will then appear in the scheduling views (weekly and daily).

The time slot will be reserved for this examination and other users will not be able to place an order at the same time for this examination.

However, if others user belong to another facility, they will only see, that the time slot is occupied – but no details related to this order.

This controlled data access protects sensitive data.

Now, let me show you how we deliver images to our referrers.



This slide shown data flow of image distribution system.

If a study has been performed for an external facility, the process continues with step 4).

Images and results are transferred to the web-distribution server.

Step 5); For each study the referring facility is defined to manage access rights.

Then, users of order facilities are able to display only own examination data.

Benefits for external users (ordering facilities)

- * Easy access to relevant prior exams
(same body part - same or different modality)
- * Enables real-time reading of images (acute lesions)

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Two points of the slide are especially profitable for an external facilities though there are some advantages of the user.

Security measures

- * SSL encrypted data communication
- * Data transfer via VPN
- * Personalized login (User ID and password)
- * Restricted study access :
Only for members of the same facility
- * Use of different AntiVirus software on web-distribution server and clients

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Security is one of the most important aspects of such a solution .

this slide shows the security methods being used.

Benefits for our hospital

- * Phone calls for exam reservation are obsolete
- * Cost for film printing and its delivery can be saved
- * Reduction of film print and CD publishing work
- * Competitive advantage compared to other facilities not providing this kind of service

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This slide was shown about benefit for our hospital.

Weak Points

- * Additional workload: Teaching and supporting users
- * Prior studies not yet available in our new system:
Manually provision of prior studies
- * Access to images not possible
(if mismatch between modality's pass code and user input)
- * Reports need to be converted to images:
Web distribution system does not support report reference function
- * Outside users can only print on paper

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Our facility needs to provide support for users

Older prior studies are not available in our new solution. Thus, whenever a prior study is needed, manual interaction is required.

The user cannot refer to the image when the input in contradiction to the rule of the passing code is done on the modality side.

We have to convert all reports to images because the web distribution system did not have the report reference function.

Outside users are limited to print out on paper only.

Result and Conclusion

- * Ordering / scheduling system and image distribution system: Increased convenience and user satisfaction
- * Reduction of report-turnaround-time → Faster treatment of patients due to faster reaction of referrers
- * Improvement on our side for end-user support needed
- * Competitive advantage over direct competitors due to convenience of our solution for external referrers
- * Our goal: raise customer satisfaction with higher convenience and security

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Conclusion and discussion

* The convenience for our users has been improved by introducing those two systems: ordering/scheduling system and image distribution system

* Those systems help us to reduce the report-turnaround-time.

The benefit for the patient is a potentially faster reaction of his referrer to the patient's clinical condition

* We have to improve our own ability to provide end-user support for our referrers

* The convenience of our system combination for our external referrers is a competitive advantage compared to neighboring diagnostic imaging centers.

* We aim at the convenience of the system and the improvement of safety to raise customer satisfaction.

Therefore, after executing the questionnaire survey to the customer, we want to do the second reports.

Thank you very much.