SPICA pipeline

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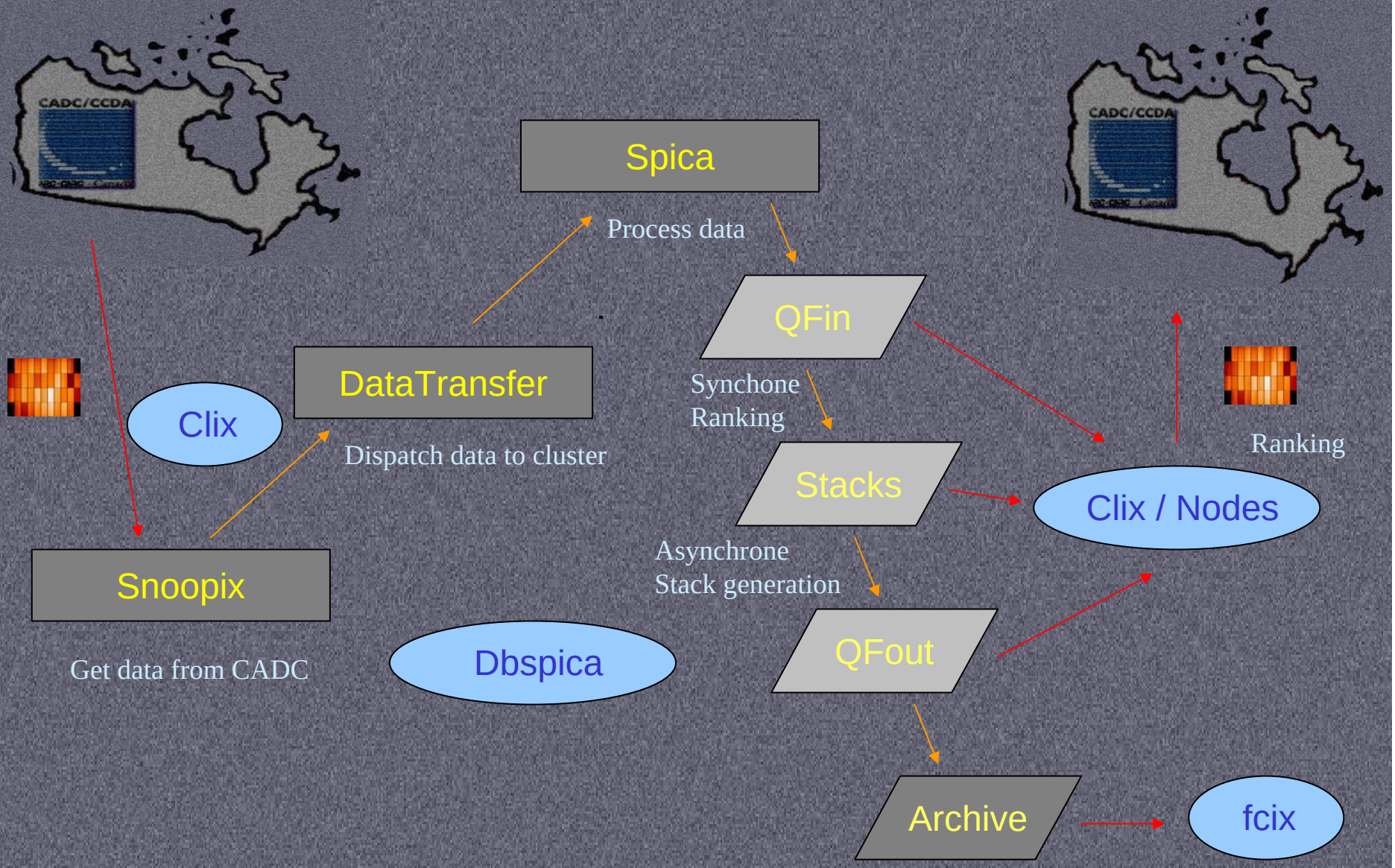
TERAPIX – IAP

Outline

- Terapix pipeline overview
- Architecture
- Installation
- Spica Automatic
- Web Interface
- Spica Database
- Spica Web
- Improvements
- Conclusion

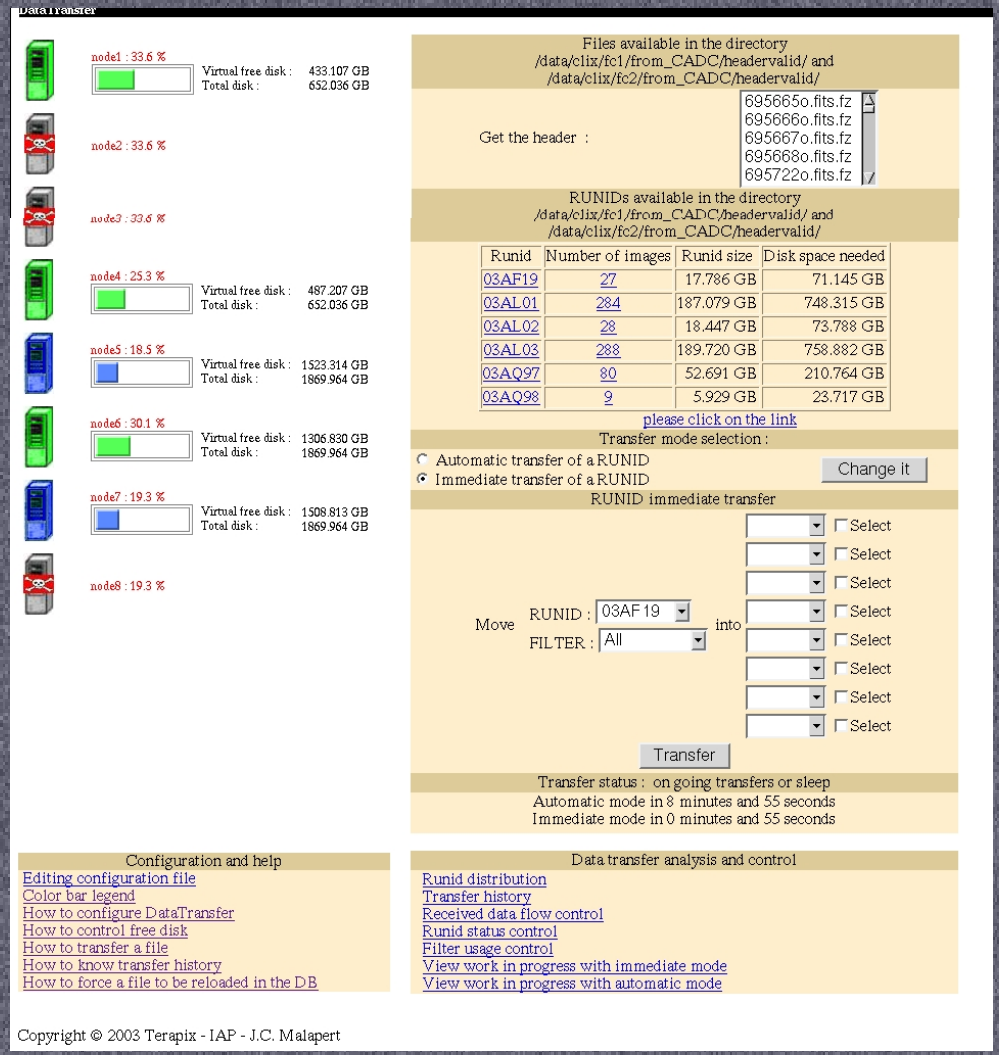
Terapix pipeline overview



Snooppix overview

- Utility for non-interactive download
- Monitors the CADC-CFHTLS archive area
- Selects of type of data to download
- Checks for data with new Elixir history (new or reprocessed by CFHT)
- Transfers these data to Terapix repository

Datatransfer



- Transfers the data monitored by SNOOPPIX from the data transfer repository disks to Terapix processing disks
- Checks available disk space on each node and sends the data on disks with enough space to produce weight + flag map images
- Makes statistics on images (period, RunID, filter, etc…) and stores meta-data on local DB
- Can run automatically or manually

Runid distribution - Copyright © 2003 Terapix - Mozilla

File Edit View Go Bookmarks Tools Window Help

Back Forward Reload Stop http://clix.iap.fr/admin/datatransfer/distribution.php Search Print

TERAPIX

Welcome to DataTransfer

DataTransfer > Analysis and Control > Runid distribution

	node1	node2	node3	node4	node5	node6	node7	node8	node9	node10
03AL04	100.0% *[2 files]*	-	-	-	-	-	-	-	-	-
03AQ98	-	-	-	100.0% *[10 files]*	-	-	-	-	-	-
03AF19	-	-	-	-	100.0% *[45 files]*	-	-	-	-	-
03AL05	-	-	-	-	-	100.0% *[49 files]*	-	-	-	-
03AL01	16.1% *[73 files]*	-	-	-	-	50.7% *[230 files]*	24.7% *[112 files]*	-	6.6% *[30 files]*	17.0% *[77 files]*
03AL02	-	-	-	-	-	35.9% *[28 files]*	64.1% *[50 files]*	-	-	-
03AL03	-	20.8% *[83 files]*	-	-	-	-	-	31.8% *[127 files]*	47.4% *[189 files]*	-
03AQ97	19.9% *[70 files]*	16.2% *[57 files]*	13.6% *[48 files]*	-	-	-	-	65.6% *[231 files]*	-	20.5% *[72 files]*

Done

SPICA Characteristics

- MegaCam data processing tool
- Data Flow control (based on runid/filter)
- Scamp, Swarp, Sextractor and QualityFITS tools
- Cluster/Standalone
- 5-level scripts
- Synchronous /asynchronous scripts
- Builds shell scripts to feed spica daemon
- Several Modes (survey/images/area…)
- Automatic (scripts) / Manual (Web) processing
- Handles MEF/CCD files
- Database storage (history / XML output)
- Web report

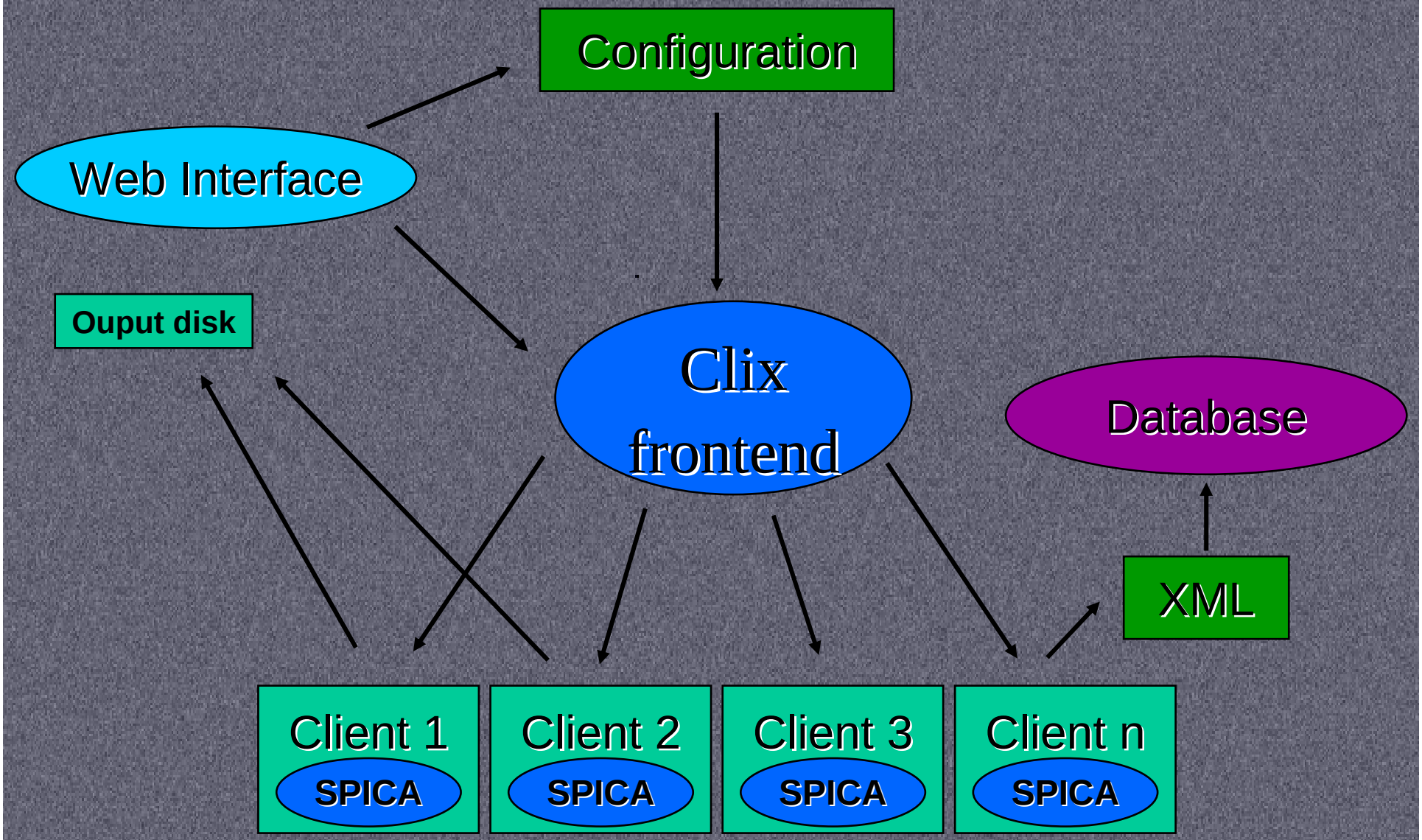
Architecture proposed at first

- Client/Server
  - Server prepares stacks
  - Server searches for available node
  - Server sends stack according to cpu, ram, disk node
- Redondant server
  - In case of hardware failure
- Database
  - Pipeline memory

Terapix constraints

- Nodes should be autonomous
  - No redundancy
  - No server
- I/O should be minimized
  - Data on the same node
  - Local output and remote output for CADC
- Release configuration « Frozen »
- Failure tolerances
  - Save pipeline status
- Can work with any image
  - Dynamic and flexible database (dbterapix)

Hardware configuration



History

- Pipeline CFH12k
  - No database, rsh
  - February 2002 – June 2002
- Spica Web
  - Elixir / Dbterapix / Astrometrix
  - June 2002 – June 2004
- Spica automatic
  - Spica / Dbspica / Scamp
  - June 2004 – March 2012

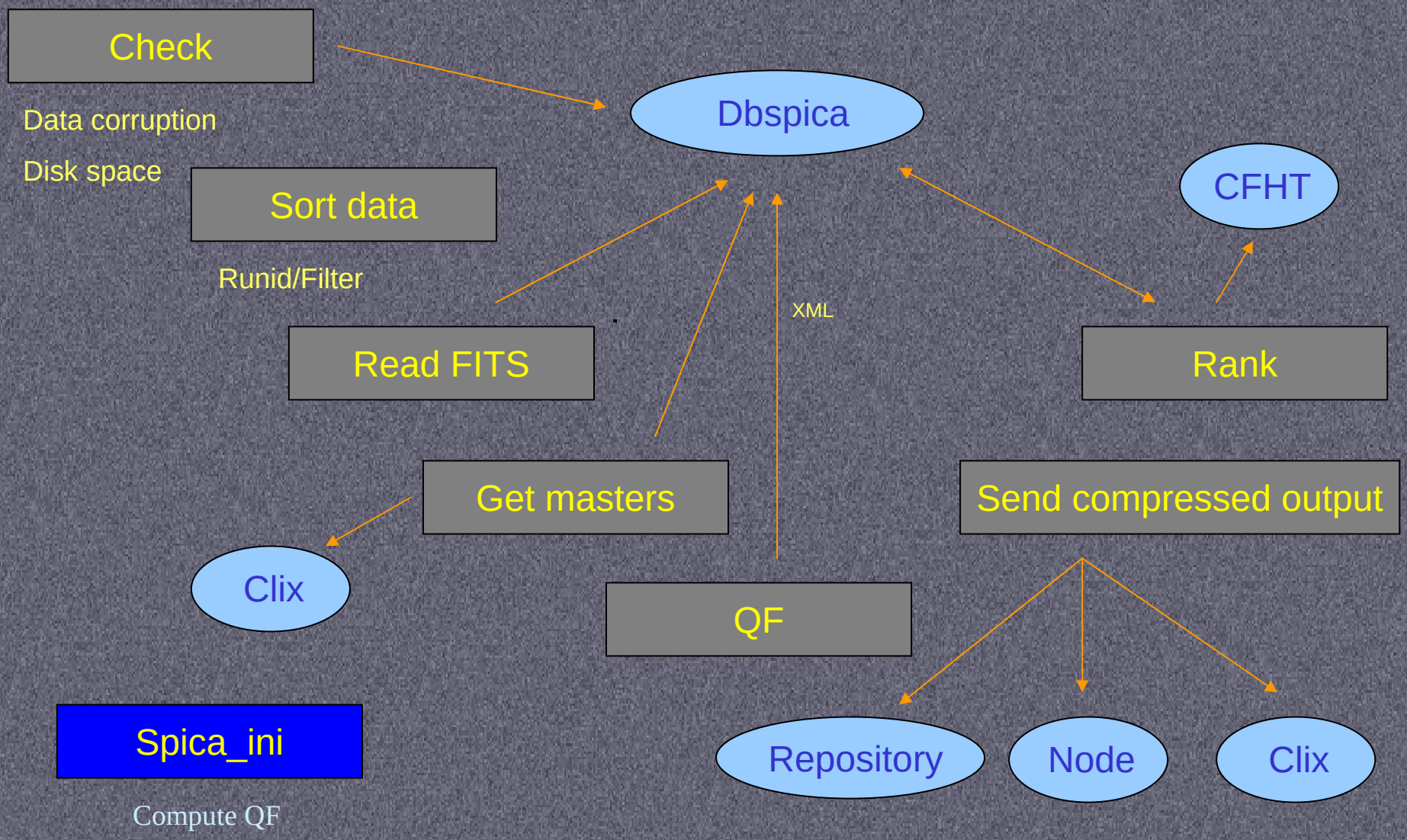
Installation

- Requirements :
  - Perl, PHP, MySQL, NFS (almost optional)
- Perl Modules:
  - DBI : database connector
  - Astro-WCS : compute WCS coordinates
  - XML-Simple : XML parsing
  - PDL : completeness graphs
- Spica : 3 packs + 1 db
  - Core : perl scripts (/usr/local/spica/)
  - Web interface : PHP scripts (/var/www/html/)
  - Configuration files (/usr/local/etc/spica/)
  - Database SQL table

QualityFITS in

- Synchronous Perl script (spica_ini.pl)
  - Runs on each node
  - One for each raid partition
  - 20 to 50 minutes per file
- Todo
  - Reprocessing
  - Using CFHT Metadata
  - Downloading masters from CFHT, from other nodes
  - Webservice ?
    - Faster but data is dispatched randomly => problems when crash occurs

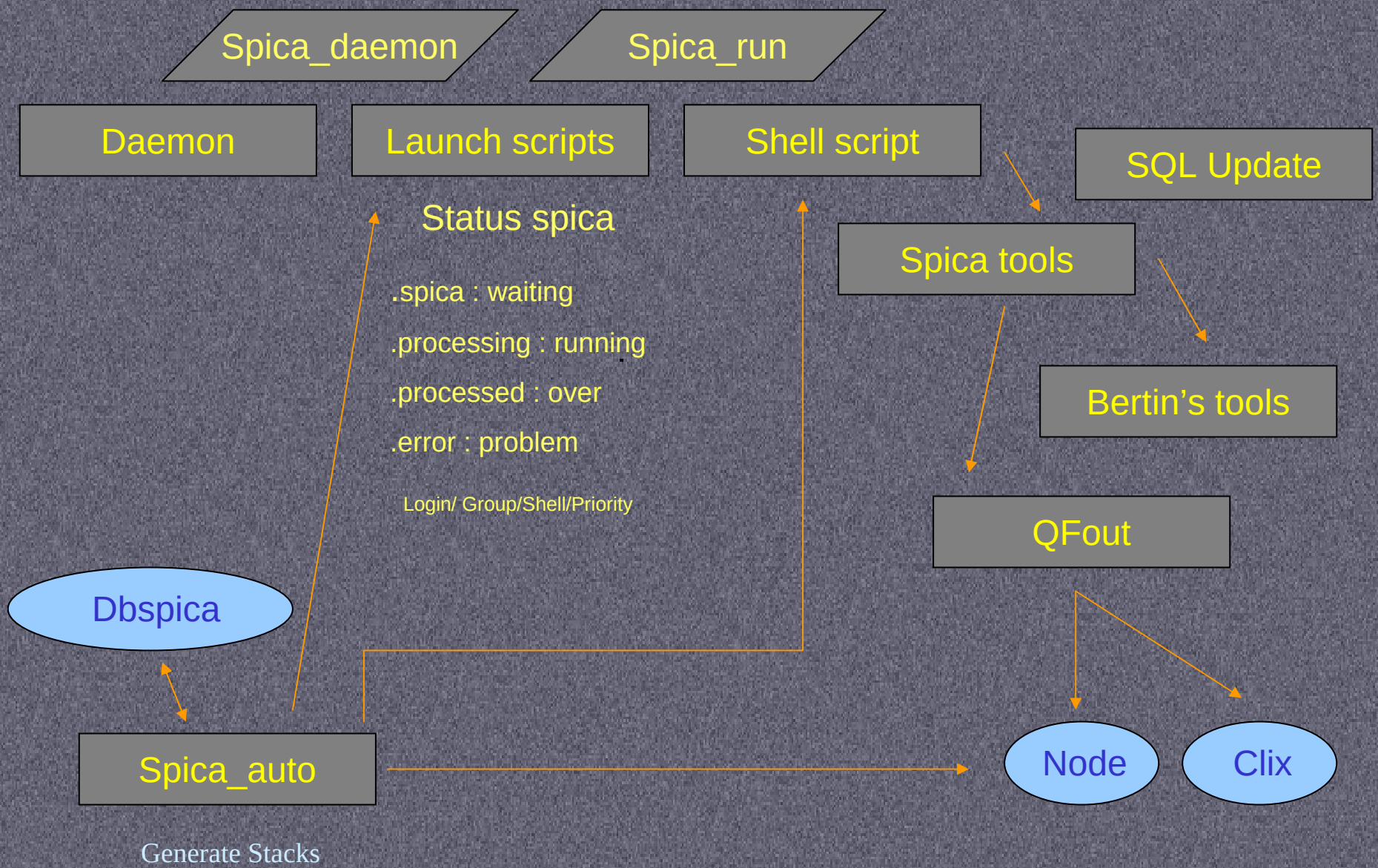
QualityFITS in



Spica

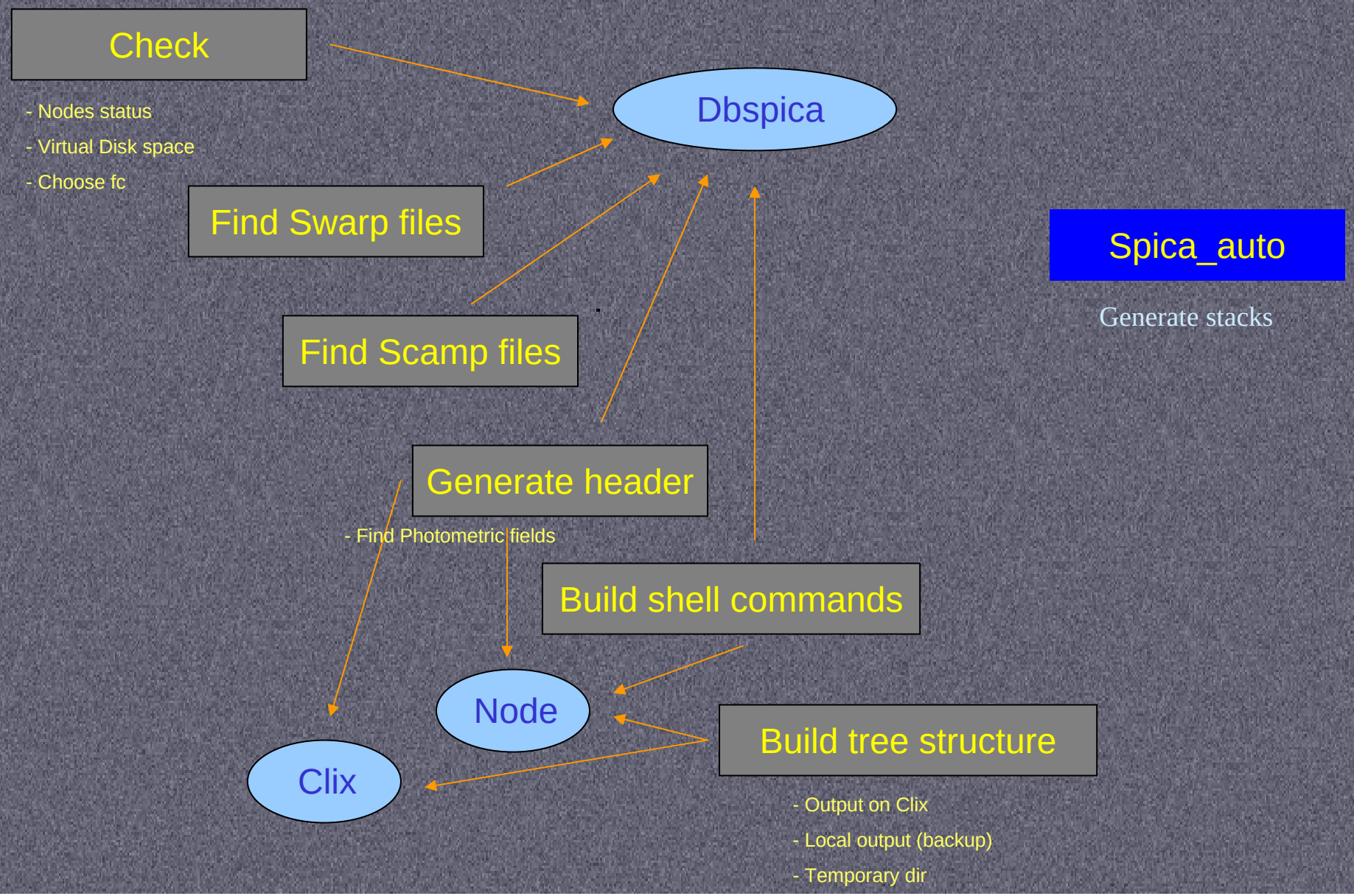
- Perl script (spica_auto.pl)
  - Generates commands and launches scripts for each stack
  - Generates .head files (photometry)
  - Copies/Links weighted data from other nodes
  - Chooses files according to stacks rules
    - Filter, Exposure Time, Skyprobe, Seeing …
- Daemon scripts
  - Chooses which stack to run (priority rules)
  - Restarts stopped stacks (software crash)

Spica running on nodes



Generate Stacks

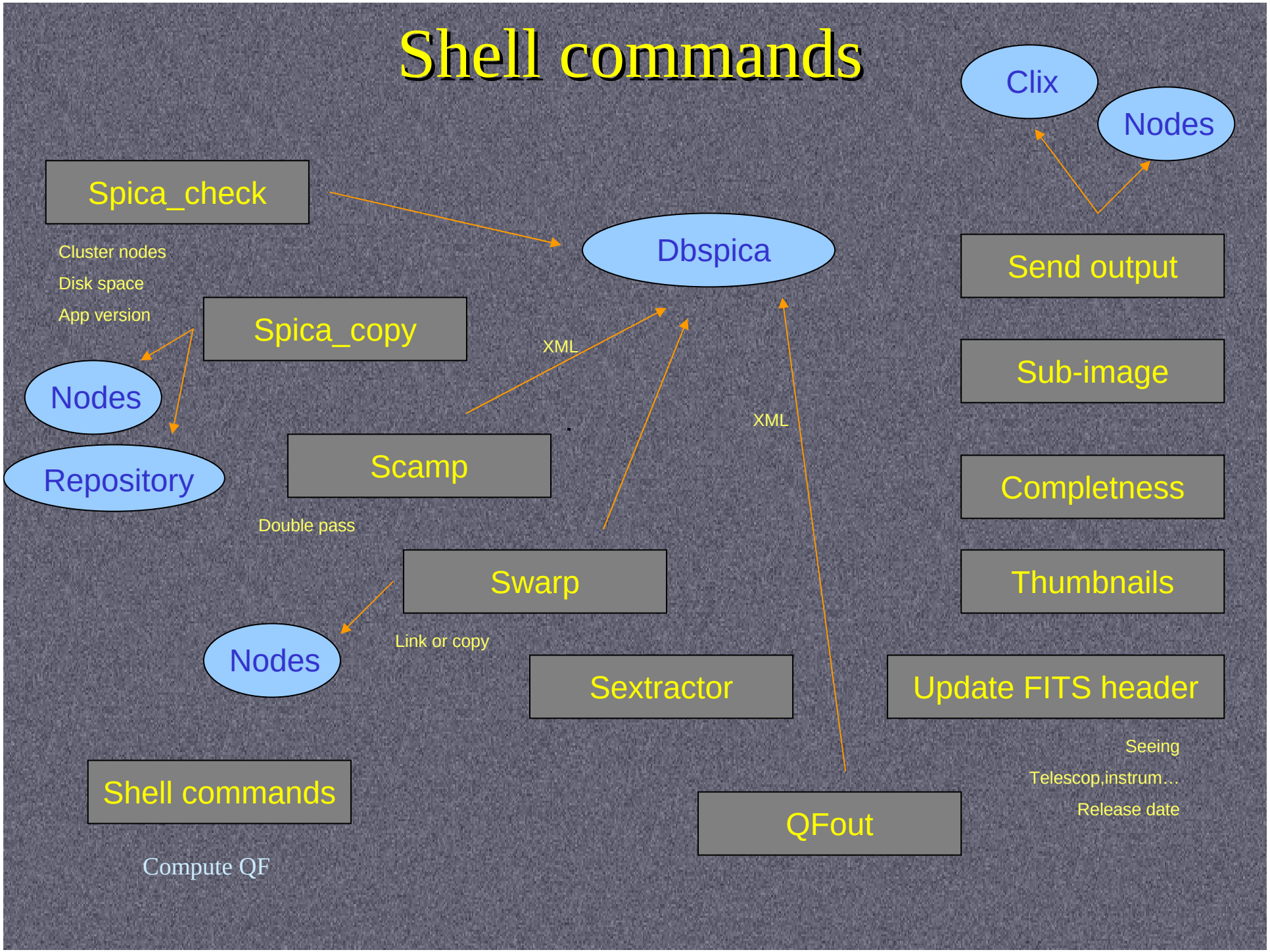
Spica on each node



Spica

- Finds for each file located on the node
  - To which stack the file belongs
  - Lists files to be used by swarp
    - Makes symbolic links to other nodes (or copies the files)
  - Lists files to be used by scamp
    - Number of sources must be uniform across the field of view
    - Create .ahead for missing Phot_C, Scampcol, PhotFlag
  - Creates tree structure (temporary working directory)
- Finds Photometric files
  - Uses CFHT Meta-data (skyprobe, ranking)
- Generates one shell command file and one starting file per stack

Shell commands



Spica_auto

- Computing modes
  - Image by image (VW)
  - Stack (Wide, Pre-Wide, Deep)
  - PI …
- Finds sky areas to stack
  - Automatic group selection
  - Sky grid
  - Loads location sky fields coord.
- Filtering rules
  - Filter, Exposure Time, Skyprobe, Seeing …

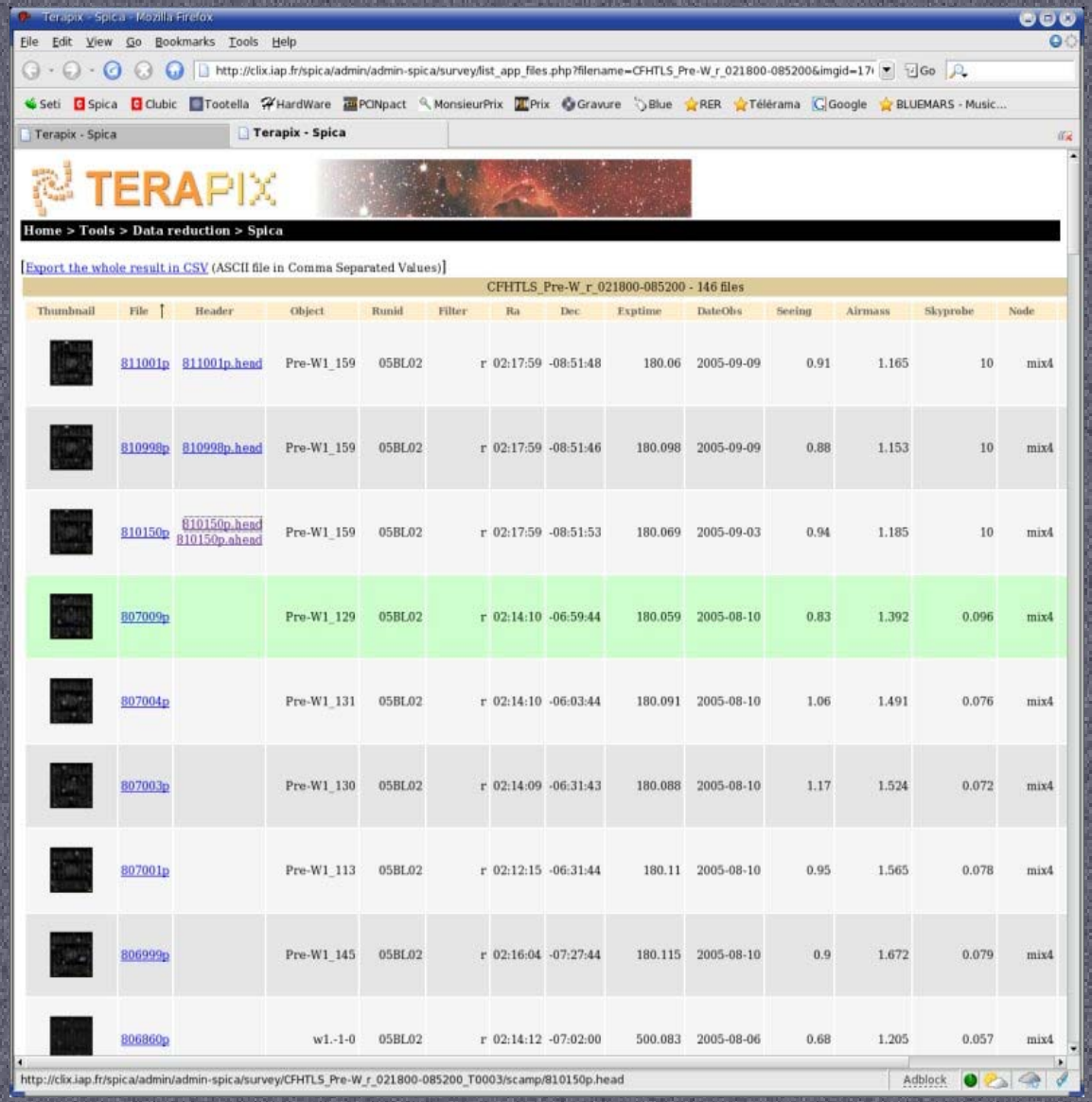
Spica scripts (1)

- Spica_auto.pl
  - Generates shell command scripts for each stack
  - Prepares stack files according to filtering rules
  - Generates XML history
  - Fills dbspica
- Spica_daemon.pl
  - Executes the .spica file
  - .error, .processed, .processing status
- Spica_run.pl
  - Runs each shell command lines
  - Checks status control
  - Aborts and saves if problems

Spica scripts (2)

- Shell command files
  - Copies/Updates files
  - Executes applications and spica scripts
- Spica scripts
  - Database queries / loading XML
  - Input/Output management
  - Extracts sub-image/Comptness/thumbnails/ Update QF…

Stacks list



Thumbnail	File	Header	Object	Runid	Filter	Ra	Dec	Exptime	DateObs	Seeing	Airmass	Skyprobe	Node
	811001p	811001p.head	Pre-W1_159	05BL02	r	02:17:59	-08:51:48	180.06	2005-09-09	0.91	1.165	10	mix4
	810998p	810998p.head	Pre-W1_159	05BL02	r	02:17:59	-08:51:46	180.098	2005-09-09	0.88	1.153	10	mix4
	810150p	810150p.head 810150p.ahead	Pre-W1_159	05BL02	r	02:17:59	-08:51:53	180.069	2005-09-03	0.94	1.185	10	mix4
	807009p		Pre-W1_129	05BL02	r	02:14:10	-06:59:44	180.059	2005-08-10	0.83	1.392	0.096	mix4
	807004p		Pre-W1_131	05BL02	r	02:14:10	-06:03:44	180.091	2005-08-10	1.06	1.491	0.076	mix4
	807003p		Pre-W1_130	05BL02	r	02:14:09	-06:31:43	180.088	2005-08-10	1.17	1.524	0.072	mix4
	807001p		Pre-W1_113	05BL02	r	02:12:15	-06:31:44	180.11	2005-08-10	0.95	1.565	0.078	mix4
	806999p		Pre-W1_145	05BL02	r	02:16:04	-07:27:44	180.115	2005-08-10	0.9	1.672	0.079	mix4
	806860p		w1.-1-0	05BL02	r	02:14:12	-07:02:00	500.083	2005-08-06	0.68	1.205	0.057	mix4

- Stacks list :
  - Pending
  - Running
  - Completed
- Files list :
  - Scamp
  - Swarp
- Priority
- Ranking
- Processing time

Spica scripts

- Spica_ini : QF
- Spica_auto : Prepares and generates stacks
- QF_xml : Loads XML QF into dbspica
- Spica_check : Checks before launch
- Spica_run : Runs each shell command
- Spica_daemon : Launches stacks
- Comptness : Computes comptness
- Stifbin : Thumbnails
- Spica_copy : Copies ldac node to node
- End_runid : Email, Symlink, Closes stacks
- Scamp_xml : Loads Scamp XML into dbspica
- Extract_subimage : Extracts stack subimage
- Ranking_auto : Stack notation
- Update_seeing : Updates FITS keyword
- Update_swarp_header : Updates external header
- Update_db_spica : SQL update
- Update_release_date : Updates FITS keywords
- Qf_db_spica : Updates QF output in dbspica
- Update_qf2 : Updates QF HTML page

PHP Scripts

- Display :
  - QF, Stacks report
  - Data management
  - Data-mining
- Dbspica management
- Spica Web
  - Data selection
  - User account
  - …

Spica database (1)

- 29 tables
  - Application configurations (Spica Web)
  - Cluster configurations (node, user, path, problem)
  - QF XML output, Scamp XML, Comptness, WCS
  - Metadata (skyprobe)
  - Spica auto
    - Auto_status (stack list)
    - Auto_run (status list)
    - Auto_job (application list)
    - Auto_file (file list)
- Processing history
- Data-mining tool

Spica database (2)

- ClusterNode
  - cluster configuration (Ram,Cpu,Disk,Status)
  - Checks available node (via crontab script)
- Application
  - Name, Binary,Version, Date, Config files
  - Checks all nodes have the same binary
  - Updated when a new binary is installed
- Auto_view
  - Login, passwd, runid, email
  - Restricts access for Web interface
  - Updated with PI Data

Spica testing

- Pix3/Pix4 testing nodes
- How to use it :
  - Install images on pix3/pix4 node
  - Install/Update
    - Spica scripts
    - Applications
    - Configuration files (Release number + options)
    - Dbspica (version number)
  - Run QFin with spica_ini.pl
  - Run stacking with spica_auto.pl
  - If necessary to remove QFin/Stack, use Web interface

Software failure (1)

- Failure detection :
  - Spica_check before running each stack
    - Node status
    - Disks space
    - Stack status
    - Application version number
  - ldac repository used in case of node crash
- If a failure happens :
  - Spica processes the next stack
  - Spica sends Teraop Email
  - Spica changes Status in dbspica
  - Spica moves .processing to .error

Software failure (2)

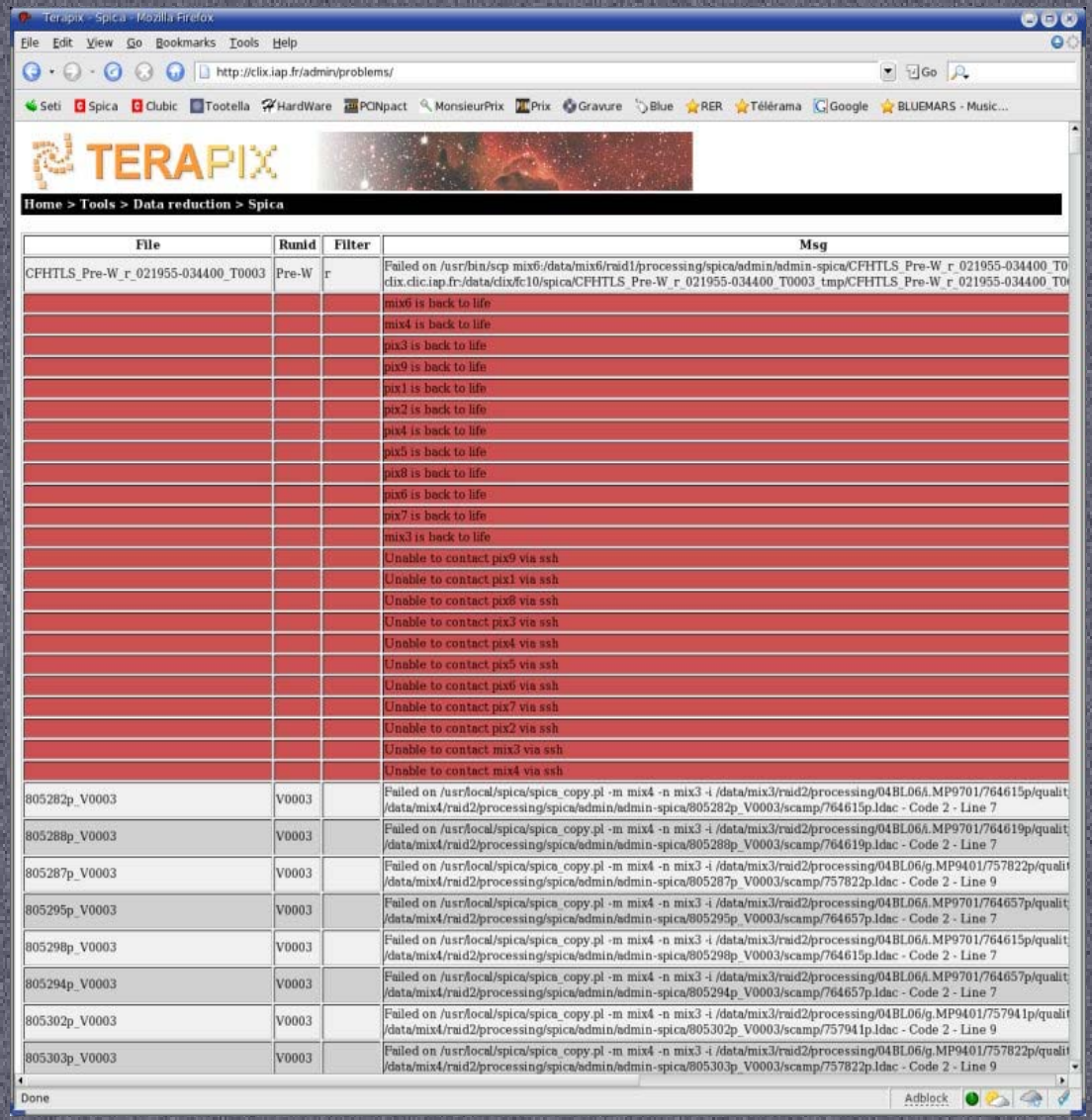
- Standard procedure to recover from the failure :
  - Check files, solve the problems and restart
  - Rename launch script from .error to .spica (stack)
  - Remove lock file (QFin)
  - Change Status_spica flag in dbspica.auto_status
- Restart from the failed command (memorized by Spica when failure happened)

- Note : NFS dependence
  - Web interface
  - Swarp symbolic links (to avoid data transfer between nodes)

Hardware failure

- Sensitive hosts (not allowed to crash)
  - Dbterapix : Dbspica
  - Clix : input/output disks, mail, DNS
  - Mix6 : repository ldac
    - Note : Crontab scripts checks node state regularly
- When hardware failure happens :
  - Find which QF,Stack was running
  - Check Dbspica
  - Check files located on nodes and output disks
  - Unlock and repair or delete
  - Remove stack,QF to clean dbspica

Spica problem interface



File	Runid	Filter	Msg
CFHTLS_Pre-W_r_021955-034400_T0003	Pre-W	r	Failed on /usr/bin/scp mix6:/data/mix6/raid1/processing/spica/admin/admin-spica/CFHTLS_Pre-W_r_021955-034400_T0 clix.clic.iap.fr:/data/clix/fc10/spica/CFHTLS_Pre-W_r_021955-034400_T0003_tmp/CFHTLS_Pre-W_r_021955-034400_T0
			mix6 is back to life
			mix4 is back to life
			pix3 is back to life
			pix9 is back to life
			pix1 is back to life
			pix2 is back to life
			pix4 is back to life
			pix5 is back to life
			pix8 is back to life
			pix6 is back to life
			pix7 is back to life
			mix3 is back to life
			Unable to contact pix9 via ssh
			Unable to contact pix1 via ssh
			Unable to contact pix8 via ssh
			Unable to contact pix3 via ssh
			Unable to contact pix4 via ssh
			Unable to contact pix5 via ssh
			Unable to contact pix6 via ssh
			Unable to contact pix7 via ssh
			Unable to contact pix2 via ssh
			Unable to contact mix3 via ssh
			Unable to contact mix4 via ssh
805282p_V0003	V0003		Failed on /usr/local/spica/spica_copy.pl -m mix4 -n mix3 -i /data/mix3/raid2/processing/04BL06/i.MP9701/764615p/qualit /data/mix4/raid2/processing/spica/admin/admin-spica/805282p_V0003/scamp/764615p.ldac - Code 2 - Line 7
805288p_V0003	V0003		Failed on /usr/local/spica/spica_copy.pl -m mix4 -n mix3 -i /data/mix3/raid2/processing/04BL06/i.MP9701/764619p/qualit /data/mix4/raid2/processing/spica/admin/admin-spica/805288p_V0003/scamp/764619p.ldac - Code 2 - Line 7
805287p_V0003	V0003		Failed on /usr/local/spica/spica_copy.pl -m mix4 -n mix3 -i /data/mix3/raid2/processing/04BL06/g.MP9401/757822p/qualit /data/mix4/raid2/processing/spica/admin/admin-spica/805287p_V0003/scamp/757822p.ldac - Code 2 - Line 9
805295p_V0003	V0003		Failed on /usr/local/spica/spica_copy.pl -m mix4 -n mix3 -i /data/mix3/raid2/processing/04BL06/i.MP9701/764657p/qualit /data/mix4/raid2/processing/spica/admin/admin-spica/805295p_V0003/scamp/764657p.ldac - Code 2 - Line 7
805298p_V0003	V0003		Failed on /usr/local/spica/spica_copy.pl -m mix4 -n mix3 -i /data/mix3/raid2/processing/04BL06/i.MP9701/764615p/qualit /data/mix4/raid2/processing/spica/admin/admin-spica/805298p_V0003/scamp/764615p.ldac - Code 2 - Line 7
805294p_V0003	V0003		Failed on /usr/local/spica/spica_copy.pl -m mix4 -n mix3 -i /data/mix3/raid2/processing/04BL06/i.MP9701/764657p/qualit /data/mix4/raid2/processing/spica/admin/admin-spica/805294p_V0003/scamp/764657p.ldac - Code 2 - Line 7
805302p_V0003	V0003		Failed on /usr/local/spica/spica_copy.pl -m mix4 -n mix3 -i /data/mix3/raid2/processing/04BL06/g.MP9401/757941p/qualit /data/mix4/raid2/processing/spica/admin/admin-spica/805302p_V0003/scamp/757941p.ldac - Code 2 - Line 9
805303p_V0003	V0003		Failed on /usr/local/spica/spica_copy.pl -m mix4 -n mix3 -i /data/mix3/raid2/processing/04BL06/g.MP9401/757822p/qualit /data/mix4/raid2/processing/spica/admin/admin-spica/805303p_V0003/scamp/757822p.ldac - Code 2 - Line 9

- Summary of failures
  - Software
  - Hardware (red)
- Display :
  - File
  - Runid, Filter
  - Error message
  - Date
  - Node
  - Release mode,version

Spica updating

- How to update one (or more) application(s) :
  - Check permission to update (major/minor version number)
  - Install the application(s) on all nodes
  - Change configuration file if needed
  - Update application table in dbspica
- Updating Spica scripts
- Updating dbspica
- Adding a new node
  - Before Stacking
  - Update ClusterNode table in dbspica

F.A.Q. (1)

- I want to test my new software
  - Use Pix3/Pix4 ! ;)
- How to rebuild a stack ?
  - Remove it with the admin interface
  - Rerun spica_auto.pl to regenerate the command file
  - Make sure spica daemon is running
- How to launch Spica ?
  - QFin : spica_ini.pl
  - Stack : spica_auto.pl

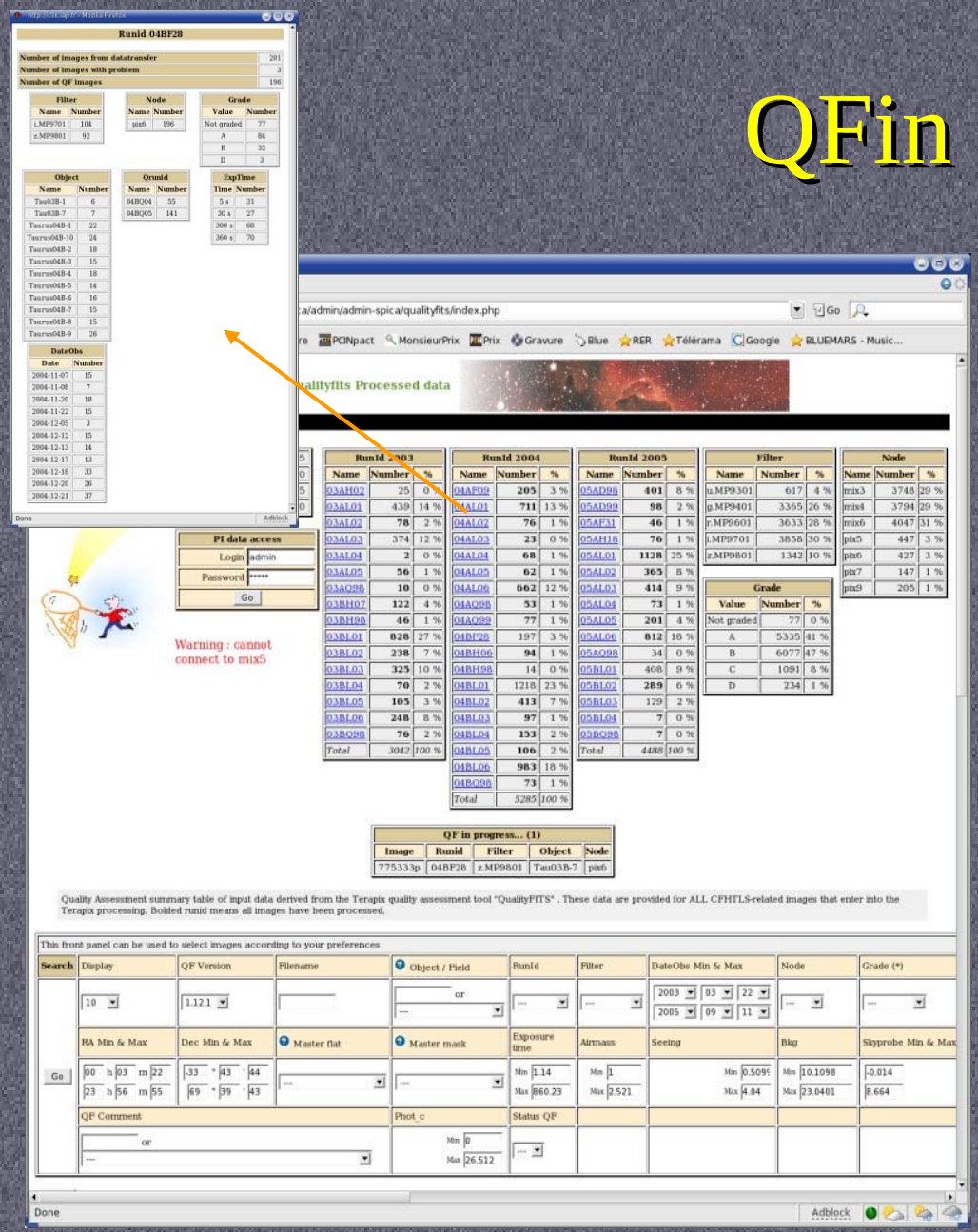
F.A.Q. (2)

- What can I do ?
  - Run QFin when spica is running
- What cannot I do ?
  - Remove QFin / Change rank when Spica is running
  - Update application with major version number
  - Change spica command files without deleting them beforehand
    - Selection of files
    - Ahead values
    - …

Web Interface

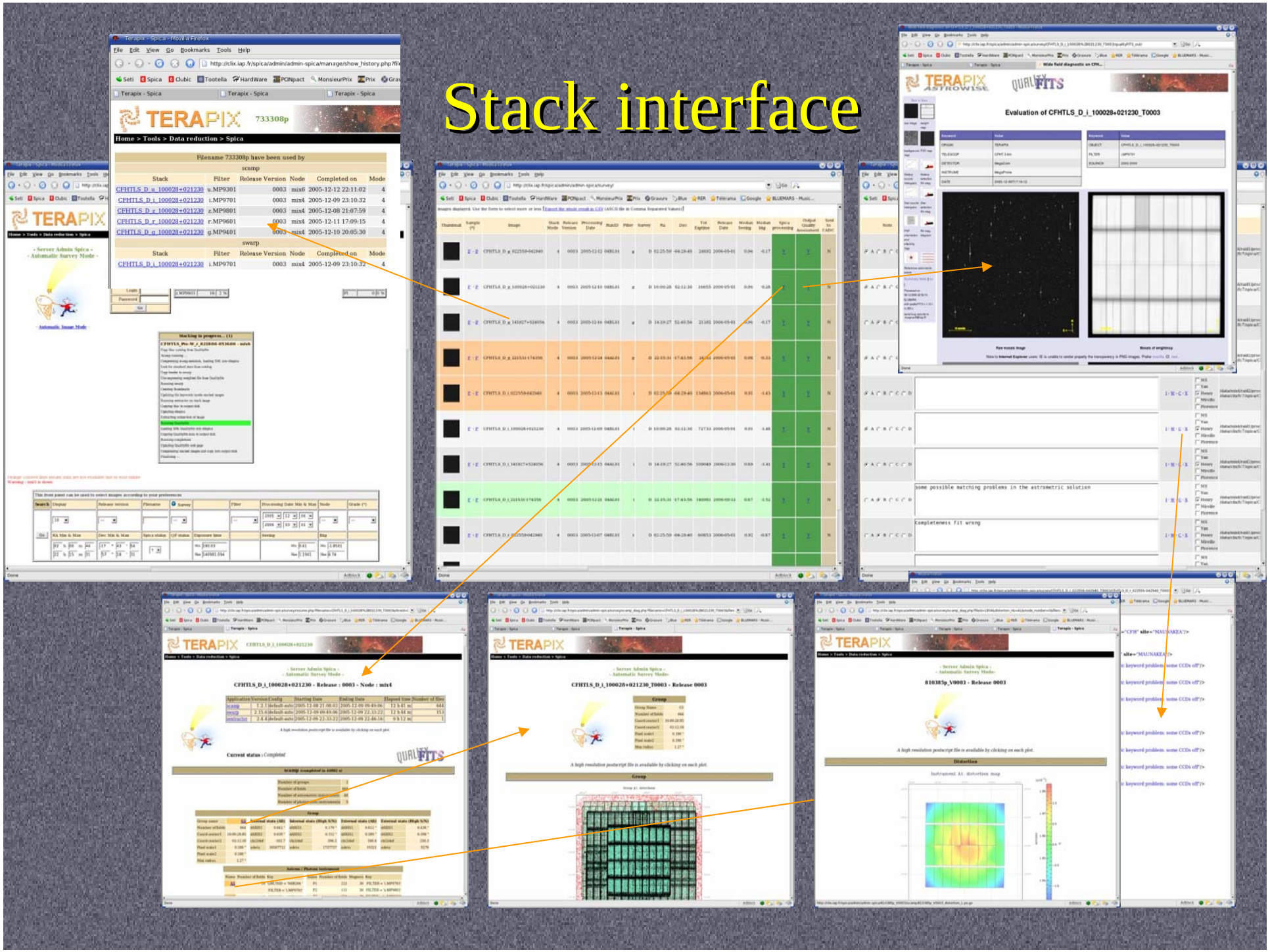
- Database Query
  - QFin
  - Stack
  - Individual image (QFin + VeryWide)
- Data Management
  - Ranking QF and stack
  - Removing QFin / Stacks
- Data-mining
  - CPU stats
  - Stack comparison
  - Scamp / Completeness plots

QFin interface

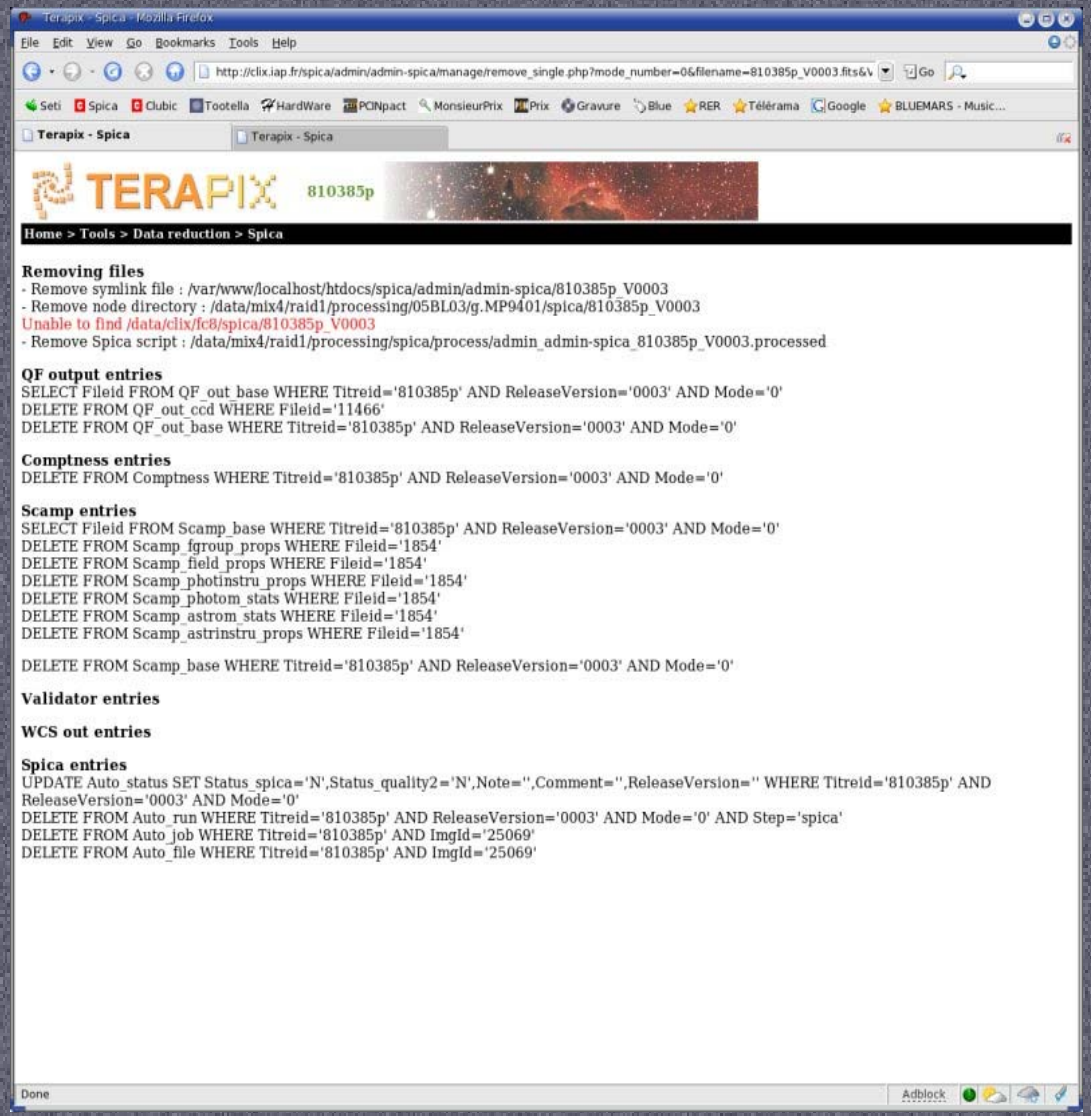


- QFin in progress
- QFin summary
- PI access restricted
- Search utility
  - Processing node, Status
  - Input files (master…)
  - Criteria (runid, filter…)
  - Output fields (seeing…)
- Reprocessing
- Validation
  - Ranking
  - Comments
- Output files :
  - Location
  - Input file, weight, catalog

Stack interface

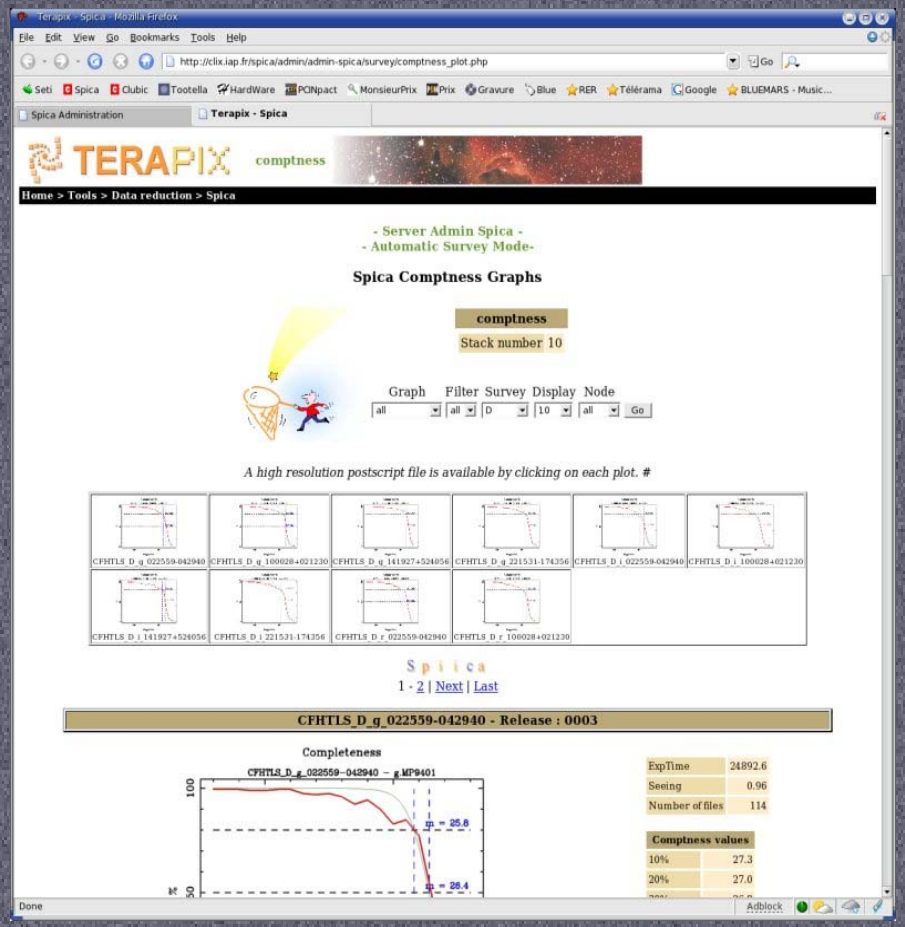


Stacks removal

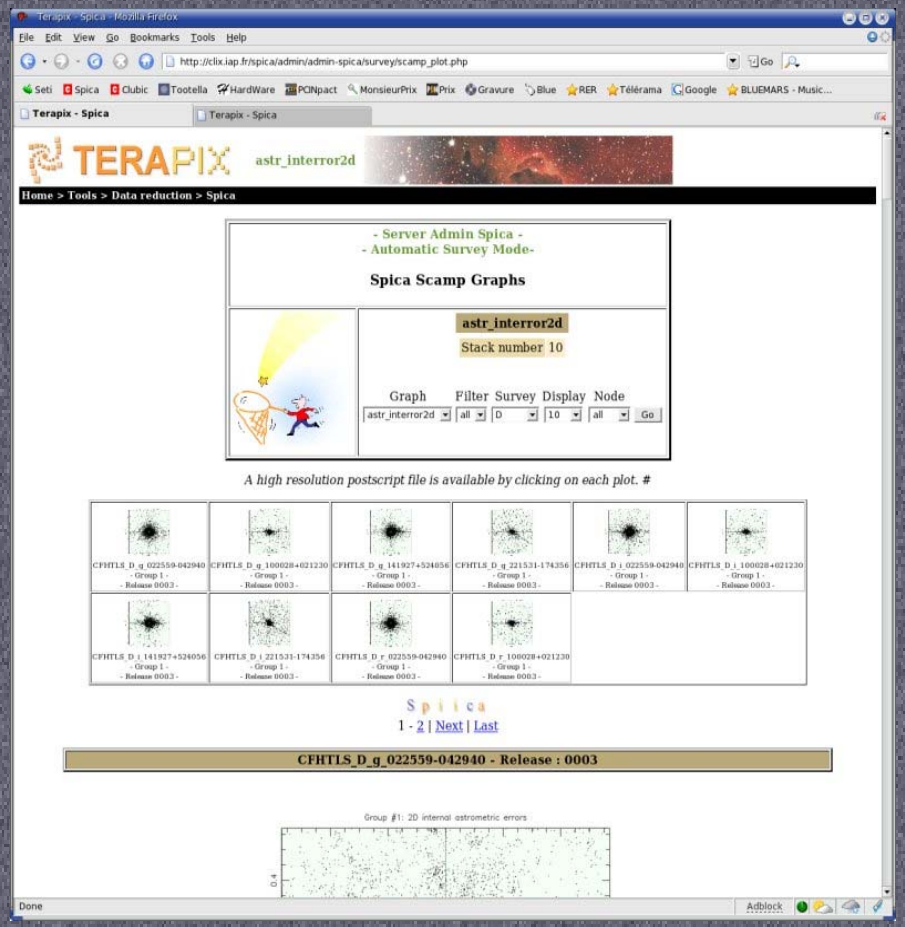


- Remove entries :
  - Dbspica
  - Output files
  - Input files
- Spica step :
  - QFin
  - Stacks mode
  - Image mode (VW)
- Group :
  - Filename
  - Runid
  - Node

Data-mining

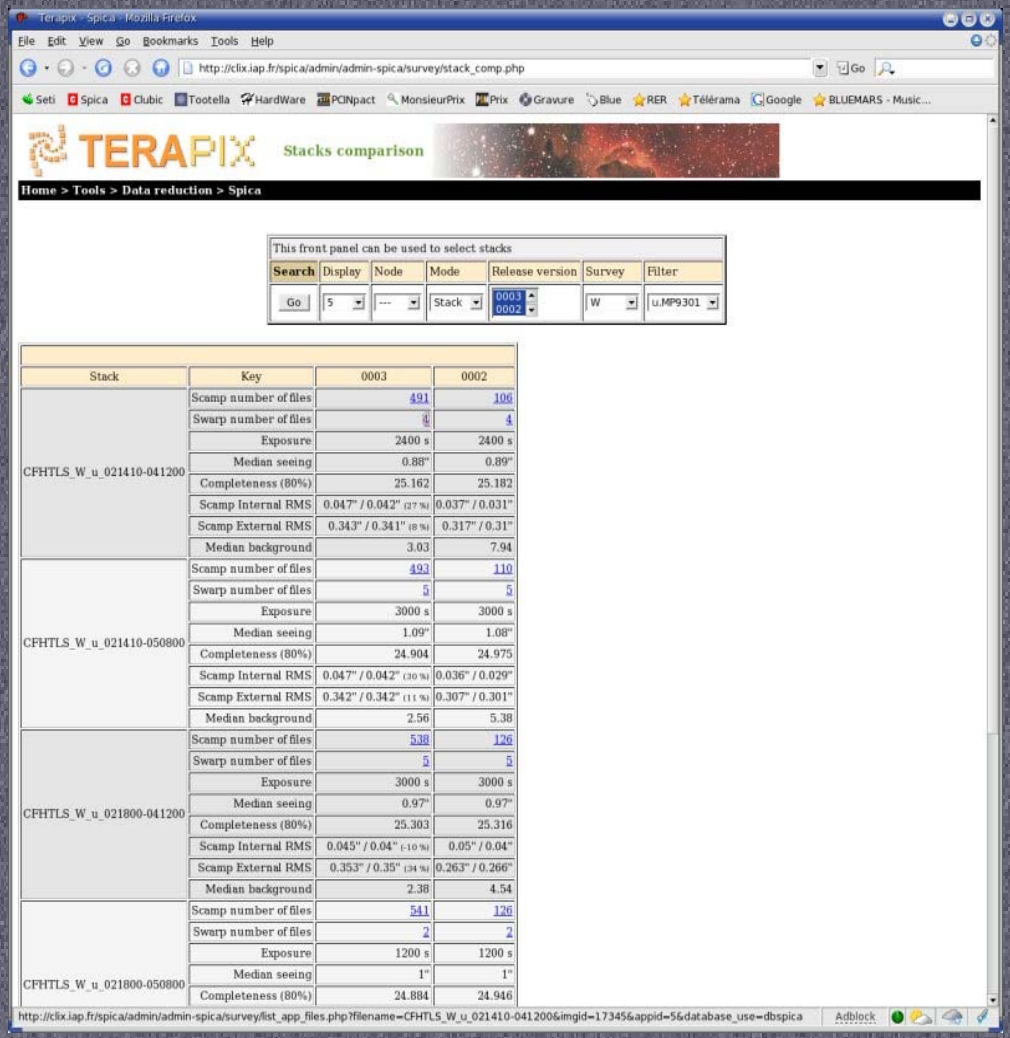


Completeness



Scamp

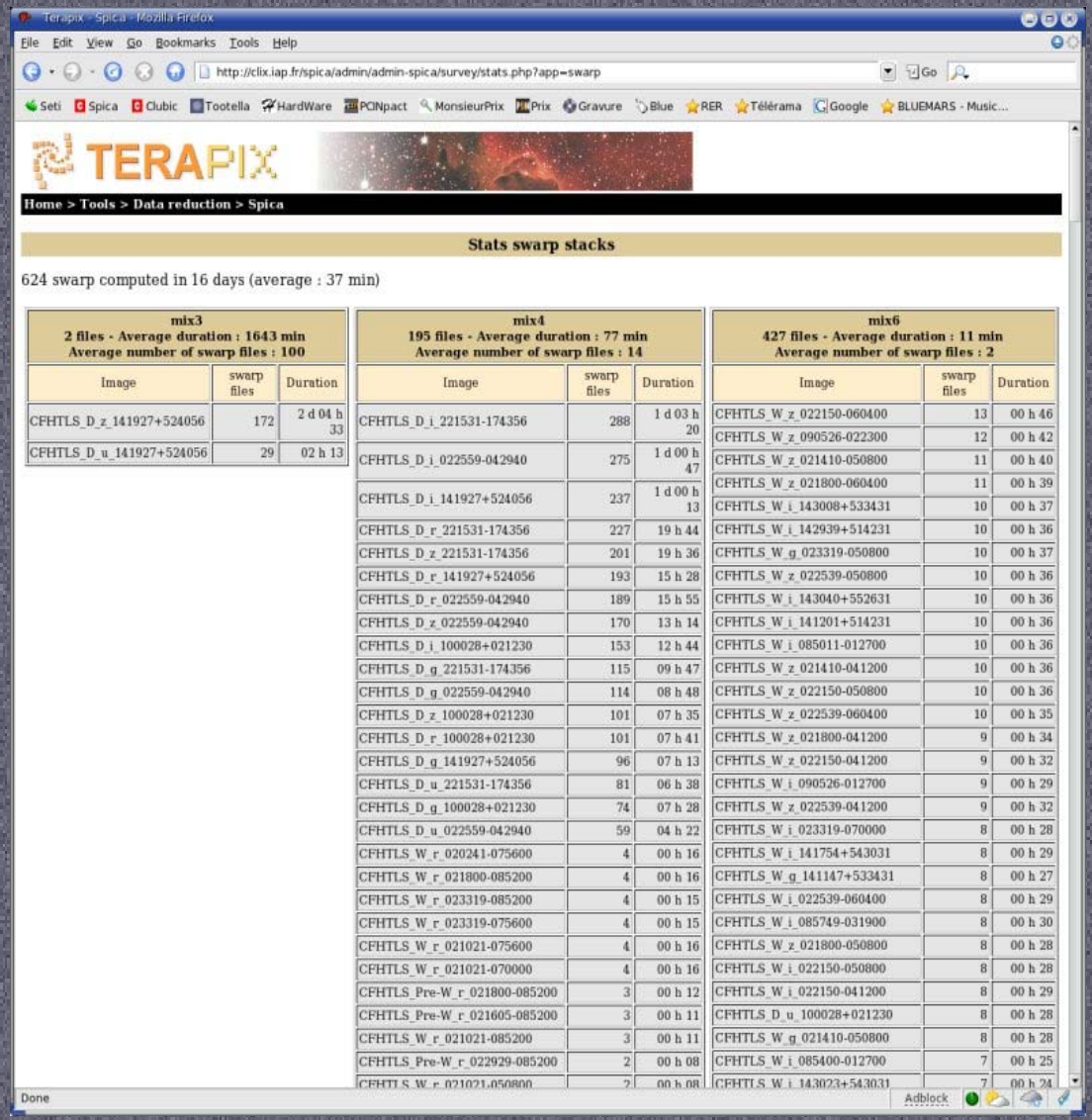
Release comparison



Stack	Key	0003	0002
CFHTLS_W_u_021410-041200	Scamp number of files	491	106
	Swarp number of files	4	4
	Exposure	2400 s	2400 s
	Median seeing	0.88"	0.89"
	Completeness (80%)	25.162	25.182
	Scamp Internal RMS	0.047" / 0.042" (27 %)	0.037" / 0.031"
	Scamp External RMS	0.343" / 0.341" (8 %)	0.317" / 0.31"
	Median background	3.03	7.94
CFHTLS_W_u_021410-050800	Scamp number of files	493	110
	Swarp number of files	5	5
	Exposure	3000 s	3000 s
	Median seeing	1.09"	1.08"
	Completeness (80%)	24.904	24.975
	Scamp Internal RMS	0.047" / 0.042" (30 %)	0.036" / 0.029"
	Scamp External RMS	0.342" / 0.342" (11 %)	0.307" / 0.301"
	Median background	2.56	5.38
CFHTLS_W_u_021800-041200	Scamp number of files	538	126
	Swarp number of files	5	5
	Exposure	3000 s	3000 s
	Median seeing	0.97"	0.97"
	Completeness (80%)	25.303	25.316
	Scamp Internal RMS	0.045" / 0.04" (-10 %)	0.05" / 0.04"
	Scamp External RMS	0.353" / 0.35" (34 %)	0.263" / 0.266"
	Median background	2.38	4.54
CFHTLS_W_u_021800-050800	Scamp number of files	541	126
	Swarp number of files	2	2
	Exposure	1200 s	1200 s
	Median seeing	1"	1"
	Completeness (80%)	24.884	24.946

* Compare several releases :
  - Scamp / Swarp files
  - Exposure
  - Seeing
  - Completeness
  - Background
  - …
* Find stack to compare :
  - Survey
  - Filter
  - Release number
  - …

CPU Stats



Terapix - Spica - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

http://clix.iap.fr/spica/admin/admin-spica/survey/stats.php?app=swarp

Seti Spica Clubic Tootella HardWare PCNpact MonsieurPrix Prix Gravure Blue RER Télérama Google BLUEMARS - Music...

TERAPIX

Home > Tools > Data reduction > Spica

Stats swarp stacks

624 swarp computed in 16 days (average : 37 min)

mix3 2 files - Average duration : 1643 min Average number of swarp files : 100		
Image	swarp files	Duration
CFHTLS_D_z_141927+524056	172	2 d 04 h 33
CFHTLS_D_u_141927+524056	29	02 h 13

mix4 195 files - Average duration : 77 min Average number of swarp files : 14		
Image	swarp files	Duration
CFHTLS_D_i_221531-174356	288	1 d 03 h 20
CFHTLS_D_i_022559-042940	275	1 d 00 h 47
CFHTLS_D_i_141927+524056	237	1 d 00 h 13
CFHTLS_D_r_221531-174356	227	19 h 44
CFHTLS_D_z_221531-174356	201	19 h 36
CFHTLS_D_r_141927+524056	193	15 h 28
CFHTLS_D_r_022559-042940	189	15 h 55
CFHTLS_D_z_022559-042940	170	13 h 14
CFHTLS_D_i_100028+021230	153	12 h 44
CFHTLS_D_g_221531-174356	115	09 h 47
CFHTLS_D_g_022559-042940	114	08 h 48
CFHTLS_D_z_100028+021230	101	07 h 35
CFHTLS_D_r_100028+021230	101	07 h 41
CFHTLS_D_g_141927+524056	96	07 h 13
CFHTLS_D_u_221531-174356	81	06 h 38
CFHTLS_D_g_100028+021230	74	07 h 28
CFHTLS_D_u_022559-042940	59	04 h 22
CFHTLS_W_r_020241-075600	4	00 h 16
CFHTLS_W_r_021800-085200	4	00 h 16
CFHTLS_W_r_023319-085200	4	00 h 15
CFHTLS_W_r_023319-075600	4	00 h 15
CFHTLS_W_r_021021-075600	4	00 h 16
CFHTLS_W_r_021021-070000	4	00 h 16
CFHTLS_Pre-W_r_021800-085200	3	00 h 12
CFHTLS_Pre-W_r_021605-085200	3	00 h 11
CFHTLS_W_r_021021-085200	3	00 h 11
CFHTLS_Pre-W_r_022929-085200	2	00 h 08
CFHTLS_W_r_021021-050800	2	00 h 08

mix6 427 files - Average duration : 11 min Average number of swarp files : 2		
Image	swarp files	Duration
CFHTLS_W_z_022150-060400	13	00 h 46
CFHTLS_W_z_090526-022300	12	00 h 42
CFHTLS_W_z_021410-050800	11	00 h 40
CFHTLS_W_z_021800-060400	11	00 h 39
CFHTLS_W_i_143008+533431	10	00 h 37
CFHTLS_W_i_142939+514231	10	00 h 36
CFHTLS_W_g_023319-050800	10	00 h 37
CFHTLS_W_z_022539-050800	10	00 h 36
CFHTLS_W_i_143040+552631	10	00 h 36
CFHTLS_W_i_141201+514231	10	00 h 36
CFHTLS_W_i_085011-012700	10	00 h 36
CFHTLS_W_z_021410-041200	10	00 h 36
CFHTLS_W_z_022150-050800	10	00 h 36
CFHTLS_W_z_022539-060400	10	00 h 35
CFHTLS_W_z_021800-041200	9	00 h 34
CFHTLS_W_z_022150-041200	9	00 h 32
CFHTLS_W_i_090526-012700	9	00 h 29
CFHTLS_W_z_022539-041200	9	00 h 32
CFHTLS_W_i_023319-070000	8	00 h 28
CFHTLS_W_i_141754+543031	8	00 h 29
CFHTLS_W_g_141147+533431	8	00 h 27
CFHTLS_W_i_022539-060400	8	00 h 29
CFHTLS_W_i_085749-031900	8	00 h 30
CFHTLS_W_z_021800-050800	8	00 h 28
CFHTLS_W_i_022150-050800	8	00 h 28
CFHTLS_W_i_022150-041200	8	00 h 29
CFHTLS_D_u_100028+021230	8	00 h 28
CFHTLS_W_g_021410-050800	8	00 h 28
CFHTLS_W_i_085400-012700	7	00 h 25
CFHTLS_W_i_143023+543031	7	00 h 24

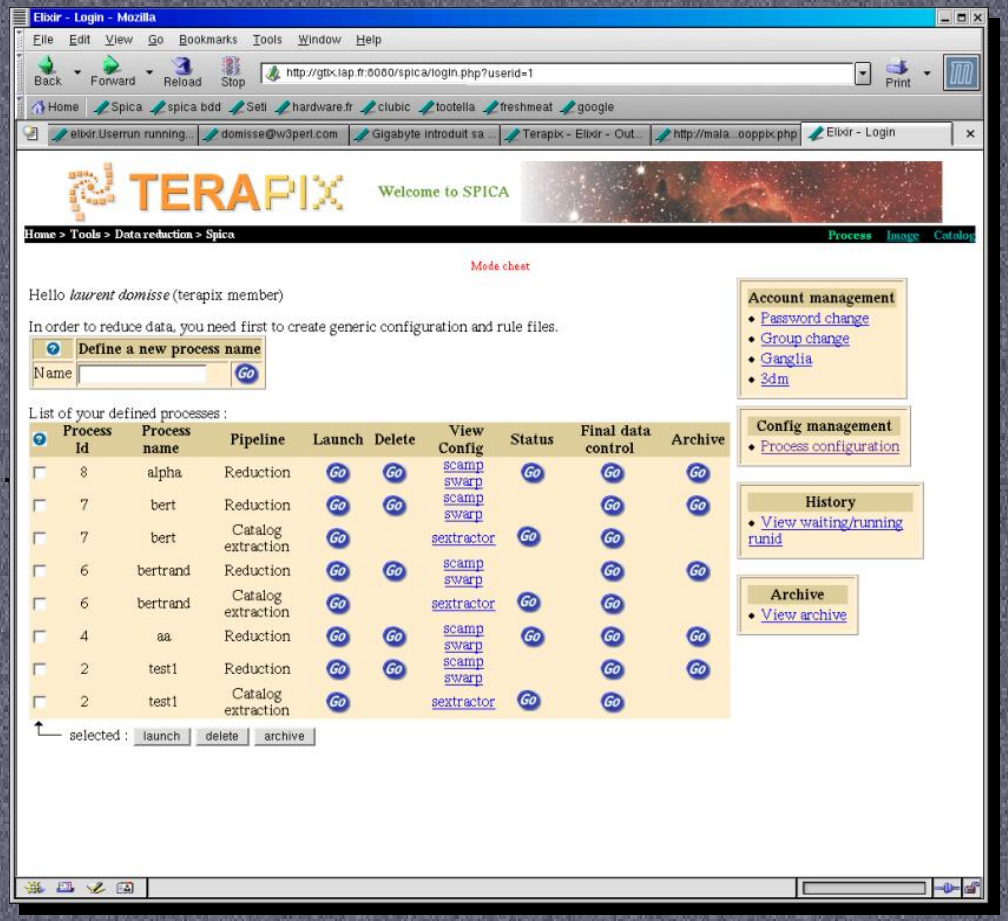
Done

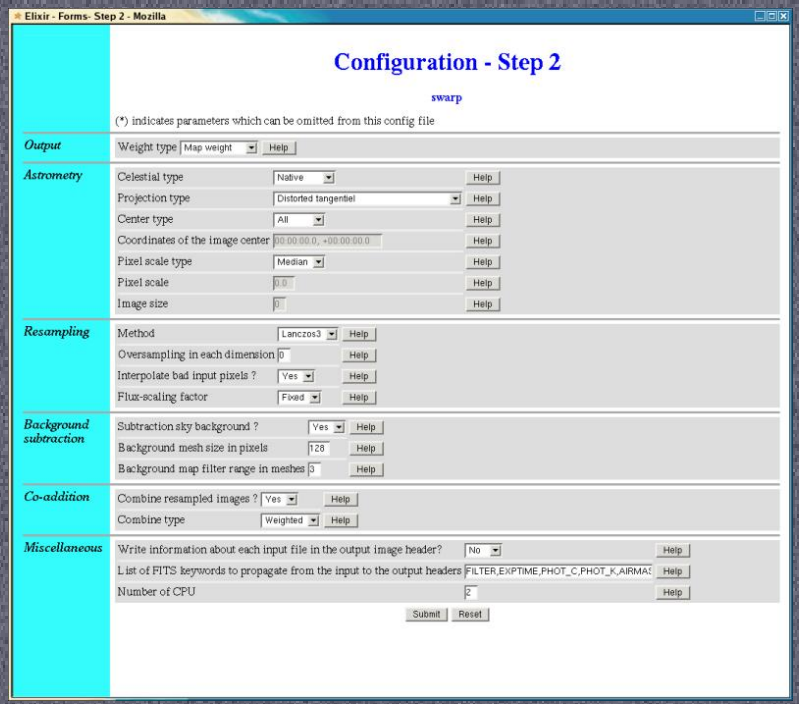
Adblock

- By application
  - Scamp
  - Swarp
  - Sextractor
  - QF
- By node
- Total CPU used
- Average by node

Pipeline SPICA / Web

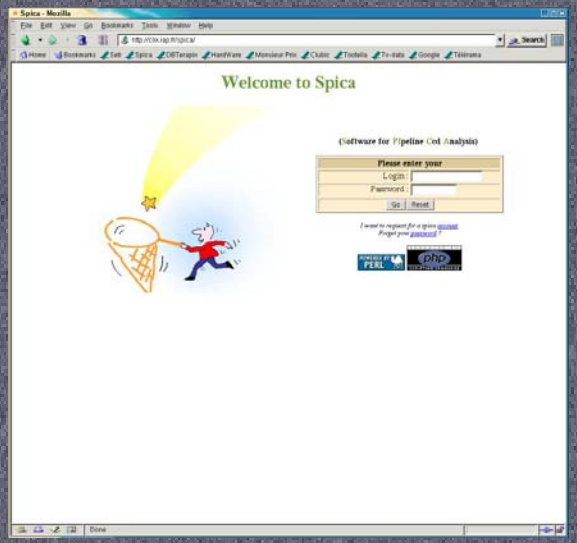
- « web » interface
  - used remotely
  - User accounts
  - Selection criteria included for user selection of images and configuration files

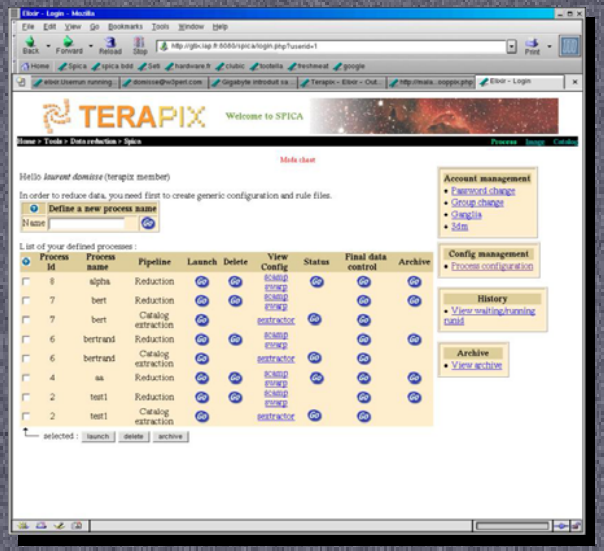




- Forms configuration
  - Manage processing configuration

Pipeline SPICA / Web

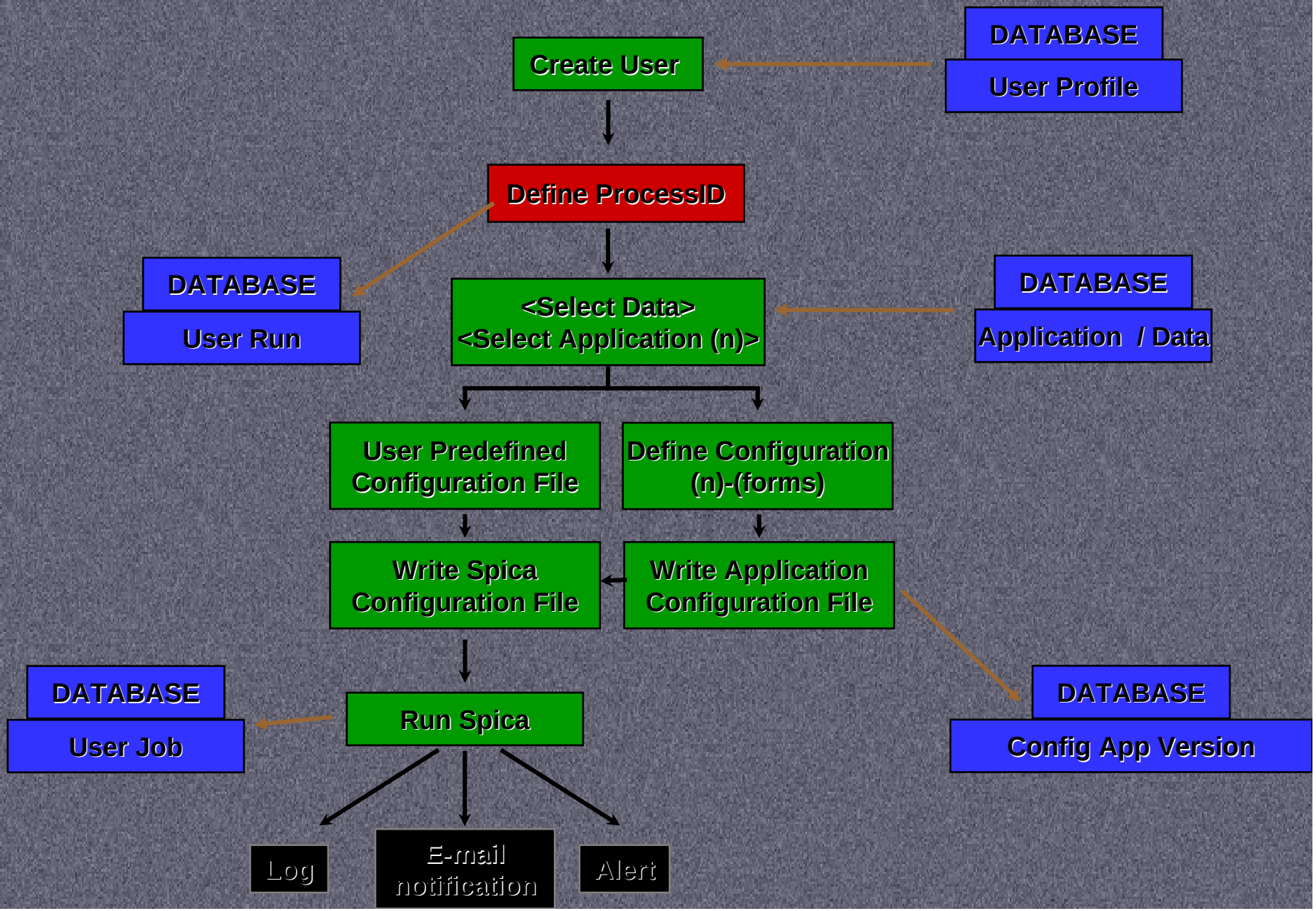




- Results

- Coadded image
- Weighted image
- Flag map
- Metadata
- Catalogue

Web mode


DATABASE
User Profile
Create User
Define ProcessID
DATABASE
User Run
<Select Data>
<Select Application (n)>
DATABASE
Application / Data
User Predefined Configuration File
Define Configuration (n)-(forms)
Write Spica Configuration File
Write Application Configuration File
DATABASE
User Job
Run Spica
DATABASE
Config App Version
Log
E-mail notification
Alert

Todo list (1)

- Spica
  - Stacks
    - Ability to move a stack from one node to another one
    - Use previous scamp results for similar stack fields
    - Use external ldac as a reference for the stacks
  - QFin
    - Get masters from CFHT or from others nodes
    - Reprocessing
    - Managing CFHT metadata
    - QF Webservice
    - Autocorrelation
  - WirCam processing
  - More error control (errno, md5sum)
  - Automatic ranking

Todo list (2)

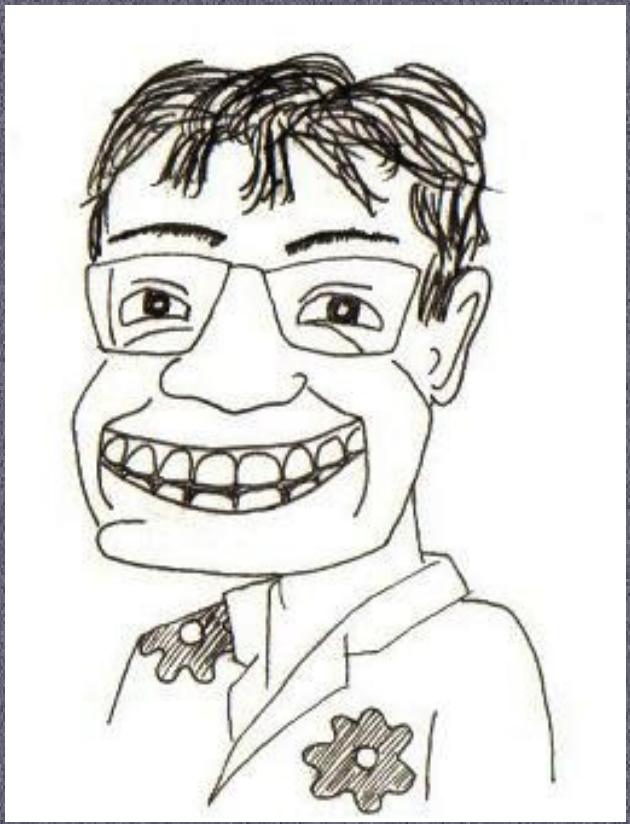
- Packaging
  - Spica Configuration files (SQL + configure)
  - SQL script to install and to fill the database
  - Subversion (spica_core, spica_config, spica_web)
  - Spica standalone
- Spica Web
  - Based on Elixir, Astrometrix, dbterapix, selectix !
  - As a webservice ?

Todo list (3)

- Web Interface
  - Fields sorting and selection, CSS output
  - Remove / Rerun spica
  - Shares configuration files with spica auto (PHP/Perl)
- Database
  - Multi-base, Multi-release, Structure optimisation
  - Uses transactions to secure
  - Store release filter rules
  - Catalog loading and data-mining
- Post-Spica
  - Catalog database
  - Chi2 / Dust / Mask / Color-Color plots

Conclusion

- Not perfect …
  - Intented to be a 2 month's work
  - Set of patches made as fast as possible
  - Tailored to Megacam
- … but it works as required !
- Interesting stuff
  - Packaging
  - Adding Wircam
  - Data-mining (catalog)
  - Spica Web



GRRRRRRR…

JOKER