

The CLAS Shifts Schedule and Productivity Management Tools

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The CLAS online shifts schedule and productivity management suite provide the collaboration with tools unique within the nuclear and particle physics community. As a relatively large and geographically spread organization, with complex procedures, bylaws and manpower resources, the CLAS collaboration benefits considerably from online tools that allow decentralized contributions and formalize internal procedures. This paper contains a description of the system and can also serve as a user's manual.

Keywords: CLAS; Shifts; Hall B Website; Productivity; SoS; CSC

Contents			
		C. Paper and PAC Reviews	13
		D. Pop-ups	13
I. Introduction	1	VIII. Utilities	13
II. Access	2	A. Reminders	13
A. Databases	2	B. Mailing lists	14
B. Authentication	2	C. Publications list	14
III. Shifts Schedule	3	IX. Other resources	14
A. List of Institutes	3	A. Shift operator training	14
B. Members management	3	B. Shift statistics	14
C. Scheduler	4	C. Experiment Status Toolbar	14
D. Signing up for Shifts	4	D. Map	14
E. Institute Pairing	5	X. Maintenance and Support	15
F. Swaps	5	A. Feedback and bug reports	15
G. Trades	5	XI. Summary	15
H. RC and PDL	6	A. Acknowledgments	15
I. Experimental Program	6	XII. Appendix	15
IV. Service Work	6	A. Database Tables	15
A. Submission	6	B. Email Notifications	16
B. Reviews (Audits)	7	C. Scheduler Algorithm Explained	16
C. Summary Tables	8	D. Security	16
D. CLAS12 Tasks	8	References	17
V. Paper and PAC Reviews	8		
A. Initiating a review	8		
B. Contributing to a review	8		
VI. Speakers Committee	9		
A. Requests	9		
B. Reviews and Nominations	9		
C. Statistics	10		
VII. Documentation	10		
A. General FAQ	10		
B. Service Work FAQ	12		

I. INTRODUCTION

The CLAS Online Interface (COI) presented in this paper is a web interface that formalizes and simplifies shift assignment and CLAS-specific shift transactions, paper and analysis reviews, CLAS speakers appointments and Service Work reporting and accounting. This suite of tools is one-of-its-kind among nuclear and high-energy physics collaborations and was created specifically for the CLAS collaboration. Together with other embedded features like automatic email reminders, dynamic creation of mailing lists and statistical data, this suite of tools

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provides a geographically distributed collaboration like CLAS with significant productivity gains.

The CLAS Online Interface runs on the www.jlab.org server(s). The content is generated dynamically. More than 90% of the code is written in PHP [1] and executed via the embedded PHP module of the Apache server. The rest is composed of JavaScript and shell functions. The source code and configuration files are located in the Hall-B/ web directory, except for an access library that resides in a secure directory. Data is stored partly on the CUE filesystem and partly in a MySQL database.

While trying to avoid very technical details, this paper is meant to serve both as a description of the CLAS Online Interface features and an offline user's manual.

II. ACCESS

Parts of the site are open to general (read) access. Other sections are accessible only after login either to protect CLAS collaboration internal information, or because they provide functions to modify information from the database.

The CLAS Online Interface's URL is

<http://www.jlab.org/Hall-B/shifts/>

The 'shifts' in the address point to the original functionality as interface to the shifts database - the productivity tools were added later on, between 2009 and 2010. The page will display by default the Hall B shifts schedule for the next two weeks, with a sidebar on the left showing the date and current shift status (Jlab local time, expert, novice, PDL [2], RC [3] assignments, and experimental program), a search form, and links to other resources like training, FAQ etc. (see Fig. 1).

Login is restricted to users registered in the shift takers database. These names are listed on the drop-down menu on the l.h.s. sidebar and on the login dialog. The passwords for this interface have *no connection whatsoever* to the regular Jlab CUE passwords and the authentication mechanism is custom-written for the CLAS Online Interface. Authentication via Jlab CUE passwords is not enabled. The passwords for the CLAS Online Interface are automatically created when a user is added to the shift takers database, and are emailed to the user in the welcome email. They can be changed later on by the user, his institute representative or the COI administrator (see FAQ).

The list of shift takers is maintained on an institute by institute basis with the help of institute representatives (IRs). At the moment of writing, the *shift* database comprised 42 CLAS member institutes and 160 shift takers.

A. Databases

The database backend of the CLAS Online Interface is a MySQL database running on clasdb.jlab.org and

maintained by Jlab IT. Part of the database structure is inherited from older implementations of the CLAS shift scheduling tools, but new tables and updated table definitions were employed in order to implement new features (see the list of DB tables in appendix XII A).

On the `clasdb` server, there are two databases relevant to the CLAS Online Interface: the *shift* database and the *membership* database. The first database is administered by the COI administrator, and the second by the CLAS Membership committee. There have been attempts to merge the two databases, but in the end the optimal solution was found to be to preserve two separate databases, while maintaining a certain degree of synchronization [4].

The database serves all the CLAS Online Interface data, with the exception of service work records, shifts swaps and trades data, which are stored in files on the CUE filesystem.

B. Authentication

Each user has his/her own password for logging in to this interface. Passwords set via the CLAS Online Interface interface are encrypted.

There are four categories of users, differentiated by what features they can access after login:

1. regular users - can sign up for shifts, change own password, edit own service work, swap and trade own shifts
2. IRs - can assign, change password, edit service work, swap and trade for any of their institute's members. Can also change own institute's contact list (IR assignment)
3. CSC members - have regular user privileges but in addition can edit the CLAS speakers and conferences lists
4. Superusers - have regular user privileges and, in addition, can generate the shift schedule, edit the RC and PDL lists and the experimental program table, change or restore user passwords, view the access log etc.

In addition to their usual access permissions, the current PDL or RC and the paper and SoS reviewers have access to certain extra features.

If one tries to log in with an incorrect password, one is given the option to receive an email reminder. This mechanism should be tried first. If the received password does not work, one should get in touch with their institute representative (IR), who can reset this password. The IRs can be found following a link entitled 'List of Institutional Contacts' in the left menu of the CLAS Online Interface. If the IR forgets his/her password, only Superusers can restore it.

Today is
Tuesday, April 12, 2011

Current shift status
Time: 06:04 EDT
Expert: ANL
Worker: Rafayel Paremuzyan
RC: Franz Klein
PDL: Aleksandra Dicus
Schedule: G14 Install

Display options
Start: 15 Feb 2011
End: 30 Jun 2011
Narrow search by name:
or by institute:
or by accelerator schedule:
Choose view:
 schedule statistics
 PDLs RCs
List Reset form

or show the next two weeks
Log in

More resources
- Required training
- List of Institutional Contacts
- FAQ
- Service work & SoS
- Speakers Committee
- Paper and PAC Reviews
- Experiment Status Toolbar

CLAS - Shift Schedule - Log In - FAQ - Mailing List - Map - Speakers - SoS - Reviews

Shift schedule from Feb 15, 2011 to Jun 30, 2011

Date	Expert Owl (00:00-08:00)	Expert Day (08:00-16:00)	Expert Evening (16:00-24:00)	Duck Hunter (04:00-12:00)
15-Feb-2011 Tuesday	Sebastien Procureur	Rafayel Paremuzyan	John Goetz	Michael Kunkel
16-Feb-2011 Wednesday	Sebastien Procureur	Lorenzo Zana	John Goetz	Michael Kunkel
17-Feb-2011 Thursday	Sebastien Procureur	Rafayel Paremuzyan	John Goetz	Aji Daniel
18-Feb-2011 Friday	Sebastien Procureur	Rafayel Paremuzyan	John Goetz	Aji Daniel
19-Feb-2011 Saturday	Maurik Holtrop	Desuni Adikaram	Dustin Keller	Aji Daniel
20-Feb-2011 Sunday	Maurik Holtrop	Gail Dodge	Dustin Keller	Aji Daniel
21-Feb-2011 Monday	Maurik Holtrop	Desuni Adikaram	Dustin Keller	Charles Taylor
22-Feb-2011 Tuesday	Maurik Holtrop	Desuni Adikaram	Dustin Keller	Charles Taylor
23-Feb-2011 Wednesday	Pawel Nadel-Turonski	Ivan Bedlinskiy	Andrey Kim	Charles Taylor
24-Feb-2011 Thursday	Pawel Nadel-Turonski	Ivan Bedlinskiy	Andrey Kim	Charles Taylor
25-Feb-2011 Friday	Pawel Nadel-Turonski	Serguei Pozdniakov	Andrey Kim	Victor Mokeev
26-Feb-2011 Saturday	Pawel Nadel-Turonski	Serguei Pozdniakov	Andrey Kim	Victor Mokeev
27-Feb-2011 Sunday	SCAROLINA	WM	John Goetz	Victor Mokeev
28-Feb-2011 Monday	SCAROLINA	WM	John Goetz	Victor Mokeev
1-Mar-2011 Tuesday	SCAROLINA	WM	John Goetz	Gary Smith
2-Mar-2011 Wednesday	SCAROLINA	WM	John Goetz	Gary Smith

FIG. 1: Overview of the l.h.s. menu panel and top menu bar (user is not logged in). Discover more online.

After login, the l.h.s. menu bar will display 'You are logged in as' and the user's name, and an *options menu* will be displayed in the main window (see Fig. 2). The options are tailored to the category of user one falls into, as explained above. At the bottom of the options menu, the remaining session time is listed: sessions automatically expire after two hours. It is however recommended that users log out when they are finished.

Hi, Dan Protopopescu! You are now logged in.
Your session automatically expires after two hours of inactivity.

User info for Dan Protopopescu:

Full name: Dan Protopopescu
Affiliation: GLASGOW (University of Glasgow)
Email: protopop@jlab.org
Qualification: Expert

You can use this interface to:

View all the shifts currently assigned to you	Show my shifts
Change your shifts password	Change password
Assign your name to shifts allocated to your institute	Sign up for shifts
Trade your shifts with someone else	Trade shifts
Add in your service work contributions	My service work
Start or contribute to a paper or PAC review	Reviews

As CSC member, you also have access to the following functions:

Manage CLAS speakers	Manage speakers
Edit conferences list	Edit conferences

In addition, you have access to the following superuser functions:

Reset shifts password for anyone in CLAS	Recover passwords
Assign a Physics Division Liaison	Assign PDLs
Edit the accelerator and Hall B experimental program	Experimental program
Generate shift schedule for the next period	Generate new schedule

and a sessions log

FIG. 2: The options menu of the COI administrator. Only the top group of buttons is available to regular users. IRs have a slightly different set of options.

III. SHIFTS SCHEDULE

The CLAS collaboration has long established rules for experimental shifts assignments that provide equal and fair participation to all member institutes and all collaboration members, current and prospective, but leaves a certain flexibility to account for the geographical location of institutes, available manpower and travel costs.

Maintaining the manpower lists is the responsibility of the IRs, but the schedule and institutional share of shifts is done in a centralized manner by the COI administrator. This initially generated schedule is obviously not optimal for everyone involved because the central scheduler lacks specific information like personal availability and travel constraints of individual members. Two optimization mechanisms are then available to further improve the shifts schedule for everyone: **swaps** and **trades**. These will be explained in the following subsections.

A. List of Institutes

The *shift* database contains a list of CLAS member institutes that corresponds to the official CLAS membership list. This list is maintained and can be edited only by the COI administrator. Depending on geographical location and travel costs, CLAS member institutes are loosely divided into three categories *Foreign*, *Domestic* and *Local*. Each institute has a designated *shifts* DB acronym and one (or several) designated contact person(s), customarily referred to as institute representative(s) - IRs.

B. Members management

The institute representative(s) - or IRs - must edit and keep up to date the list of members for their institution in the shift database. These lists should roughly correspond to the official CLAS membership of that institution, but extra names can be included to the shift lists for the sole purpose of taking shifts.

IRs can modify the member lists for their institute by logging in, then choosing [Manage members](#) from the options menu. An editable list containing name, email, qualification level etc. will be displayed, accompanied by detailed instructions. Names and emails should be entered *with care* and should correspond with the official membership data of that person [5]. A welcome email is automatically sent to the newly added person, CC-ed to the CLAS Collaboration and Membership chairperson(s). An IR can appoint a new or additional IR for his/her institute.

Note that simply adding people to the shift personnel list does not make them members of CLAS, and deleting people from the list does not alter their publication authorship rights. But an official CLAS member can be

deleted from the shift takers list *only* after s/he is first removed from the membership database. For specific CLAS membership issues, one must contact the CLAS membership committee [6].

CLAS shifts are always manned by a team of two: an *expert* and a *novice (or worker)*. These two qualification levels are assigned to shift takers on an individual basis, by their IRs. It is at the latitude of the IRs to assign the 'expert' qualification, based on their knowledge of the person. The minimal *expert* requirement is that the person has taken eight shifts and the Hall B safety walk-through (SAF 111) *or* has served as a RC *during the past six months*. The expert list is augmented by individuals flagged by the PDL as experts based on his/her judgment of their experience. If one feels that they have an expert qualification but are listed in the database as *novice*, one should contact their institute representative, who can update this qualification level in the shifts database. Warnings are shown on the **Manage members** interface (available to the IRs) in case the *expert* requirements can not be automatically verified based on the information from the *shift* database.

There's a special 'No shifts' user qualification that should be used only in extraordinary circumstances (pregnancy, medical conditions). Members labeled as such will not be counted towards an institute's shifts share. The 'No shifts' label should be used responsibly.

An email notification is automatically sent out when a person is added or removed from the members list, or their details are changed.

C. Scheduler

Shift allocations are done proportional to the number of active CLAS members (i.e. affiliated as Term and Full members to the institute at that particular calendar date). However, IRs are then free to distribute these shifts among all their institute's members registered for shifts, i.e. one can have students or prospective CLAS members on the shift lists, without being given a higher shifts load because of this.

Let's say an institute has a total of 5 CLAS active (Term or Full) members, and 7 names listed for shifts duty. The allocation will be based on a manpower of 5, but any of the 7 people can sign up. The ratio of *expert/novice* shifts allocated will correspond to the expertise levels ratio in the shift members list. More details about the actual algorithm can be found in appendix XII C.

Under normal circumstances, the shift schedule is generated twice a year. Between set dates, Superusers have access to an additional button in their *options menu* labeled **Generate new schedule**. If automatic reminders announcing the approaching start of the swap period are sent out, it means that the scheduler interface is active. After login, the COI administrator or any of

the Superusers can access this interface.

Before generating a new schedule, the COI administrator should notify the IRs and give them one week to review and update their institute's membership lists.

Then the COI administrator should edit the experimental schedule (click **Experimental program** in the options menu) using information from the official CE-BAF experimental program [7]. It is a good idea here to create a raw backup of the *shift* database.

The Hall B schedule is then generated via the dedicated interface in three steps :

1. choose start and end dates; optionally, a downtime gap can be inserted; the number of days must be a multiple of 4, else a warning is given
2. inspect manpower allocations: a table with institute personnel figures and shift shares is presented; the 'staggered novice' option [8] can be selected here; if everything is OK, one should click 'Generate'
3. inspect shift allocations then click 'Write to DB'; the user's password must be entered at this point

Once the shift schedule is generated, the swaps can start as scheduled in the CLAS Online Interface configuration. Once the swaps start, the scheduler interface becomes again inactive (i.e. the button is greyed-out in the options menu).

D. Signing up for Shifts

On the generated shift schedule, each institute is allocated randomly distributed bunches of shifts. Users can now 'sign up' for shifts, or, alternately, can let the IRs assign names to their institute's shifts.

To sign up/assign shifts, the user/IR has to login, then choose **Sign up for shifts** / **Assign shifts** from the options menu. A table of eligible shifts is presented and the user/IR can choose the desired assignments.

To quickly review one's shift assignments, one can make use of the button labeled **Show my shifts** at the top of the *options menu*. This will list all user's future shifts and provide again the sign up option.

Expert shifts can only be assigned to users with 'expert' qualification, but 'novice' shifts can be assigned to anyone. Shift assignments can be modified at any time.

In certain cases, IRs can also assign shifts using manpower from a so-called 'sister' institute, explained in the next section.

An email notification is automatically sent out when shifts are assigned by the IR.

E. Institute Pairing

Institute pairing allows two institutes (usually one *Foreign* and one *Local*) to use each other's manpower. Institutes composing such a pair are called 'sister' institutes.

How this works? Let's say A and B are 'sister' institutes. Then the institute representative from A has the option to assign shifts to people from B, and viceversa. Say you are from A and you appoint someone from B on a shift assignment you can not fulfill due to extraordinary circumstances [9]. The person assigned (and/or the institute representative of B) is notified by email, and a shifts *debt* is recorded in the database. The debt can be settled later on by B by assigning members of A on their shifts. Two institutes A and B can become sister institutes by mutual agreement, and the institute representatives of both A and B must email the COI administrator to confirm the pairing.

F. Swaps

By *swap* we mean here an exchange initiated and finalized unilaterally by a person. Swaps are done during designated periods, and are meant to ease the travel load on Foreign and Domestic institutes.

CLAS member institutes are loosely divided into three categories [10]: *Local* (from Jlab and the state of VA), *Domestic* (from within the USA) and *Foreign* (from the rest of the world).

Because members from Foreign and Domestic CLAS institutes have to make travel arrangements in order to fulfil their shifts share in Hall B, they can save money and time if they are allowed to group their shifts, reschedule them around Jlab meetings and conferences etc. For this reason, after the initial schedule is generated and everyone has one week to look it over, so-called *swap periods* are allocated during which, in an order corresponding to their relative geographical distance from Jlab, institutes can rearrange their shifts.

Firstly 'Foreign' institutes have two weeks to swap their shifts at will with shifts previously allocated to 'Domestic' and 'Local' institutes. After these first two weeks, the 'Foreign' shifts are frozen and the 'Domestic' institutes benefit of two weeks to swap their shifts at will with shifts allocated to 'Local' institutes. 'Local' institutes can not swap their shifts.

Automatic email reminders that announce the start and end of these swap periods are generated via a cron job running on one of the CUE machines (see section VIII A).

The shift swaps procedure is implemented in a very intuitive way, in a minimum number of steps, with guidance and pop-up hints along the way: one chooses the shifts that they want to swap, then the swap target shifts, then reviews the swap and confirms it. The shift assignments are automatically switched in the database, and the schedule is instantly updated.

IRs can swap any of their institute's shifts. Regular users must sign up for a given bunch of their institute's shifts before being allowed to swap them.

To keep swaps fair, there are certain rules that govern the shift swaps, for example:

- one can not swap night shifts into day shifts; a certain preferability hierarchy is in place
- one can not swap expert shifts with novice shifts or viceversa
- shifts are only swapped in groups of four
- one can not relocate shifts to a 'downtime' period (but the opposite is allowed)

These rules are implemented into the CLAS Online Interface, and they can not be overridden by anyone (not even the Superusers).

G. Trades

By *trade* we mean here an exchange initiated by one party and finalized with the agreement of a second party. There are no restrictions on trades, i.e. any number of any type of shifts can be traded at any time during the current experimental period, based solely on mutual agreement between the persons or institutes involved.

Simplifying shift trades has been the initial motivation for writing the whole CLAS Online Interface. In the past, the two parties involved had to identify the shifts that they wanted to trade, agree via email, and then email the Shifts admin to execute the assignments by hand. This was a non-intuitive process, meant a lot of back-and-forth, long waiting intervals, mistakes, as well as tedious and unrewarding work for the Shifts administrator.

The new interface implements shift trades in a very transparent way: one party chooses the shifts that they want to trade, one or several trade targets, and sends *trade offers* to the other party/parties. Every offer is recorded and the second party receives and email detailing the trade offer. The second party can then either accept or reject the trade. If accepted, the shift assignments are automatically swapped in the database, and confirmation emails are sent to both parties involved. If the trade offer is refused, a polite email is automatically sent to the offerer. In the case of multiple trade offers generated for the same set of shifts, they are executed on a 'first come, first served' basis. Pending trades can be canceled by the offerer at any time.

The trades interface is very easy to use and will lead the user through the steps with explanations at the top of the page and pop-up hints along the way. Once a trade offer is initiated, when the offeree logs in to the CLAS Online Interface s/he will immediately notice a blinking notification at the top of the option menu.

Automatic email reminders regarding pending trades are sent to the offeree, to limit the waiting period for the

offerer. If not acted upon, trade offers expire automatically after two weeks.

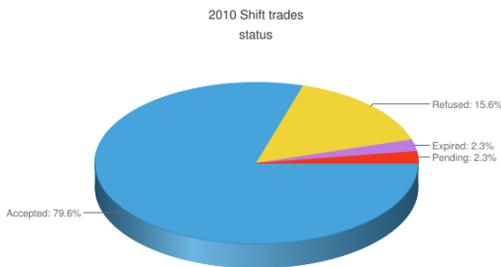


FIG. 3: Trade statistics for the previous year.

Trade statistics pie charts are automatically generated for every calendar year basis (linked on the 'Utilities' page), see Fig. 3.

H. RC and PDL

Tables with the Run Coordinator (RC) and Physics Division Liaison (PDL) appointments are also maintained in the *shift* database.

Access to the RC and PDL tables is available from the l.h.s. menu bar either via the schedule search form (search between chosen dates) or via quick links from the current shift status box (displaying by default ± 2 months around the current date).

The RC and PDL tables are filled automatically by a script that parses the current experiment status page `run_plan.html`. This page is updated by hand and maintained up-to-date by Jlab staff [11]. In addition to this, the PDL and RC tables can also be edited by hand by Superusers or by the currently appointed PDL or RC, respectively.

I. Experimental Program

The *shift* database contains a copy of the Hall B experimental program or accelerator schedule (EPAS). Only the Superusers can edit the EPAS table via a dedicated interface (accessed via the **Experimental program** button in the *options menu*), as explained in section III C.

In the database, the EPAS table structure is `date:schedule` but the online interface provides a more user friendly format `date-interval:schedule`. The EPAS is displayed day-by-day on the last column on the r.h.s. of the shifts schedule (default view), and, if properly set up, linked to the experiment's web page.

The EPAS table is used by the shifts swap functions to decide which pairs are swappable (it would be unfair to swap uptime shifts into downtime for example, hence such transactions are forbidden). The EPAS also is used by the automatic shift reminder script to decide whether notifications are needed or not for a certain date

(reminders are suppressed for 'Downtime' or 'Install' periods for example).

IV. SERVICE WORK

Service Work is loosely defined as 'tasks that will contribute to all or part of the CLAS collaboration effort, apart from tasks that will benefit primarily the individual' [12]. The Service Work Committee (SWC) is an Ad-Hoc committee that collects and evaluates service work reports from all CLAS member institutes.

These service work reports are customarily called Statements of Service (SoS). The submission, review and evaluation of SoS-es used to be tedious and very time-consuming tasks. The new online interface [13] standardizes and considerably simplifies the process at all its stages since:

1. it can be accessed from anywhere in the world,
2. allows users to add their contributions directly and along the way (from April until mid-October),
3. standardizes the input format and task categories,
4. contains error checking, hints and guidelines at every step,
5. reuses the year's estimate as starting point for the ensuing report, eliminating duplication of work,
6. simplifies and standardizes the review (audit) process,
7. automatically highlights errors and deviations from the SoS requirements, and
8. overall totals, statistics and pie charts are automatically produced.

The SWC reviews (or audits) the service work reports between December and February every year, and the chair of the SWC presents a status report and makes various recommendations usually during the spring CLAS Collaboration meeting.

A. Submission

Two SoS-es must be filled in and submitted every year before the mid-October: one reporting work done during (or in progress until December of) the current **calendar year** [14], the second estimating service work to be carried out during the following calendar year.

To make things easier for the IRs, group members can now contribute to the service work reports. After login, any member can edit their institute's SoS and add their own service work by choosing **My service work** from the *options menu*. At the end of the SoS submission period, IRs must login and choose **Submit SoS** from the

options menu, review all individual contributions, add their own items, and submit the full report at the end. Detailed instructions accompany the submission pages at every step.

Besides adding and/or editing service work items, IRs must edit the institute's member list to declare any CLAS membership status or institute affiliation change for each member. This information is used by the SWC reviewers to adjust the expected FTE.

The required contribution \mathcal{C}_A (or 'expected FTE') of an institute A is calculated as:

$$\mathcal{C}_A = N_A \times 0.25 \text{ FTE} \quad (1)$$

where N_A is the number of Full and Term CLAS members from institute A. FTE stands for 'Full Time Equivalent'.

Some basic guidelines for reporting service work are listed below [15]:

- 1 FTE is equal to 10 months, or 0.025 FTE is approximately one week
- A paper review should take 2 - 4 weeks (i.e. 0.05 - 0.10 FTE)
- Maintenance of a cluster used by/for the collaboration less 2-4 weeks counts as 0.05 to 0.10 FTE

while for example the following items are not considered service work:

- Membership Committee participation
- Paper reviews added in the next year's SoS estimate (unless ongoing at the turn of the year)
- Scientific publications
- Supervision of students doing service work
- Grant applications

If a task is not finished during a given calendar year, the actual FTE is calculated by multiplying the FTE by the 'percentage done' fraction. The remaining percentage should be claimed on the next SoS.

Institute representatives should pay attention when editing the final SoS reports making sure they

- update the personnel lists for each SoS year, including membership status and notes (N.B. 'time share' is not used in the FTE calculation),
- if a person's membership or institute affiliation does not cover the whole year, mention this in the 'Remarks' box,
- keep CLAS and CLAS12 service work separate,
- avoid extensive use of abbreviations,
- correctly allocate tasks to the appropriate category,
- do not exaggerate the FTEs,

- provide appropriate documentation: an explanation of the work carried on, links to web pages, articles or documents detailing the work etc.,
- save edits before the 120 minute session auto-logout, and
- submit before the deadline.

At every step, entered data is cached on server and can be modified later on if necessary. If one does not finalize (submit) the report, all cached data is available next time one logs in to work on the SoS report. Just before the last step, the IRs have the possibility to postpone the submission and circulate the SoS within their group. In such a case, the IR will have to return later on to finalize the submission. At submission, a text version of the SoS is emailed to the CLAS Service Work Committee and a copy is kept on server for evaluation. Any message from the IR to the SWC should be included in the SoS comments box just above the 'Submit' button. The evaluation (auditing) is done using the *latest SoS version* stored on server. Once on the server, SoS reports are public and can be viewed by everyone.

Periodic email reminders are sent automatically to all IRs up until the SoS submission deadline. After the deadline, SoS submissions are no longer possible. The tools administrator can not insert reports by hand.

B. Reviews (Audits)

Once the SoS submission period has ended, the review (or auditing) period begins. Each member of the SWC committee is responsible for the audit of between 10 and 12 SoS-es (reports + estimates). The audits are done online via the CLAS Online Interface as well, and the findings are discussed during dedicated SWC meetings.

To review an institute's SoS, a SWC member must log in, navigate to the desired SoS report, and click the 'Review this SoS' link at the top left hand side of the page. The report is then shown in *review mode*, with input boxes where the auditor can add adjusted FTEs, comments and notes. In the '*Comments or reviewed FTE*' column the auditor can add a number representing the adjusted FTE, a comment, or both (in this order, and separated by a '#' character). At the bottom of the page, there is a text box for reviewer's feedback and general comments or suggestions. The reviewer can use the feedback box to praise the service work, or ask questions or clarifications from the IR. When submitting the audit, the reviewer can choose to immediately notify the institute of the audit by ticking the option box below the 'General remarks' input field. If clarifications were required from IR and/or the IR provides further information, the reviewer can re-audit the SoS and then re-submit.

When audited, a report is stamped with the date and with the name of the auditor. Reports can be re-audited

as many times as necessary. Once audited, the audited version of the report is displayed by default, but the viewer can switch between the *pre-* and *post-audit* versions.

C. Summary Tables

Summary SoS tables are automatically produced. They show a category breakdown of each institute's contribution, category subtotals, category percentages, totals, and pie charts. FTE totals below requirements are highlighted in red. Audited reports are marked in the with an asterisk. The summary table can switch between *pre-* and *post-audit* views. The summary tables and pie charts are ready to be used in the SWC chair's spring status reports.

D. CLAS12 Tasks

In addition to the service work reports described above, a special CLAS12 service assignment interface has been introduced in January 2012. To access the feature, click "CLAS12" in the top menu or the **CLAS12 tasks** button in the user *options menu*.

The new interface allows certain designated 'CLAS12 task admins' to define tasks, classified by subsystem, category and skills required. Each task has a short description, an associated FTE/year estimate, one or two contact persons and a due date. CLAS12 tasks can be recurrent, e.g. 2 days/week, or can be a one-time job, e.g. 0.1 FTE - or 1 month of work.

The difference from SoS reports is that these CLAS12 tasks are defined in advance, and once a CLAS12 task was added by one of the 'CLAS12 task admins', it appears on a list from where any user can pick it (after login).

Before picking a CLAS12 task, the user should make sure s/he has the required skills and the necessary commitment. Once a task is picked up by a CLAS member, the member's name is listed in the 'Responsible' column. The responsible person can keep the task unit completion or can drop it early, if circumstances require so. A task dropped before completion can be picked up by someone else etc.

Once a task is completed or dropped, it shows up in the 'Completed CLAS12 Service' table, and an associated FTE is calculated for it. The user has to make sure s/he copies this task to the SoS at the end of the year - **no automatic mechanism to do this has been implemented at the time of writing.**

V. PAPER AND PAC REVIEWS

The CLAS Online Interface formalizes the CLAS paper review process, implementing the rules established

in the CLAS Charter and providing a transparent, integrated and easy to use interface for carrying out reviews, through all the stages - from analysis to journal publication. PACs can also be reviewed using this tool.

One can navigate to the reviews page via either one of the three links provided in the l.h.s. menu bar, top menu or user *options menu* (Fig. 2). The access to the 'Reviews' CLAS Online Interface feature is restricted. To initiate or contribute to a review, the user must log in, else a warning is displayed.

After logging in and navigating to the reviews page, a table listing ongoing reviews is displayed, with titles, authors, review committees, status and options (if any). The choice to list all paper and PAC reviews from the database is also given.

All documents, comments and replies are available online, but these review materials are restricted [16] as follows:

- Collaboration-wide reviews are open to everyone [17]
- PAC, Analysis and Ad-Hoc reviews are open only to the author, the three reviewers and the initiator
- Superusers have read access to all reviews

Reviews to which the user does not have access are listed but no links are provided.

Below the table, there is a link to initiating a new review. One must click the '[+]' symbol to expand the input form.

A. Initiating a review

Reviews are initiated - at the request of the authors - by one of the Physics Working Group (PWG) chairs or by the CLAS Collaboration Chair.

The input form will have fields for the review title, contact author, and other data, to upload a PDF copy of the material, designate 3 committee members (for PAC, Analysis or Ad-Hoc type reviews), write a committee 'charge' and set the review deadline [18]. An email is automatically sent out to all the people involved. If there is a committee, the 3 members have to confirm their appointments before the review can start (the initiator can opt to skip this step if the appointments are already confirmed). The initiator must make sure the review committee is aware of their task and of the deadline. Detailed instructions accompany the form and should be read attentively.

B. Contributing to a review

Once the review starts, the committee members (or everyone in the case of Collaboration-wide reviews) can view the material, post comments. In addition to this,

the author and the initiator can post replies or upload new documents. User permissions are displayed as an 'Options' list.

Uploaded documents are listed in a chronological table, each dated and accompanied by a short description. Comments are listed in a sortable HTML table, with collapsible cells and advanced formatting options.

New comments can be added using HTML formatted or plain text via a dedicated form (recommended), and then they are listed chronologically in a table. Or the comments can be collated by the review committee chair and uploaded as PDF. Comments are tagged with the document version they refer to. If comments are uploaded as PDF, they will be listed in the 'Associated documents' table but an automatic entry is made in the 'Comments and replies' table as well. Formatted or plain text comments are recommended since they are much easier to browse online. Email notifications are automatically generated when new posts are made or when new documents are uploaded.

Regular email reminders are automatically sent out to the review committee (see section VIII A). Once a round of review is finished either the committee chair or the initiator can close the round of comments, suppressing further reminders. If the authors provide updated materials, the initiator can start a new round of review and so forth.

Once a paper is published in a journal, a link to the online version should be included in the comments.

VI. SPEAKERS COMMITTEE

The role of the CLAS Speakers Committee (CSC) is to supervise and promote the accurate and broad dissemination of CLAS results to the scientific community via talks by members of the CLAS Collaboration [19].

A CSC interface that makes use of the common database backend is built into the CLAS Online Interface. This greatly simplifies both the Speakers Committee administrative work and the communication between CLAS members and the CSC.

By default, the 'Speakers' page lists conferences and corresponding requests for talks. At the top of the page, there are instructions for users on how to submit a request. Login is required to request CSC's permission to give a talk. CSC members also have to login in order to manage speaker requests and the list of conferences.

By default, only conferences beginning later than one week from the current date are listed, but the options to view the full year or a complete list are provided. A link to statistics and pie charts is provided at the bottom of the page.

In the conferences and speakers table, the CSC tries to provide an exhaustive list of conferences for the incoming year, with calendar dates, location, and links to the official websites. Sometimes, the CSC contacts conference organizers, obtains formal invitations, then directly

nominates CLAS speakers. To give a CLAS-related talk, one has to be either nominated by the CSC, or request permission from the CSC, as explained in the next section.

A. Requests

To request CSC's permission to give a talk or show a poster, one must log in, and then click either the 'Speakers' link from the top menu or 'Speakers Committee' from the l.h.s. menu bar. Once on the 'Speakers' page, there's a form at the top of the page for submitting a CSC request. One has to enter the presentation type then either pick the conference from the drop-down list or add a new conference to the database. Clicking **Next**, takes the user to the next page where s/he has to add a title, tick off some options, add some accompanying notes and upload a draft in PDF format.

Once a request is submitted, the CSC is automatically notified by email and will review the request.

B. Reviews and Nominations

In essence, the CLAS Speakers Committee is concerned with the following two tasks:

1. receive requests from CLAS members that would like to present research at various workshops and conferences, and make sure that the talks appropriately represent CLAS results
2. appoint speakers to various conferences to promote both CLAS results and the researchers themselves

To accomplish task 1, the CSC reviews the requests submitted as described in the previous subsection, and either approves the request or contacts the speaker to suggest improvements. On approval, an email is sent automatically (unless this option is unchecked) to the speaker.

To accomplish task 2, the CSC obtains generic invitations from the conference organizers and uses this same online interface to generate nominations for speakers from within the CLAS collaboration. The nomination entails first an email to the chosen speaker inquiring if s/he is interested in the conference and, if invited, will be able to attend. The speaker must get in touch with the CSC and confirm her/his interest before the CSC forwards the nomination to the conference organizers.

The progress of all presentations, via either route, can be followed in the conferences and speakers table. Once the presentation is given, the CSC can edit the entry and add a link to the official conference proceedings for example.

At any time, CSC members have the options to 'Manage Conferences' (add newly announced ones, update

communication status) and 'Manage Speakers' (nominate, approve requests, update status). The conferences and speakers table features data filters, such that a CSC reviewer can select for example approved invited talks related to a given physics working group etc. Filters are enabled by clicking the relevant tags.

C. Statistics

Statistics that illustrate the policies of the CLAS Speakers Committee are automatically produced from the information stored in the CSC database tables. The actual pie charts are produced using Google APIs [20]).

This greatly simplifies the work of the CSC, eliminating the tedious and repetitive task of producing these charts at the end of every year.

Statistics produced are for example: conferences total, contacted, providing feedback, talks totals, CLAS versus CLAS12 shares, nominations, junior/senior ratios, physics working groups percentages etc. Pie charts and statistics are shown for every calendar year, starting with 2010.

The statistics and pie charts are formatted ready to be used in the CSC's end of year report to the CLAS collaboration (usually given at the spring meeting).

VII. DOCUMENTATION

Even though the interface is intuitive and extremely easy to use, the CLAS Online Interface is accompanied by extensive documentation, pop-up hints and explanations and notes on every page. The explanations accompanying the pages are concise, but they provide useful and important instructions on how to use these pages. Users must read attentively all the text on the CLAS Online Interface pages - most of the problems arise from not paying attention to these instructions.

There's a detailed FAQ section (linked in the top toolbar) where everything is explained, from how to do this and that to specific procedural issues.

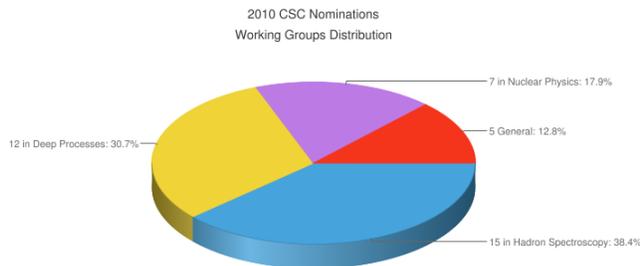


FIG. 4: A pie chart from the CSC statistics table.

A. General FAQ

For offline access, the online FAQ section is reproduced in here, with the warning that items may change if new features or procedures are implemented.

How do I login ? There is no 'Institutional Login' anymore, but only 'User Login'. However, after login, there is a differentiation depending on the user's responsibilities:

- General users will be able to sign up for shifts assigned to their institution, trade or swap their shifts or change their own passwords.
- The representative(s) of each CLAS institution have more permissions than the regular members, as they can change passwords and assign, trade or swap shifts for anyone in their group. They can also edit the member lists.
- The current PDL/RC can in addition modify the PDL/RC table and should update it to assign the next PDL/RC before his/her term ends.

What's my password ? Each user has his/her own password for logging in to this interface. If you don't know yours, forgot it or never knew you have one, please read the next FAQ item. Passwords set via this interface are encrypted.

What to do if I don't know my password ? If you try to log in with an incorrect password, you will be given the option to receive an email reminder. Try that first. If the received password does not work, then get in touch with your institute representative, who can reset it for you. If you are the institute representative and forgot your password, please contact the COI administrator to reset it for you.

What to do if my name is not listed ? Get in touch with your institute representative, who should log in and add you to his/her members list.

How do I find who my institutional contact is ? Click the link 'List of Institutional Contacts' in the left hand side menu of the web page.

How do I change my password ? Log in, then choose 'Change passwords' from the menu and follow the steps. The new password will be stored encrypted in the database.

Should I subscribe to any mailing list ? There are now several mailing lists (`clas_members`, `clas_full_and_term`, `clas_term`, `clas_shift_takers` and `clas_reps`) that are automatically refreshed nightly based on the information from the `shifts` and `membership` databases. Reminders and notifications will be sent to those. In addition, it is a good idea to be subscribed to the Hall B (`hallb@jlab.org`) mailing list in order to receive up to date information about experiment status, shift schedule changes etc.

How can I change my email in the CLAS mailing lists ? For `clas_members`, `clas_full_and_term`

and `clas_term`, edit your JLab 'phonebook' entry and modify the `email1` field. To change your subscribed email address in `clas_reps` and `clas_shift_takers`, ask your IR (institute representative) to update your entry in the shifts personnel tables.

What to do if I change my affiliation ? If you transfer to another CLAS member institute, say from A to B, then you should do the following:

1. Notify the CLAS Membership Committee of the transfer from A to B
2. Ask A's IR to remove you from their shift takers list
3. Ask B's IR to add you to their shift takers list

If your name is already listed on any future shifts, you will still have to do them.

How are shift allocations calculated ? Shift allocations are done proportional to the number of active CLAS members (i.e. affiliated as Term and Full members to the institute at that particular date). However, one is then free to distribute these shifts among all the members registered for shifts, i.e. one can have students or prospective CLAS members on the shift lists, without being given a higher shifts load because of this. Let's say an institute has a total of 5 CLAS active (Term or Full) members, and 7 names listed for shifts duty. The allocation will be based on a manpower of 5, but any of the 7 can sign up. The ratio of expert/novice shifts allocated will correspond to the ratio in the shift members list.

Am I a shift expert ? The shift database flags members who are certified as shift experts. If you have taken eight shifts in the past six months and the safety walk through, you are an expert. Same if you've recently served as RC. The expert list is augmented by individuals flagged by the PDL as experts based on his or her judgment of their experience. If you feel that you are an expert but are in the database as a novice, contact your institute representative, who can update your qualification level in the shifts database.

What are the requirements for 'worker' (or novice) shift takers ? In addition to the standard Hall B Requirements for Shift Personnel, one has to sit through at least four shifts with both expert and worker before being eligible to take any shifts at all.

What is a shift swap ? What is a shift trade ? A swap is an exchange initiated and finalized unilaterally by a person. A trade is an exchange initiated by one person and finalized with the agreement of a second party. Swaps are done during designated periods, and are meant to ease the travel load on the Foreign and Domestic institutes. Trades can be done at any time, and are based solely on mutual agreement between the persons or institutes involved. Note: If the shifts in discussion were assigned to you by your institutional representative, you may want to consult with him/her before swapping or trading them.

How do I add a new shift taker ? If you are an institute representative (IR), you can add a new name on

the shift taker's list of your institution. You have to log in and choose [Manage members](#) from the menu.

How do I delete a shift taker from my institution's list ? If you are an institute representative, you can delete names from your shift taker's list, once the corresponding person no longer shows as an active member of your institution in the CLAS Membership database. To change the CLAS Membership database information, please contact the CLAS membership Committee. Then you have to log in via the shifts interface and choose [Manage members](#) from the options menu, etc.

How do I sign up for shifts ? You don't have to select a date range. Just log in, then choose [Sign up for shifts](#) from the menu. You will be presented with a list of future shifts assigned to your institute. Follow the steps.

Can I be excluded from shifts during the next cycle ? Yes, ask your institutional representative to edit the members list and mark your expertise level as 'No shifts'. You will still be able to log in to the interface, but you will not be counted on for shifts. Please use this feature responsibly.

How do I perform a shift swap ? You don't have to select a date range. Just log in, then select option [Swap shifts](#) from the menu and follow the steps. There are several courses of action:

1. Institutional contacts swap shifts first, then assign names or ask members to sign up, or
2. Institutional contacts assign names and leave it to the members to swap their own shifts, or
3. Members sign up and then swap their own shifts

Only the first option was available in the past, but some of you might now prefer one of the other options. Please note that you can now (and is recommended to) sign up as early as your swap period starts. It is recommended, especially for Foreign institutes, to couple downtime shifts with normal shifts and travel to Jlab for the whole period, just in case there is a last minute change in the schedule and all the shifts have to be filled. To see the current shift swaps schedule, hover with your mouse over the FAQ link in the green menu bar at the top of the web page page.

How do I trade a shift ? Log in, then select option [Trade shifts](#) from the menu and follow the steps. An email will be automatically sent to the other party, who will have to either accept or refuse the trade. You will be notified by email when the transaction is finalized. You can send multiple trade offers for a given set of your shifts, and the trade will belong to the first person who accepts it.

If you get an email notification of a trade offer, follow the instructions contained therein to finalize or refuse the trade - or else you will receive daily reminders until the trade expires (in 15 days). Do not worry, in case you

reject a trade, a polite email will be sent to the initiator. An email will also be automatically sent out to both parties when the transaction is finalized.

Can I cancel a trade I proposed ? Yes. Log in, then select option **Trade shifts** from the menu and at the top of the page there will be listed all pending trades proposed by you. You can choose to keep or delete any of them. Select the ones you wish to delete and click the 'Refresh' button. Then continue with a new trade or simply log out.

Someone agreed to do my shifts, how do I re-assign them ? Let's say you are from institute A (and B is not the sister institute of A). If someone from institute B agrees to do your shifts - perhaps because you asked for a favor - they can be assigned without intervention from shifts administrator, but based solely on a tacit agreement between the involved parties (A and B). To do it, the institute representative of A has to log in and follow these steps precisely:

1. Add the name of the person from B to A's shift takers list as "First Last (for A)", for example: "John Smith (for RPI)". Eventually insert a short explanation in the 'remarks' field.
2. Assign the new name to the desired A shifts
3. Remove the new name from A's shift takers list

This way the exchange is traceable and the parties involved are automatically notified. Please use this feature responsibly. This is not a trade, since you don't exchange shifts, but simply sign up someone else to do your shifts.

How is the experimental schedule made ? The accelerator schedule is taken from

http://www.jlab.org/exp_prog/experiment_schedule/

and copied into the shift database. Sometimes changes are made to it after our shift schedule has been generated and swaps or trades are underway. In such cases, some of the shifts will not have to be taken, while some others, initially during downtime, will need to be filled.

Should we sign up for shifts during maintenance days ? The accelerator schedule is created months in advance and the actual activity on maintenance days varies greatly. Sometimes CLAS does take data and other times it is in fact down. You should assign names to ALL shifts during the MAINTENANCE/RESTORE periods. It will not be known until the week before the maintenance period what the actual schedule will be during these days. Contact the PDL or RC to see what is expected of shift takers during the maintenance days.

Should we sign up for shifts during Down/Install days ? There will not be any shifts during the Down/Install days and you do not need to sign up for shifts. The main exception being the first or last week of scheduled Down/Install periods. If you have shifts around the beginning or end of a long DOWN period, you should be prepared to take those shifts in

case: a) the schedule changes or b) there are shakedown shifts needed to bring the experiment back on after a long downtime period. Please contact the PDL/RC for details. *The recommended practice, especially for Foreign institutes, would be to group downtime shifts with normal shifts and travel to Jlab for the whole period, just in case there is a last minute change in the schedule.*

How do I set up the link to my experiment's web page ? To have your experiment's web page automatically linked herein, the name of the experiment as it appears in the database and is shown on the "Accelerator Schedule/Hall B Program" column in the shifts schedule table, should be identical to the its **clasweb** directory under `/group/clas/www/clasweb/html/shift/`.

How do I assign the next RC ? Only the current RC can edit the future Run Coordinators list. To do that, the current RC has to log in before the end of her/his term, and click on the **Assign RCs** button, then follow the instructions.

How do I assign the next PDL ? Only the current PDL can edit the future PDLs list. To do that, one has to log in before the end of her/his term, and click on the **Assign PDLs** button, then follow the instructions.

B. Service Work FAQ

How do I fill in my SoS ? Log in via this interface and then choose **My service work** from the menu. Follow the steps. If confused, please consult the general FAQ.

Who should edit the SoS ? Any member can now claim their service work by editing their institute's SoS, as many times as they wish, at any time between April and October. However, only the representative(s) can actually submit the (final) report.

Who should submit the SoS ? The representative(s) of each CLAS member institution should log in to fill in and submit the SoS. Alternatively, they can appoint someone else from their group to fill the SoS, by editing their members list and adding another 'Contact'.

Can I use the Open Office SoS template from past years ? No, you should use the online interface. Do not submit in any other (text, PDF, DOC) format.

I made a mistake, can I resubmit my SoS ? Yes, you can submit again, and the old data will be overwritten. The evaluation is done using the latest SoS version submitted.

Can I see the overall statistics ? Yes, the aggregated SoS data can be viewed by following the links from the online SoS FAQ section. Once your SoS is submitted, it will show up on its own row in there.

How can I review (audit) an SoS ? If you are a member of the SWC, you can review an institute's SoS by following these steps: 1) log in, 2) navigate to the desired SoS report, 3) click 'Review this SoS' link at the top left of the page. In the 'Comments or reviewed FTE' column

you can add an adjusted FTE, a comment or both (separate them with a '#'). You can choose to notify the institute of your submission by ticking the notification option box below the 'General remarks' input field.

Are CLAS12 tasks automatically added to the SoS ? No, such feature is not yet implemented. At the end of the year, make sure that the tasks that you were responsible for are copied to your institute's SoS and reviewed by your IR before the SoS is submitted to the CLAS Service Work Committee.

C. Paper and PAC Reviews

I logged in, but still couldn't access some of the reviews. Why ? As per the CLAS charter, section XI.3, access to some documents and associated comments is restricted to the review committee members until the review is completed.

Who and how initiates these reviews ? Analysis and Ad-Hoc reviews should be initiated by the PWG chair, while collaboration-wide and PAC reviews should be initiated by the CLAS chair. To initiate a review, one must log in, else a warning is displayed. After logging in and navigating to the Reviews page, a table listing ongoing reviews is displayed. Below the table, there is a link to initiating a new review. One must click the '[+]' symbol to expand the input form and enter the review info.

Who can upload documents for a review ? In order to start a review, the initiator must upload a first version. Once ongoing, any of the author, committee chair or initiator can upload new/updated documents. No documents can be uploaded after the review has ended though.

Should we set up a separate web page for the review ? No, it is no longer necessary to set up your own web page for the review. All versions of the paper and any supporting material should be uploaded via this interface. Comments and replies should be entered via this interface as well.

Do we have to email comments to clascomment ? All comments and replies entered via this interface will be automatically posted on `clascomment@jlab.org`.

D. Pop-ups

JavaScript pop-ups are employed all over the CLAS Online Interface pages to provide handy help, explanations and guidance. Pop-ups are small snippets of text that are displayed in a small frame when the user hovers with the mouse pointer over a certain text or image embedded in the visited web page.

These pop-ups provide important and useful information. Please read the text shown in all pop-ups.



FIG. 5: A pop-up showing a hint. Read pop-ups because they provide relevant and useful information.

VIII. UTILITIES

There is a 'Utilities' section of the CLAS Online Interface, linked in the l.h.s. menu bar but only visible after user log in, providing various tools like:

- Comparisons between shift lists and official CLAS membership lists: this is useful both for the IRs and the CLAS Membership chair
- Dynamic generation of mailing lists
- Reminders for the start and end of swap or SoS submission periods, oncoming shifts, pending trades, ongoing paper/analysis/PAC reviews
- Shift trades statistics: pie charts for every calendar year showing the fractions of accepted/refused/expired/canceled/(pending) trades
- A CLAS12 Service Work analysis page with subsystem and category breakdowns and institutes share of service work (tables and pie charts)

We will review some of these utilities in more detail in what follows.

A. Reminders

The reminders generate actual email submissions if the page is accessed with a given PIN. This is accomplished via daily cron jobs run from one of the Jlab CUE machines.

There are reminders for:

- Pending trades: daily (excepting Sundays), until the trade is executed or expires
- Incoming shifts: two weeks, one week and one day advance emails that either remind the users of their own shift assignments or notify the IRs to assign names to their institute's shifts. These reminders are suppressed during downtime periods.
- Swaps: one week and one day before the start, and then one week and one day until the end of each swap period

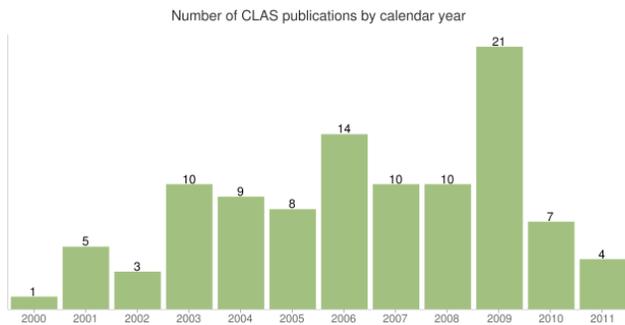


FIG. 6: CLAS publications by year (figure produced with Google Charts API).

- SoS submissions: 30, 15, 7 and one day before start and end of the service work submission period
- PAC and paper reviews: 30, 15, 7 and one day before the end of the review period

B. Mailing lists

Mailing lists are dynamically created from the information contained in the *shifts* and *membership* databases. Current mailing lists and pending subscriptions can be viewed via a link in the top menu bar - login is required before access

The nightly update of the mailing lists is triggered via the 'Utilities' page. Two `cron` jobs are employed: one uses `wget` to dynamically generate the lists based on the current info from the databases, the second updates the *mailman* subscriptions using PERL `WWW::Mechanize` functions.

Subscriptions done by hand via the *mailman* web interface are not affected by these nightly updates. To change their subscribed email addresses, users have to modify their emails in the corresponding databases (see relevant sections in the FAQ).

C. Publications list

A list of CLAS journal publications is dynamically created using the information stored in the `membership.publications` database table. Published and submitted papers are shown by default, but the user has to log in in order to access the papers currently under review. A link to the secure CLAS publications page is also provided.

The table is sortable, and can be reordered by clicking the column headers. Each article is listed with year, title, lead author, status, journal reference and a link. At the bottom of the table, a bar chart of CLAS publications by year is provided (Fig. 6).

IX. OTHER RESOURCES

There are a handful of other tools and resources provided on the CLAS Online Interface pages (see Fig. 1).

A. Shift operator training

The *Required training* page lists the training required in order to take shifts in Hall B.

Before showing up for shifts, one is required to complete the training detailed on this page, and read the documents linked therein. Paper copies of these documents are available in the Hall B counting room and electronically accessible on the web directly from the Main Hall B Page/Shift-Taker's Manuals.

B. Shift statistics

The search form in the l.h.s. menu bar provides also a 'Stats' option. This offers access to various shifts statistics like:

- Shifts per institute during a given time interval
- Type of shifts per person and time interval, totals and semi-totals
- Institute info, contact email addresses etc.

Thus IRs can compare their shifts duty and manpower use along consecutive years, individual users can calculate their personal contributions etc.

C. Experiment Status Toolbar

There is a XUL/JavaScript browser plug-in written for Firefox which once loaded in the browser creates a toolbar showing the current Hall B experiment status. The parameters displayed and the associated charts can be customized for any specific CLAS experiment. The plug-in uses a MonALISA [21] repository hosted by the Glasgow group [22], and depends on data sent by a Perl script that runs on one of the `clon` servers at Jlab. All these components have to be up and running for full functionality.

D. Map

The map shows CLAS member institutes and observers on an interactive Google map [23]. The geographic latitude and longitude coordinates for the location markers, as well as the homepage links should be provided by the IRs.

The map offers zoom in and out, panning, pop-ups etc. and gives a very nice impression of the size and geographical spread of the CLAS collaboration. Explanations are provided in a pop-up activated when one's

mouse pointer hovers above the question mark icon on the top r.h.s. Corrections and feedback should be sent to the COI administrator.

X. MAINTENANCE AND SUPPORT

The system is perpetual, that is it runs by itself year after year with minimal human intervention as long as no drastic changes in the CLAS experimental schedule, rules or bylaws are made. Administrative intervention is only needed to generate a new schedule (but an automatic reminder is sent out), recover IR passwords (if the case) and respond to unanticipated user requests (soliciting new features, for example). Any of the Superusers can act as administrator online, but for editing the PHP code or configuration files, one needs access to the CUE filesystem from a local machine.

In the lower r.h.s. of every page there is a link entitled 'Send any queries or bug reports to shiftbot@jlab.org'. However, along the last two years, all answered questions were copied into the FAQ, and very little can happen now that is not already covered in there. The pages contain exact instructions and pop-up hints at every step, they are intuitive to use, and all rules and restrictions are implemented in the software, indeed leaving very little room for mistakes.

Both the database backend and Apache server are maintained by Jlab IT, with whom good communication is maintained, and this makes the system very stable and reliable on the long run.

A. Feedback and bug reports

Please email all feedback and bug reports to **shiftbot@jlab.org**. The admin(s) will reply to you as soon as possible.



FIG. 7: Map of CLAS member institutes.

XI. SUMMARY

The CLAS collaboration is a relatively large collaboration, with member institutes spread from California to South Korea, and from Scotland to Chile, bound by complex bylaws and charters that govern the day-to-day organization of the experimental schedule and the publication process. The coordination of these tasks is done by various committees - from permanent ones like the Membership Committee, Service Work Committee, Speakers Committee to temporary ones like the Ad-Hoc Paper Review committees. The CLAS Online Interface provides a suite of management tools that greatly simplify the interaction between users - in the case of shifts management, swaps and trades - and between users and these committees by standardizing the collection and processing of data, precise record keeping, transparency and user-friendliness.

The CLAS Online Interface is a one-of-its-kind system, created specifically for CLAS and providing our collaboration with significant productivity gains.

A. Acknowledgments

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Thanks also to everyone else who helped improve the CLAS Online Interface by providing feedback in the form of bug reports, comments and suggestions for new features.

XII. APPENDIX

Included here are some technical details and some in-depth explanations of how things are set up or function.

A. Database Tables

Database tables used by the CLAS Online Interface at the time of writing are listed in Tables I and II.

Functionality	Database Tables
Membership records and Mailing lists	smembers sinstitutes
Shifts schedule	acc_sched expert novice spdl runcoord shifttradehistory
CLAS Speakers Committee (CSC)	conferences speakers
CLAS12 Tasks	clas12tasks
Paper and PAC reviews	paper_reviews review_comments review_papers
Online access records	tokens logins

TABLE I: MySQL tables in the *shift* database.

Functionality	Database Tables
Membership records and Mailing lists	Person Institute History
Publications	publications

TABLE II: *Membership* database tables queried.

B. Email Notifications

Email notifications are automatically sent when certain actions are carried out via the CLAS Online Interface. These should not be confused with the reminders generated by the cron jobs described in section VIII A. A list is shown in Table III.

C. Scheduler Algorithm Explained

The scheduler algorithm allocates shifts in a fair and balanced manner. The algorithm functions like this [24]: 1) calculates the number of days to be covered 2) calculates the number of members and ratio novice/expert for all institutes (JLab's share is halved because they provide all on-site support) 3) calculates integer shares for each institute, rounded to take into account that shifts are allocated in bunches of four 4) calculates numbers of 'expert' and 'novice' shifts based on the manpower of each institute and creates two 'urns' of shifts 5) shuffles the 'urns' 6) starts filling the expert schedule with bunches of allocations randomly extracted from the 'expert' urn; shuffles urn after each extraction 7) same for 'novice', but if staggered option is 'on', first and last two days of shifts are allocated to JLAB 8) generates two files con-

taining SQL queries 9) executes these queries, effectively inserting the assignments in the database.

D. Security

Data security is accomplished via custom-written authentication functions. Login is done via HTTPS, employs dedicated passwords independent of the regular CUE credentials, and is validated at both ends (browser and server login tokens must coincide). In a multi-step procedure (e.g. submitting an SoS or trading shifts) credentials are checked at every step.

User passwords are encrypted. The automated password recovery function uses only user names and email addresses already in the database, records the originating IP, and the COI administrator is automatically notified. All login attempts are recorded in a dedicated database table. Certain session parameters (id, time, IP) are recorded. A session history is available in the Superusers options menu.

SQL injection is preempted by replacing text input fields with drop-down menus, or where not possible pre-parsing POST or GET data before constructing MySQL queries. Illegal characters in input fields are automati-

Task	Email to	Type
Add/Remove/Edit user	user, IR, CC	A
Password change	-	
Signup for shift	-	
Assign Shift to user	user, IR, CC	A
Swap shift	-	
Propose shift trade	both users, (IR)	A
Accept or refuse trade	both users, (IR)	A
Edit own service work	-	
SoS submission	IR, SWC chair	O
Submit SoS audit	-	
Initiate paper review	author, RC, RI, (WGC), CC	A
Update paper review	author, RC, RI, (WGC), CC	O
End review (round)	-	
Submit speaker request	speaker, CSC (WGC)	A
Review/update request	speaker and/or CSC (WGC)	O
CSC nomination	speaker and/or CSC (WGC)	A
Edit experiment schedule, PDL or RC assignments	-	
Password recovery	user	A

TABLE III: Email notifications. Type: A - auto, O - optional. Abbreviations IR - institute representative, RI - review initiator, RC - review committee, CC - collaboration chair, WGC - physics working group chair. Item in brackets means 'if applicable'. All emails are BCC-ed to the COI administrator.

cally expunged. In FORM submissions, `GET` method is used on publicly accessible pages, where one might want to directly quote a link, but the more secure `POST` method is used on pages that require login.

To avoid exposing user's emails to spammers, email addresses are obfuscated on all pages using a custom-written function.

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- [1] more than 16,000 lines of PHP code
 - [2] PDL stands for Physics Division Liaison
 - [3] RC stands for Run Coordinator
 - [4] for a comparison between the two databases, see the membership lists tables from the 'Utilities' page
 - [5] if this exists. E.g. a summer student can be registered for shifts, without any official CLAS membership status
 - [6] the official CLAS Membership Committee page's URL is <http://www.jlab.org/Hall-B/general/membership.html>
 - [7] the official CEBAF Experiment schedule can be found at http://www.jlab.org/exp_prog/experiment_schedule/
 - [8] 'staggered novice' means that *expert* and *novice* shift bunches are staggered by 2 days. A 'bunch' of shifts is composed of 4 identical 8-hour shifts spread over 4 days
 - [9] a volcano eruption in Iceland for example
 - [10] see a complete list of IRs at <http://www.jlab.org/Hall-B/shifts/?display=contacts>
 - [11] one should be careful not to change the HTML formatting of the `run_plan.html` file when editing it
 - [12] see SWC page at <http://www.jlab.org/Hall-B/secure/sos>
 - [13] the first round of SoS submitted via the new interface were the 2009 service work reports
 - [14] calendar year means January to December inclusive
 - [15] these SWC recommendations might change
 - [16] see CLAS charter section XI.3
 - [17] there is an alternate interface for collaboration-wide reviews including opt-in forms etc.
 - [18] one can toggle the input format between either a *deadline date* or a *duration*, with default values given in both cases.
 - [19] quoted from the CLAS Speakers Committee wiki page http://clasweb.jlab.org/csc/wiki/index.php/Main_Page
 - [20] all pie charts in here are actually produced with these Google APIs: <http://code.google.com/apis/charttools>
 - [21] read more about MonALISA at <http://monalisa.cern.ch>
 - [22] this repository is on <http://mlr1.gla.ac.uk:7002>
 - [23] <http://code.google.com/apis/maps/>
 - [24] the scheduler code can be found in `new_schedule.inc`