



# DicomStar

A Google for DICOM Files



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# Motivation

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- ... you need **special** DICOM images and DICOM files ...
- ... finding of images in archives takes a **long** time ...
- ... you need to apply **special** search queries ...
- ... you want to **see** thumbnails for visual selecting ...
- ... you want to download matching files (DICOM, JPEG, WebPage) ...
- ... you want download the whole **series** belonging to a found image ...
- ... you **don't** want a large pool of unsorted images on your PC ...
- ... quick and easy to use **Web** interface ...
- ... **access** to DICOM data *and* images from everywhere ...
- ... you want to customize your **own** view to data ...
- ... you want to see a **Movie** from series or Multiframe ...
- ... you want to do a **quick** fulltext search ...



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# Solution

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## DicomStar

DicomStar is a **fast** database driven Search Engine for DICOM images and files (e.g. structured reports, waveforms, ....).

**“A Google for DICOM!”**

DicomStar is a Client-Server-Application for archiving and retrieving DICOM files and images.

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## some **Features**

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- Search and **find** DICOM files and images
- **Web** based (accessible from everywhere)
- User Interface for **simple** search
- True **SQL** queries
- Thumbnail **preview**
- Downloadable **hits** (DICOM, JPEG and Web Page)
- Collect all images from same **series**
- File system access for **full** loading of series
- **Large** image archive, many modalities and formats
- Fulltext search
- Patient Search
- WADO Access ...



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# some Applications

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- Image Pool
- Archive
- Consulting
- Publications
- Research & Development
- Education & Training
- Structured File share
- Quality Control
- Test Resources
- Marketing and Sales support
- Data mining
- References
- Tele-Portal... ..



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# Process Flow:

Please make your selection:  
 Choose Modality: MR - Magnetic Resonance  
 Choose Transfer Syntax: - don't care -  
 Choose Photometric Interpretation: - don't care -  
 Choose Body Part Examined: - don't care -  
 Show 6 Hits per page  
 Submit Query

Please note that not all combinations of options are possible and conform to DICOM.

[Simple Search](#) [Advanced Search](#) [Expert Search](#) [Fulltext Search](#)  
 DicomStar Version 1.0, © 2005 MH

Query ...

... Results

The DicomStar found 215 Hits, Page 11 of 36

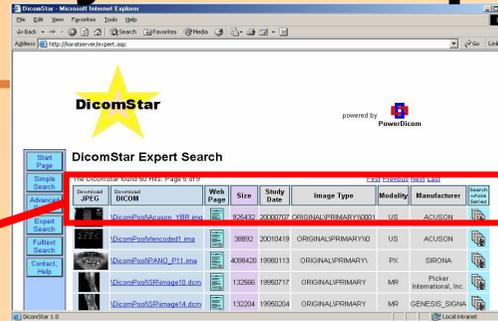
| Download JPEG | Download DICOM                                         | Web Page | Size   | Modality | Transfer Syntax                          | Photometric Interpretation | Body Part Examined | Rows Columns Frames | Search whole Series |
|---------------|--------------------------------------------------------|----------|--------|----------|------------------------------------------|----------------------------|--------------------|---------------------|---------------------|
|               | <a href="#">\DicomPool\Images\Series\BRAINBRAIN051</a> |          | 133092 | MR       | Explicit VR, little endian, uncompressed | MONOCHROME2                |                    | 256 / 256           |                     |
|               | <a href="#">\DicomPool\Images\Series\BRAINBRAIN052</a> |          | 133092 | MR       | Explicit VR, little endian, uncompressed | MONOCHROME2                |                    | 256 / 256           |                     |
|               | <a href="#">\DicomPool\Images\Series\BRAINBRAIN053</a> |          | 133092 | MR       | Explicit VR, little endian, uncompressed | MONOCHROME2                |                    | 256 / 256           |                     |
|               | <a href="#">\DicomPool\Images\Series\BRAINBRAIN054</a> |          | 133092 | MR       | Explicit VR, little endian, uncompressed | MONOCHROME2                |                    | 256 / 256           |                     |
|               | <a href="#">\DicomPool\Images\Series\BRAINBRAIN055</a> |          | 133092 | MR       | Explicit VR, little endian, uncompressed | MONOCHROME2                |                    | 256 / 256           |                     |
|               | <a href="#">\DicomPool\Images\Series\BRAINBRAIN056</a> |          | 133092 | MR       | Explicit VR, little endian, uncompressed | MONOCHROME2                |                    | 256 / 256           |                     |

First Previous Next Last  
 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36



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# Detail: Query Results presentation I



The DicomStar found 50 Hits. Page 5 of 9

[First](#) [Previous](#) [Next](#) [Last](#)

| Download JPEG | Download DICOM                            | Web Page | Size   | Study Date | Image Type            | Modality | Manufacturer | Search whole Series |
|---------------|-------------------------------------------|----------|--------|------------|-----------------------|----------|--------------|---------------------|
|               | <a href="#">\DicomPool\Acuson_YBR.img</a> |          | 925432 | 20000707   | ORIGINAL\PRIMARY\W001 | US       | ACUSON       |                     |

Image View and Download

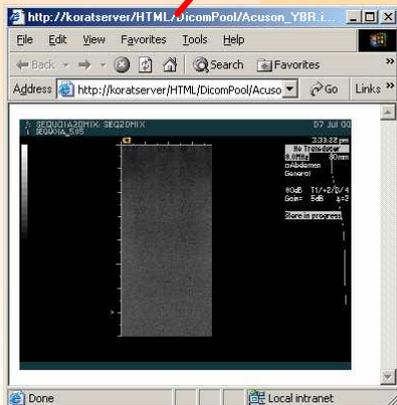
File information (some possible tags shown)

This view is an example only.

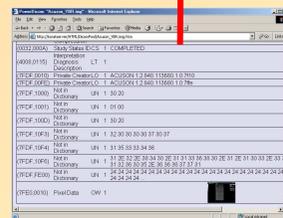
View is online configurable

by user!

Search whole series to this image (see next page)



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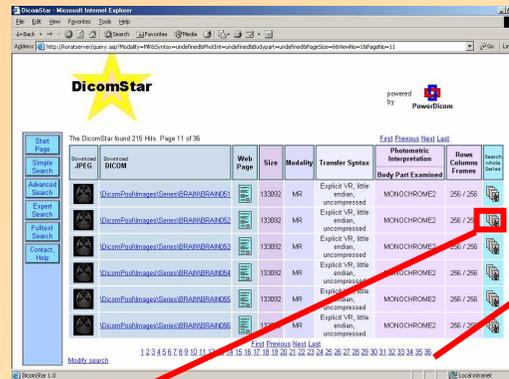


Web Page



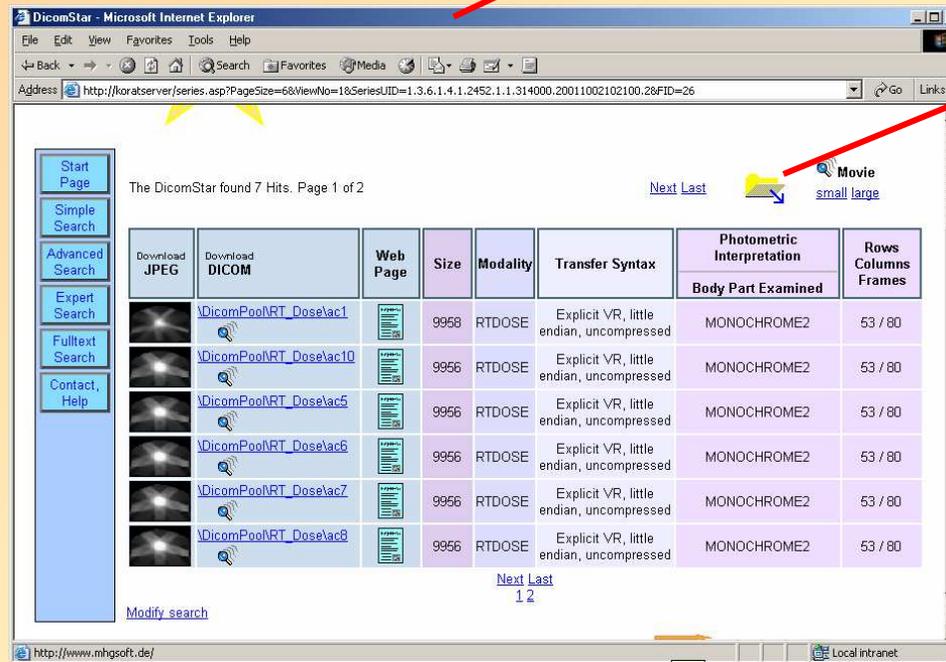
File Download

# Detail: Query Results presentation II

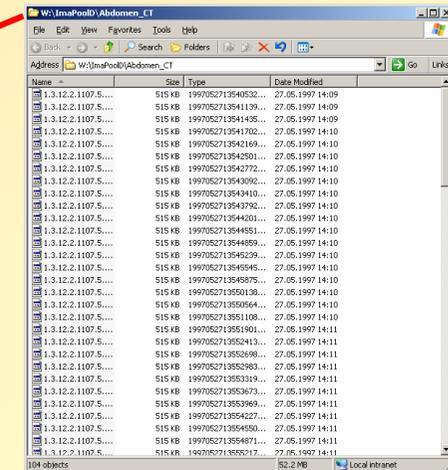


[Next](#) [Last](#)  
1 2 3

Hit list Navigation



File system access



All Images of same series



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# Detail: Simple Search

DicomStar - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites Media Print Mail

Address http://koratserver/query.asp Go Links

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powered by **PowerDicom**

Please make your selection:

Choose Modality: MR - Magnetic Resonance

Choose Transfer Syntax: - don't care -

Choose Photometric Interpretation: - don't care -

Choose Body Part Examined: - don't care -

Show 6 Hits per page

Submit Query

Please note that not all combinations of options are possible and conform to DICOM.

[Simple Search](#) [Advanced Search](#) [Expert Search](#) [Fulltext Search](#)

DicomStar Version 1.0, © 2005 **MHGS** 4/7/2005 10:48:17 AM

DicomStar 1.0 Local intranet



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Easy user interface – looking for images

# Detail: Advanced Search

Choose tags from a list and build your own query with your specific conditions!



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Advanced Search

The advanced search is:

1. Choose all the DICOM attributes will be searched.
2. Specify the sorting order.
3. Enter your search criteria.

**1. Columns**

(0018,1018) Secondary  
(0008,0021) Series Date  
(0008,103E) Series Description  
(0020,1000) Series Instance  
(0020,000E) Series Instance Number  
(0020,0011) Series Number  
(0008,0031) Series Title  
(0018,1622) Shutter Priority

**3. Criteria**

You can choose the criteria for your search here:

**Condition 1**  
(0008,0060) Modality = MR

OR

**Condition 2**  
(0008,0060) Modality = CT

< Back AND AND NOT OR Search

You can add further conditions by clicking on the 'AND', 'AND NOT' or 'OR' button.

Simple Search Advanced Search Expert Search Fulltext Search

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Local intranet

# Detail: Expert Search

Type in SQL statements!  
Very detailed search possible.



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## Welcome to the DicomStar Expert Page

You can compose your own SQL-Query here. Refer to [Help](#) for Details and a list of supported DICOM attributes.

Specify the DICOM attributes that you want to be displayed.

Enter your search criteria in SQL syntax

Optional field for additional clauses.

```
SELECT
S0008_0020, S0008_0008, S0008_0060, S0008_0070
FROM DicomStar
WHERE
(S0008_0020>'20011231') AND (S0008_0060='CT')
```

ORDER BY S0008\_0008 DESC

Show 6 Hits per page. Clear Fields Submit Query

DicomStar 1.0 Local intranet

# Detail: Patient Query

Type in the first letters of Patient's name.

The left screenshot shows the DicomStar search interface. The search box contains the text 'smit'. The right screenshot shows the search results page, which displays a table of 4 hits. A red arrow points from the search box in the left screenshot to the table in the right screenshot.

| Name                    | ID         | Birth Date | Sex |
|-------------------------|------------|------------|-----|
| SMITH*HAROLD            | PIKR750000 |            | M   |
| SMITH*JOHN*PAUL11111111 | 19600707   |            | M   |
| SMITH*MARY              | ATL000001  |            |     |
| Smith*Mary              | ATL000001  |            | F   |



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Patients list

# Detail: Patient Navigation

Navigate ...

**DicomStar Patients Search**  
The DicomStar found 4 Hits. Page 1 of 1

| Name                                | ID         |
|-------------------------------------|------------|
| BABYGRAM*                           | CT00000023 |
| BARIUM-ENEMA D PRESTIGE V           |            |
| BERRA, JAMES                        | 874763492  |
| BRAIN WITH ANGIOVOLUMEER***X:545454 |            |

Simple Search Advanced Search Expert Search Fulltext Search Patient Search WADO Access Help Contact

... from Patient ...

**DicomStar Patients Search**  
The DicomStar found 1 Studies.

| Date     | Time | Acc. # | [Ref. Physician] |
|----------|------|--------|------------------|
| 19970114 |      |        |                  |

Simple Search Advanced Search Expert Search Fulltext Search Patient Search WADO Access Help Contact

... to studies ...

**DicomStar Patients Search**  
Series of BARIUM-ENEMA D

| Number | Modality | Date     | Time | Body Part | Description |
|--------|----------|----------|------|-----------|-------------|
| 1      | RF       | 19970114 |      |           |             |

Simple Search Advanced Search Expert Search Fulltext Search Patient Search WADO Access Help Contact

... to series ...

**DicomStar Patients Search**  
The DicomStar found 5 Hits. Page 1 of 1

| Download JPEG | Download DICOM | Web Page | Size    | Modality | Transfer Syntax                          | Photometric Interpretation | Body Part Examined | Rows Columns Frames |
|---------------|----------------|----------|---------|----------|------------------------------------------|----------------------------|--------------------|---------------------|
|               | 188            |          | 1051212 | RF       | Explicit VR, little endian, uncompressed | MONOCHROME2                | 1024 / 1024        | 1024 / 1024         |
|               | 182            |          | 1051212 | RF       | Explicit VR, little endian, uncompressed | MONOCHROME2                | 1024 / 1024        | 1024 / 1024         |
|               | 188            |          | 1051212 | RF       | Explicit VR, little endian, uncompressed | MONOCHROME2                | 1024 / 1024        | 1024 / 1024         |
|               | 189            |          | 1051212 | RF       | Explicit VR, little endian, uncompressed | MONOCHROME2                | 1024 / 1024        | 1024 / 1024         |
|               | 190            |          | 1051214 | RF       | Explicit VR, little endian, uncompressed | MONOCHROME2                | 1024 / 1024        | 1024 / 1024         |

Simple Search Advanced Search Expert Search Fulltext Search Patient Search WADO Access Help Contact

... to images.



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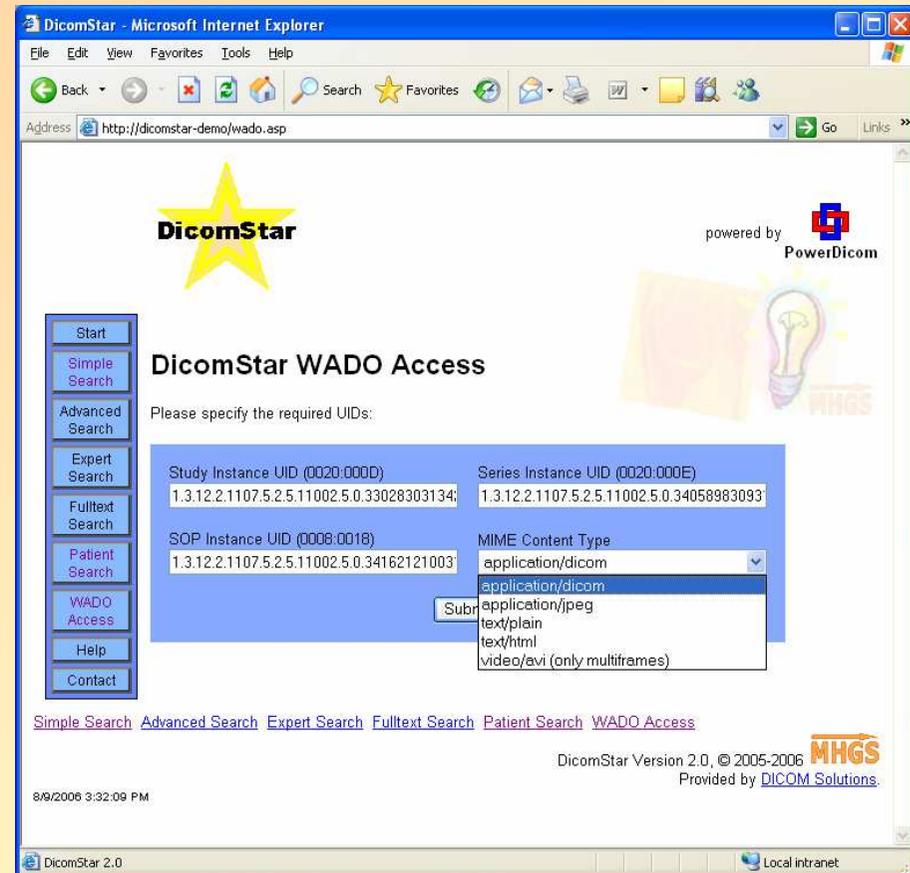
# Detail: WADO Access

WADO is a fast transfer protocol for accessing DICOM Objects over HTTP.

DicomStar supports multiple MIME types.



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# Detail: True Fulltext Search

All files are indexed for a quick Fulltext search, including wildcards



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Start Page  
Simple Search  
Advanced Search  
Expert Search  
Fulltext Search  
Contact, Help

Many DICOM attributes are not listed in the DicomStar Database. To provide a possibility to search these tags there is the **Full-Text Search**.  
You can enter the search items below. Enclose single terms by quotation marks ". You can combine multiple terms by *AND*, *OR* or *AND NOT*. Append an asterisk \* to search for files containing words that start with the specified string.

**"MONO\*" AND "HEAD" AND "DERIVED"**

Show 6 Hits per page Search

Currently DicomStar has about 349 files on board.

[Simple Search](#) [Advanced Search](#) [Expert Search](#) [Fulltext Search](#)

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DicomStar 1.0 Local intranet

Means: Show me all files containing the words 'MONO\*' and 'HEAD' and 'DERIVED'.

Note '\*' is a wildcard!

# Detail: Web Page

HTML formatted DICOM file for easy data exchange

Nested Sequences  
are supported

| Tag           | Name                           | VR | VM                             | Value                                                                                 |
|---------------|--------------------------------|----|--------------------------------|---------------------------------------------------------------------------------------|
| (0002,0000)   | Group Length                   | UL | 1 150                          |                                                                                       |
| (0002,0002)   | Media Storage SOP Class UID    | UI | 1 1.2.840.10008.5.1.4.1.1.20   |                                                                                       |
| (0002,0003)   | Media Storage SOP Instance UID | UI | 1 1.2.840.10008.5.1.4.1.1.20.1 |                                                                                       |
| (0054,0414)   | Relationship Code Sequence     | SQ | 1                              |                                                                                       |
| > (0008,0100) | Code Value                     | SH | 1 G-5191                       |                                                                                       |
| > (0008,0102) | Coding Scheme Designator       | SH | 1 99SDM                        |                                                                                       |
| > (0008,0104) | Code Meaning                   | LO | 1 Feet-first                   |                                                                                       |
| (7FE0,0010)   | Pixel Data                     | OW | 1                              |  |

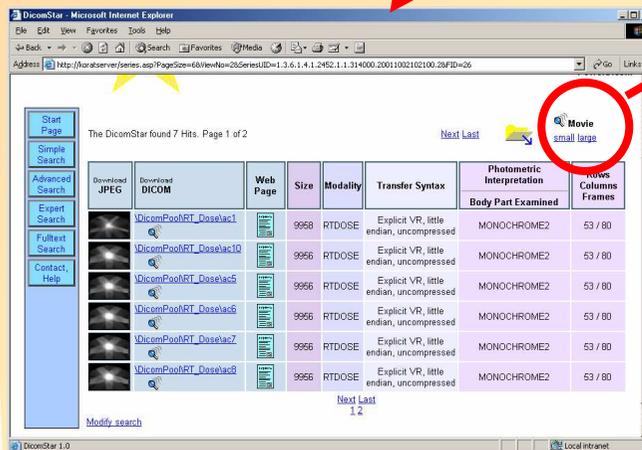
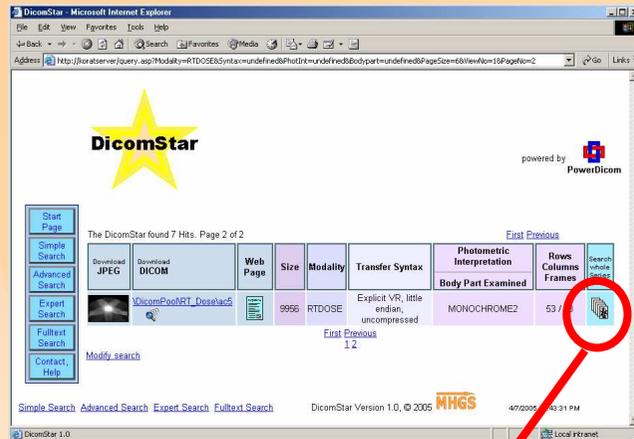
Image preview

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# Detail: Integrated Movie Player

## 1. Perform a query, open full series

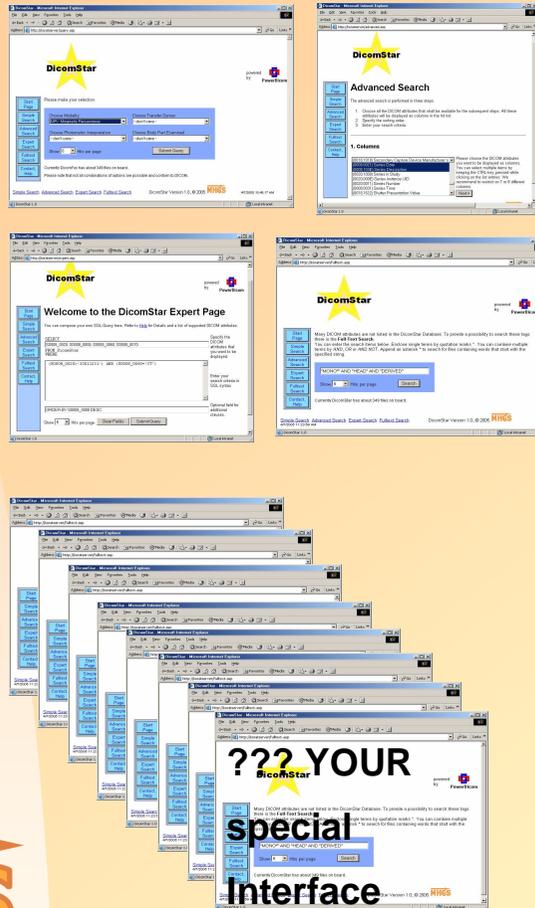


## 2. Play Movie ...



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# More user interfaces ...



Simple Search, Advanced Search, Expert Search, Fulltext Search, Patient Search, WADO Access ...

These are only **examples** for YOUR view to database queries.

Please keep in mind:

A well sorted database is the basic layer for many different user interfaces – input masks AND result presentation.

For YOUR special view to data please contact us.



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# Maintenance:

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- **Easy!**
- **Main work for inserting new files into database is automated by scripts**
- **'Few click' solution**



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# Performance:

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- **Productive system is running at customer!**

- **Typical query:  
less than 2 seconds**

**Host: Windows 2000 Server @ Pentium II, 800 MHz, 512 MByte RAM, IIS, approx. 60.000 DICOM files on board**

**Client: Windows XP @ Pentium IV, 1.5 GHz, 1 GByte RAM**

Note:

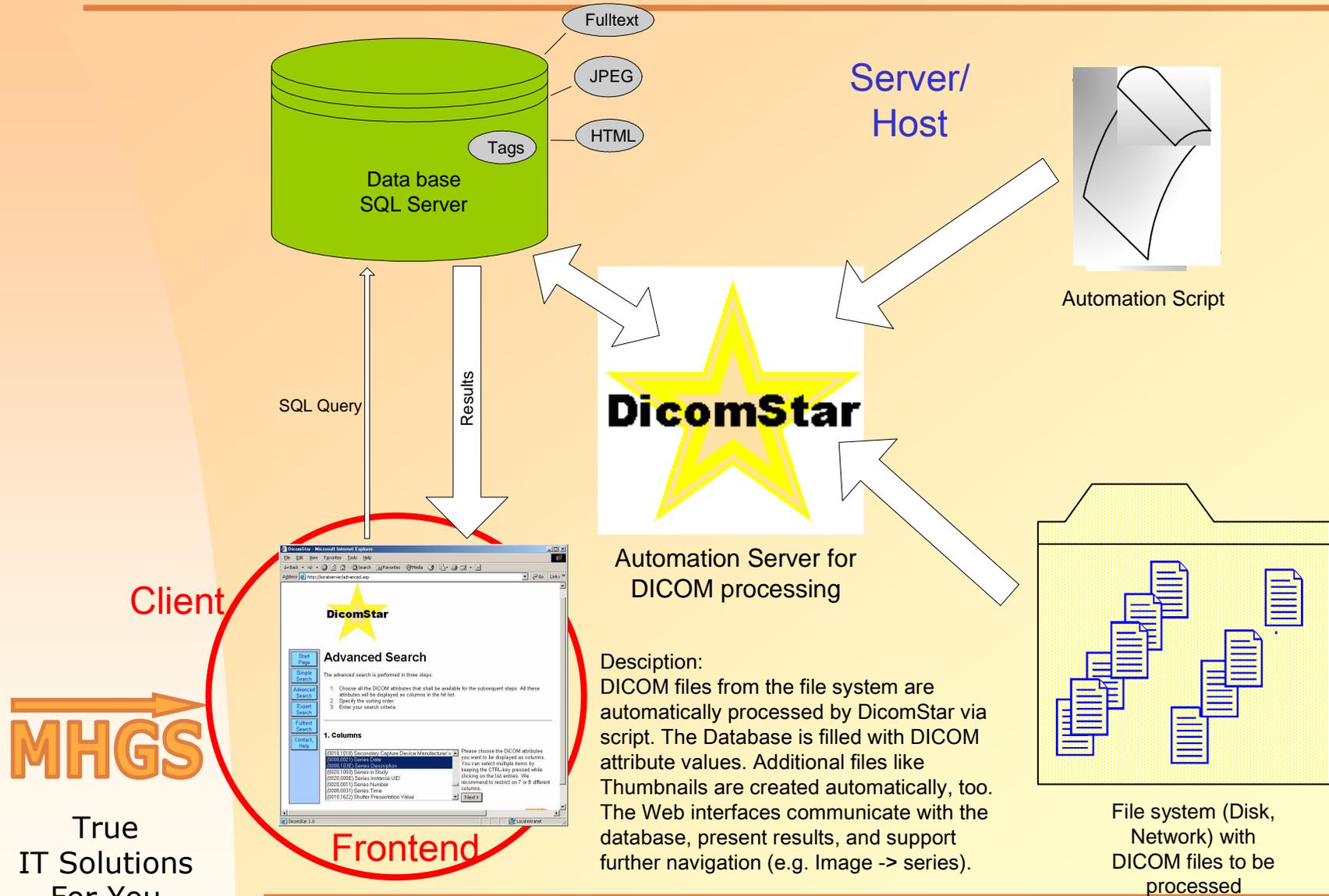
Performance depends on traffic and connection speed.

Number of DICOM files loaded into database is only limited by database capacity and available disk space – not by DicomStar.



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# Technical Overview:



# System Requirements:

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- Web Service (HTTP Protocol)
- Client-Server Architecture

## Host:

- Windows Server
- Internet Information Server (IIS)
- Database (SQL Server)

## Client:

- Internet Browser
- **No additional Software necessary !!!**



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# Contact:

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- Internet: <http://www.MHGSoft.de>  
<http://www.dicom-solutions.com>
- eMail: [mhgs@MHGSoft.de](mailto:mhgs@MHGSoft.de)



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