

Linux Clusters Institute: HPC User Support

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Targets for this Session

Target audience:

IT professionals with little or no experience with supporting HPC users

Points of interest:

- Differences between HPC and conventional IT
- HPC user categories and differences in their support
- Human aspect of HPC support (i.e. politics, conflicts)
- Problems common to most institutions/centers supporting HPC
- Exchange different approaches/solutions to common problems
- HPC education and training

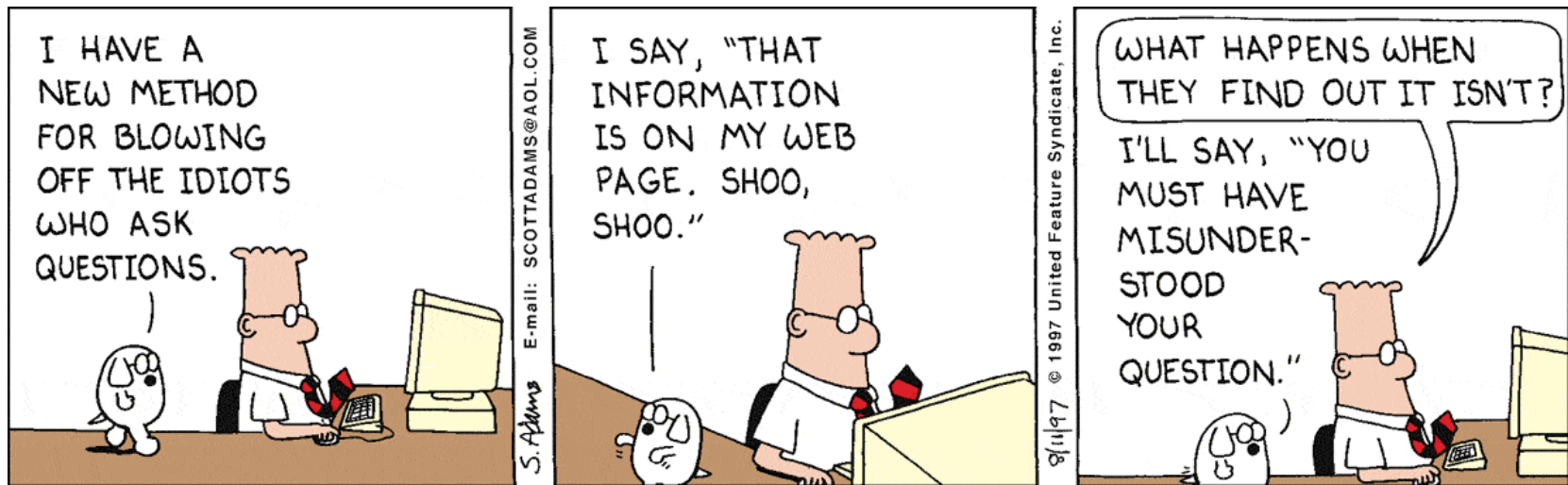
What is User Support (US)?

- Provide technical assistance to computer users. Answer questions or resolve computer problems for clients in person, or via telephone or electronically.

The importance of Documentation

- As much as we want to...

(credit: <http://dilbert.com/strip/1997-08-11>)



How Does/Can HPC User Support Differ?

- Application performance tends to be the biggest target
- Problems cover a much broader range
 - From desktops to clusters
 - More esoteric
 - Frequently very domain specific
 - More often on users than on services
- Requires code compilations using complicated mechanisms
- HPC can be more collaborative
- Few opportunities for general training
 - Not really a formal set of certifications

What Do These Differences Mean for HPC User Support?

- HPC user support personnel have to be adaptable
- Greater need to relate to people from their perspective
- Often need to understand some science as well as computers

What Are The Goals of US?

- Bring users and resolutions together
- Advance research goals
- Reduce user frustration
- Minimize impact on User Support personnel
- Efficient usage of hardware resources

User Expectations

- PI's (tend to be owners of resources, not *necessarily* active users
 - Rely on students and collaborators to do the actual work
 - Want maximum availability of resources
 - Minimal contact with HPC IT staff
 - More apt to communicate with purchasing, coordinators, etc.
 - Regular status reports

User Expectations

- Students and collaborators (and some PI's)
 - Very fast learning curve – they know the science
 - They want simple and instant fixes to problems
 - Frequent contact with HPC IT staff
 - They expect HPC to always be faster than their desktops
 - Occasionally, they want help unrelated to HPC
 - They frequently try to find an “inside friendly” staffer
 - Answers need to match their knowledge levels

HPC User Categories

- Three broad categories
 - Novice (includes “homework” students)
 - Intermediate
 - Advanced
- Difficult to identify a user's category without any prior interaction
- The language used in requests is a good indicator
- Replies to follow-up questions also reveal their level of proficiency
- In case of uncertainty, assume “novice”

Novice Users

- Identifying:
 - 5-80% of the support requests
 - No/little Linux skills
 - No/little experience with running the domain specific packages
 - No/little understanding of the scientific fundamentals behind the packages
 - Mostly identical or similar requests with straightforward solutions
 - Usually not aware of the standard help channels
 - May ask the impossible
 - May type the examples in the help documents literally
 - May feel insecure or apologetic when seeking for help

Novice Users

- Needs:
 - Cluster orientation
 - Linux 101
 - An email list
 - An easy text editor (nano?)
 - Help with configuring their MS Windows/OSX systems
 - Location of existing software
 - Installation of new software
 - Help with tools to move data in/out
 - Help with the very first job submission script

Novice Users

- Approaches:
 - Do everything to build mutual trust
 - Hold regular orientation sessions and help desks
 - Maintain up-to-date FAQ/help with screenshots
 - Provide links to existing help locations
 - Suggest proper web search terms
 - Make them feel better about their simple (or sometimes stupid) questions
 - Explain all the steps for resolution in simple, replicable terms
 - Prefer exact list of commands to general/conceptual answers
 - Be very patient and polite!

Intermediate Users

- Identifying:
 - 10-25% of the support requests
 - Largest portion of the compute activity on the cluster
 - Experience with clusters in the same or other institutions
 - First to notice and report system problems
 - A hybrid mix of straightforward and complex questions
 - Advanced and multi-step scientific workflows
 - Aware of the standard help channels
 - Suggest solutions to their own problems and may not like what you did
 - Act as the local technical expert and often train novice users in their group

Intermediate Users

- Needs:
 - Advanced (and group-specific) information sessions
 - Well-explained effective solutions
 - More performance/efficiency from already running codes
 - Specific modules/patches/versions for existing software
 - Higher level of control on their jobs
 - Access to specialized computational resources
 - Configurations that may conflict with system defaults
 - Code development/debugging/profiling support
 - Data/statistics for the resolution of conflicts with other users

Intermediate Users

- Approaches:
 - Do everything to build mutual trust
 - Hold advanced classes to "teach how to fish"
 - Schedule one-on-one meetings
 - Add exceptional/advanced cases to existing FAQ/help pages
 - Present solid data/evidence instead of speculation
 - Admit to speculation if it is inevitable
 - Show complete transparency; they can separate 'excuses' from 'facts'
 - Get help from vendor support and user forums, keeping users CC'ed
 - Be very patient and polite!

Advanced Users

- Identifying:
 - Experience with and access to multiple clusters
 - Only a small fraction of support requests
 - Inclination for bypassing the ticket system
 - Usually complex problems with long resolution time
 - Try to fix problems themselves, and see HPC support as a last resort (i.e. when it's too late)
 - Usually on the extremes; either hostile or extremely collaborative

Advanced Users

- Identifying (continued):
 - Too busy or advanced to act as the local expert for their group
 - Have complex to incomprehensible workflows
 - Usually acknowledge challenging problems, open to workarounds
 - Suggest improvements on the systems (hardware and software) and provide useful feedback
 - Open to experimentation with new systems and software
 - Find bugs in libraries and applications

Advanced Users

- Needs:
 - VIP treatment
 - Direct and open communication channels
 - Social contact
 - Acknowledgement of their level of knowledge and intelligence
 - High-level and direct vendor/developer support
 - Lots of exceptions, even though they require violation of existing policies
 - Almost everything else listed under "common intermediate users needs"
 - Root password (the answer is still no)

Advanced Users

- Approaches:
 - Do everything to build mutual trust
 - Schedule one-on-one meetings
 - Try to learn more about their research, deadlines and aspirations
 - Be very careful saying that something is "impossible"
 - Make small exceptions as long as it does not impact other users
 - Avoid speculation as much as possible (as with all users)
 - Be completely transparent, they can easily separate 'excuses' from 'facts'.
 - Encourage them to contact vendor support or user forums
 - Be very patient and polite!

Policies

- Clear policies help keep user demands under control
- Publish policies in places easy to find (online)
- Be prepared to explain the reasoning behind each policy item
- Make policies as strict as possible, be open to exceptions when necessary
- Encourage users to openly discuss and criticize the policies
- Don't hesitate updating policies frequently to stay relevant
- Build trust and effective communication with decision makers
- Seek delegation privileges to speed things up
- Don't make policies for resources you don't own, but "influence" them

Politics and Conflicts

- Tricky but inevitable
- No magic formula, needs case-specific creative solutions
- Biggest challenge: conflicts due to limited resources
 - Configure systems to exactly match policies
 - Collect and store data for past and present usage
 - Provide users with tools to browse data/statistics for their accounts
 - Run regular audits to defuse problems before they explode

Tiers of Conflict

- **Internal to a group/department:** usually easier to solve with communication and gentlemen's agreement
- **Between groups/department:** can get messy quick. Open communication is key
- **Between users and HPC support staff:** Have clear policies handy as a basis for declining impossible requests, and keep solid statistics/data as evidence

Personality Management

- Some users are difficult than others; why they behave that way is irrelevant
- Do not take anything personal; report any harassment you may receive and do not retaliate
- In most cases users do not mean bad, but they are extremely frustrated
- If your mistake caused frustration, take responsibility and offer an apology
- Show empathy and demonstrate sincere intention for resolution
- Acknowledge that:
 - You understand the problem
 - You are aware of its particular impact on the user
- Be aware of, and show tolerance for cultural differences and language difficulties
- Humor is powerful only when used appropriately, avoid being awkward or insulting
- Do not wait until having a resolution, respond immediately to inform that you started working on the problem, and provide frequent updates

Understand the World You Live In

- Funding/Budget
- Staffing
- Political will
- Know your boundaries
- Policy

photo by Hans van de Vorst

Issue Ingest

- Help Desk?
- Ticketing system?
- Shared help email?

User Education

- Web
 - Great for self-service
 - Don't get too much advice
 - Detail how to ask a good question/how to ask for help
 - Usage limitations and best practices
 - Basic Linux usage
 - Basic cluster access, concepts, scheduling system, software
 - Troubleshooting job related problems
- Classes and Seminars
 - Target specific topics

Advanced User Education

- Typically trainings rather than web
 - Debugging/optimization of codes (incl. parallel)
 - System architecture specific details
 - Advanced use of common tools (scientific python, parallel matlab)

Group Consultations

- Mini-orientations for newly joining groups
- Departmental meetings to provide feedback for resolution of internal conflicts
- Resolution of technical problems that are specific to a group
- Technical feedback to assist in policy making and system purchases
- Introduction of services to new groups with interest in getting resources

Outreach

- Grant Writing Help
 - Hardware specs, software licenses, quotes
 - Letters of support
 - Contribute portions of the grant
 - Take the lead on new grants for more resources in house with researcher input

Today's Challenges

- BYOD
- Big Data/Data Analytics age
- Data publication and curation
- Meeting demands not addressed by conventional IT

Questions?