2019 HUF Burning Issues Update
Disclaimer

Forward looking information including schedules and future software reflect current planning that may change and should not be taken as commitments by IBM or the other members of the HPSS collaboration.
Agenda

• Introduction
• Process and Voting
• Review of New Burning Issues
• Status of Open Burning Issues
• Backup
Introduction

• HPSS User Forum (HUF) Burning Issues (HBIs) are valuable input for influencing and setting Collaboration priorities
  o HBI’s are used as one source of input during release planning activities. Realistically, all HBI’s are not going to be addressed, so ranking during the voting process is important.

• Clarity on Priority, Importance, and Impact is needed
  o Changes that benefit our broader community will likely be of higher importance or impact.

• Please keep input at the requirements level helping understand what you need and why
  o Proposing a solution may not always help us understand what is needed or why.
Introduction

• Submit the highest priority burning issue per site, per year
  o Submission of burning issues is optional.
  o Reusing a previous burning issue is encouraged via the voting process
    • If there is no new issue that is more important than an existing one, please consider voting on the existing one.

• Please keep in mind that broader programmatic decisions, strategy, and direction, especially those impacting the architecture of HPSS are still within the domain of the HPSS Executive Committee
  o We are listening, but we cannot do everything.

• Burning Issues are addressed with the following:
  o Change Request (CR)
  o Call Report
  o Bug (defect)
Burning Issue Assessments

• Priority
  o Priority as reflected in the CR database.
  o CRs are reviewed on a monthly basis. CR priorities are assessed and updated regularly.
  o Questions we ask:
    • How much does the issue impact the system? Where and How?
    • How much interest is there with the development partners? Within the HPSS Community?
  o Priority is relative to other work and things to get done on a defined schedule.
Burning Issue Assessments

- Importance
  - Relative to other things, how important is the issue or action?
  - Questions we ask:
    - Are we ever likely to address the issue based on factors like schedule impact or strategic direction?
    - How many sites will be involved with the issue?
    - Impacts to current and future assignments and schedule expectations?

- Complexity
  - Is there an agreement on the requirements and how best to address the issue?
  - How many SLOCS, time, and effort involved?
  - How many subsystems?
  - How many people?
Burning Issue Process

• Please use the burning issue form introduced in 2013 for submission
  o Helps with understanding and documentation and provides the input needed to create the CR, call report, or bug.

• If a previous burning issue has not been resolved
  o Please vote on it again...
    • Provides feedback that issue is still important and
    • Allows updates concerning the requirements, use cases, etc.

• If you missed the burning issue deadline and have something to provide, please let us know.
Burning Issue Process

• Updates to open burning issues are provided at the HUF
• Email to be sent before the HUF to review the new burning issues
• New burning issues are reviewed at the HUF
  o Sites should prepare a one or two slides to review burning issue at the HUF
• All burning issues are documented by support rep via a call report
  o May result in a new CR or bug
  o May result in updating a previous CR or bug
• Sites Vote on burning issues
  o Results of the Voting will be used in planning for next HPSS release
Burning Issue Voting

- Voting will occur after the HUF
- Make sure you understand the burning issues you are voting for, if you are not sure, please ask
- Each site gets 3 votes
  - Highest importance
  - Second highest importance
  - Third highest importance
- Results will be posted to the Admin Wiki and emailed to the reflector
  - Results will be reviewed with the Collaboration EC
- Burning Issues that do not receive votes from the previous year may be dropped unless they get sponsorship to continue to stay on the list of Burning Issues
## The HPSS Big Project Backlog (as of July 24, 2019)

<table>
<thead>
<tr>
<th>Project Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>CR 393 – Tape LBP for RAIT</td>
</tr>
<tr>
<td>CR 575 – Improve RPC Performance</td>
</tr>
<tr>
<td>CR 521 – Improve mover performance when staging files within an aggregate</td>
</tr>
<tr>
<td>CR 339 – Stage data from any tape copy</td>
</tr>
<tr>
<td>Bug 5038 – Nameserver Scalability</td>
</tr>
<tr>
<td>CR 414 – Coordinated Disk Migrations</td>
</tr>
</tbody>
</table>

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<tr>
<th>Project Name</th>
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<tbody>
<tr>
<td>CR 399 - Eliminate Server Restart</td>
</tr>
<tr>
<td>CR 524 – Stage transfer rate logging</td>
</tr>
<tr>
<td>CR 548 - Support library heuristic-based request reordering for LTO (TAOS)</td>
</tr>
</tbody>
</table>

http://www.hpss-collaboration.org
HUF Burning Issues

• HPSS 8.1 Burning Issues
  o HUF Burning Issues were prioritized with other CRs and bugs for 8.1 planning
  o CR 523 was a big part of the development for 8.1
## 2019 Burning Issues

<table>
<thead>
<tr>
<th>Site</th>
<th>Title</th>
<th>Comments</th>
<th>Submittal</th>
</tr>
</thead>
<tbody>
<tr>
<td>BNL</td>
<td>TOR not working for aggregated tape data recall</td>
<td>CR 521</td>
<td>BNL 2019 BI</td>
</tr>
</tbody>
</table>


http://www.hpss-collaboration.org
BNL Burning Issue

• TOR not working for aggregated tape data recall
• TOR performance is very good for non-aggregated data
• No performance gains with TOR over FIFO for files in large aggregates
• See BNL HUF 2018 Presentation
• Same Burning Issue as NOAA CLASS 2018 Burning Issue
# Status of Open Burning Issues

<table>
<thead>
<tr>
<th>ID</th>
<th>Burning Issue</th>
<th>Status</th>
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</table>
| JX012018 | Patchwork Stage for Dual Copy COS          | Open   | M | M | M | CR 553  
2019: RAIT provides functions to automatically recover data based on parity |
| BN022018 | Purge Policy has no file size or age filter | Open   | M | M | M | CR558  
2019: Needs to be evaluated by the TC.                                  |
| SL032018 | Configurable Recall Policy                 | Open   | M | M | M | CR556  
2019: No Change                                                         |
| NC042018 | Slow Seek Performance in large aggregates  | Open   | M | M | M | CR 557, 521, 337  
2019: Design work has started for CR 337. Work on CR 337 will be done before work on CR 557. |
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| EC022017 | Flexible Dual Copy Purge with disk      | Open   | M  | M  | M  | CR435 Allow a dual copy disk/tape storage class to purge the disk if the tape has been written  
2019: No change  
2018: Needs to be evaluated by the TC.                                                                                                                                                           |
| MP032017 | Efficient use of multiple copies of data | Open   | H  | M  | M  | Same as SC022015 Burning Issues. Poor performance when staging files.  
CR533 More efficient use of multiple file copies / multiple PVRs  
2019: No change  
2018: Needs to be evaluated by the TC.                                                                                                                                                    |
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| BN012016| Eliminate Server Recycle                           | In Work| M  | H  | M  | Eliminate the need for recycling the Core server after configuration changes  
CR399 Eliminating HPSS Server Recycles  
2019: On the Project Backlog  
2018: In plan for an HPSS release  
2017: CR is in discussion for 7.5.3 planning |
| KI012015| Support for (Unicode) UTF-8 characters              | Open   | M  | M  | M  | Complete support for native language character sets for directory and file names.  
CR 321 “Support for Unicode (UTF-8, 16) character set”  
Object names can contain unprintable characters setting in the global configuration can provide support for large percentage of characters, but is not full UTF-8 support.  
2019: No Change  
2018: No Change  
2017: Being Evaluated |
| NC042015| Repack Performance Improvements                    | Open   | M  | M  | H  | Add tape drive vendor specific commands to help improve repack performance.  
CR365 Advanced repack capability - migrating at native tape drive performance  
2019: No Change  
2018: No Change  
2017: Needs more evaluation. Xcopy commands copy tape segments to new volumes. Evaluation needs to be done to determine the best way to update HPSS tape headers during the copy process. Oracle has also stopped development of their enterprise drives. |

P = priority, I = importance, C = complexity
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| SC2014 | Quota Accounting Feature               | Complete | L | M | M | Quota/Accounting Features: We need a way to enforce the HPSS storage resources that are allocated on a yearly application process to projects, groups and users. CR 298 “Implement group-based accounting and quota system”  
2019: CR523 was included in HPSS 8.1  
2018: CR 523 is required before CR 298 can be planned. CR 523 is being planned for work.  
2017: No updates.  
2016: What more is needed from this burning issue? A basic quota system using the Gatekeeper site lib and HPSS accounting is available. It can be configured with soft and hard limits for users, groups, or both. When the soft limit is reached, an email is sent as a warning, but users can still create files. If the hard limit has been reached, an email is sent and the user can no longer create or append files. The quota system is available for 7.4.3p1. Work with your support representative to configure and install the quota feature. |
| IU2014 | Verify Second Copy                     | Open     | M | M | M | CR339: Would like the ability to stage data from specified tape copy without administrator intervention. Currently the first copy tape volume must be marked down by the administrator for the system to read from the second copy tape volume.  
2019: No Change  
2018: No Change  
2017: LBP Verify tool was released with 7.5.1 and can verify the data is valid on the volume. Keeping open to allow reading from the second copy.  
2016: TC Passed. Would the LBP Verify tool cover this requirement or is there still the need to read the file? |
| EC2014 | Requests for Migration Improvements    | Open     | H | H | H | CR348: Scalability issues with MPS. When using complicated COS and Hierarchy configurations, MPS can use a large number of tape drives. Migration streams are also limited to the slowest streaming tape drive. ECMWF would like MPS to migrate data based on the target SC rather than the source SC.  
2019: No Change  
2018: CR 414 and 416 are in planning.  
2017: 3 new CRs 414, 415, and 416. CRs are being evaluated for 7.5.3 planning.  
2016: TC Evaluated. CR was evaluated, but it did not make the cutoff for 7.5.2. |

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| BN022013 | Tape Streaming repacks with utilization of disk cache.                                | Partially Complete | M  | M  | H  | CR 327 Optimize Repack  
  2019: No change  
  2018: CR397 Released with 7.5.2. Bug 7183 is related in reducing seeking down the tape for files that can be added to the aggregate.  
  2017: CR397 is included in 7.5.2. Evaluating CR 327.  
  2016: CR 397 is planned for 7.5.2. It will provide an option that will not remove sparse space in aggregates during repack.  
  2015: Planning for Feature Release  
  2014: Repack performance is important but it has been a lower priority than other HPSS scalability and performance goals. Tape mover operations and repack behavior have been studied, tests have been conducted, and many ideas generated. Data integrity remains our number one priority and concern. While a complete plan has not been finalized, current efforts have been in three areas:  
  1. Looking at a new tape management approach with the goal of repacking media from multiple slower drives onto a newer faster tape drive possibly using disk for buffering I/O operations.  
     - This is a large and complex problem which has not been high enough in priority or importance to make a release plan.  
     - Work will likely continue outside of mainstream release plans on a best-effort basis.  
  2. Reviewing tape read and write operations, in general. Repack is all reading and writing to tape. If we can read and write from tape faster, repack will be faster.  
     - Some specific cases have been studied (repacking sparse tapes) with some promising results which have not been fully vetted.  
     - New tape drive features may offer improved write performance (e.g., buffered TMs) but these features and changes have not been fully vetted.  
     - This is a large and complex problem which has not been high enough in priority or importance to make a release plan.  
     - Work will likely continue outside of mainstream release plans on a best-effort basis.  
  3. Other tape I/O-related changes that will be of benefit to repack (e.g., tape ordered recall). |

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| UK012013 | Administrative functions, such as down a tape or drive, should take precedence over other commands and be action'ed immediately. | Being Eval'ed | M  | L  | M | CR 316 Update PVR Mount-Available Drives in Real-time (from NCSA)  
2019: No change  
2018: 7.5 includes changes to will only be blocked by tape I/O operations. I/O abort features can be used to abort inflight operations.  
2017: No Change  
2016: No Change  
2015: No Change  
2014: The TC feels that at least one case of CR 316 will be covered by the solution for CR 183. Need a way to interrupt/stop i/o in flight. Other cases for CR 316 are also probably related to CR 183. Nothing else has been done. |

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| NA022012 | Fix VFS Security             | Open   | L | L | M | CR 224 “VFS host access/mount point control”.  
2019: No Change  
2018: No Change  
2017: No Change  
2016: No Change  
2015: No Change  
2014: Solution needs to focus on the general client case; this issue is not specific to VFS (Kernel or FUSE implementations). Please consult with IBM support for how to deploy VFS in a more secure manner and to discuss known risks and limitations. |
| BN032012 | Short Tape Issue            | Open   | L | M | M | CR 274 “LTO4/5 tapes EOM prematurely due to tape drive errors”.  
In summary, would like the ability to un-EOM prematurely EOM ed tape.  
2019: No Change  
2018: Bug 6230 to logs SCSI sense information is in HPSS 7.5.3  
2017: No Change, Is this still an issue?  
2016: No Change  
2015: No Change  
2014: TC has discussed this issue and CR for all drive types, not just constrained to LTO4/5. There are many ways of dealing with this problem and it’s been difficult to come to agreement on an approach that can be done in a reasonable amount of time, effort, and complexity (e.g., making everything configurable). We’re also concerned about maintaining drive-unique information. We think there may be some changes that can be done to alter the state of a volume and not mark it EOM (e.g., RO). More discussion is needed. Accommodating sense code feedback and adjusting accordingly is of interest but low priority and importance at this time. |

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<tr>
<td>UN062012</td>
<td>Migration Stream Granularity</td>
<td>Needs Evaluation</td>
<td>L</td>
<td>H</td>
<td>M</td>
<td>CR 309 &quot;Migration streams per file family&quot;.</td>
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<td>2019: No change</td>
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<td>2018: No change</td>
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<td>2017: Need to evaluate with other MPS CRs</td>
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<td>2015: Possibly combine with CR348?</td>
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<td>2014: No change. Important issue but this is stacked-up behind other MPS work.</td>
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<tr>
<td>UN152012</td>
<td>Quota and Accounting Features</td>
<td>Combine with SC2014</td>
<td>M</td>
<td>L</td>
<td>M</td>
<td>CR 298 &quot;Implement group-based accounting and quota system&quot;;</td>
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<td>2019: No change</td>
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<td>2018: See SC2014 for updates</td>
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<td>2017: No Change</td>
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<td>2015: Gatekeeper Site library developed for DKRZ and</td>
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<td>available with 7.4.3p1</td>
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<td>2014: Regressed… was an issue with NOAA (and DKRZ to an extent) as a driving business need but that need went away.</td>
</tr>
</tbody>
</table>

\[ P = \text{priority}, I = \text{importance}, C = \text{complexity} \]
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</thead>
</table>
| UN162012 | HTAR Limitations                                                             | Open       | H  | H  | H  | 2019: No change  
2018: IU will sponsor this BI  
2017: Not completed  
2015: Targeted for HPSS 7.5.1 release.  
2014: HSI 5.0.2.p0 is ready for HPSS 7.4.3 so efforts are turning to these required changes which includes removing the old tar format restrictions. GEL will be asking for volunteer sites to help test as soon as a release is available, which is expected to be in 1-2 months depending on problems/emergencies. |
| UN092011 | Enhancements for all media-related utilities (repack, recover, etc) to take advantage of data still on disk cache | Recover - Completed | M  | M  | H  | In general: CR 246 “MPS Force Migrate Frontend Utility”  
Recover: CR 249 “Recover utility fixes and improvements” – item 1: “The recover utility needs to support recovery from any valid level”. Has been formally accepted as a CR by the Collaboration and is targeted for 7.5  
Repack: Need more information.  
2019: Improvements to Recover are available  
2018: More improvements to Recover  
2017: No Change  
2016: No Change  
2015: Recover enhancements released in 7.4.3 p1  
2014: With respect to Recover only, CR 249 has been implemented and targeted for HPSS 743 patch 1 and 7.5. Nothing has been done to Repack, though. We are unclear on what other media-related utilities should be reviewed. |
Backup
2018 HUF Burning Issue Vote Results

HUF 2018 Burning Issues Voting Results

- 3rd Highest Importance Count
- 2nd Highest Importance Count
- Highest Importance Count

Burning Issue Number
2017 HUF Burning Issue Vote Results

HUF 2017 Burning Issues Voting Results

- 3rd Highest Importance Count
- 2nd Highest Importance Count
- Highest Importance Count
2016 HUF Burning Issue Vote Results

HUF 2016 - Burning Issues Results

- 3rd Highest importance
- 2nd Highest importance
- Highest importance

2015 Burning Issues Vote Results

Burning Issues from HPSS Users Forum 2015
2014 Burning Issues Vote Results

HUF 2014 - Burning Issues Results - New Issues for 2014

- SC2014
- BN2014
- IU2014
- EC2014

Legend:
- 3rd Highest Importance
- 2nd Highest Importance
- Highest Importance
2013 Burning Issues Vote Results

Issue 5: Job and I/O Cancellation

Issue 4: Reordering of files to be staged (Bug 2213). Poor performance staging files from an aggregate if requests are not in tape order

Issue 3: On the Fly metadata conversion

Issue 2: Tape streaming repacks with utilization of disk cache

Issue 1: Administrative functions, such as down a tape or drive, should take precedence over other commands and be action'ed immediately

Votes
## Burning Issues Complete / Rejected / Duplicate

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<tr>
<td>2013 Issue: The dumppv_pvl –u command should include the volume's PVR name in the output (ANL)</td>
<td>Complete</td>
<td>ANL agrees to close this burning issue as resolved; Ishpss was significantly enhanced in HPSS 7.3.3; Isphss –vol now shows the Volume ID, Type, Label Type, PVR, Alloc State, Admin State, Op State and Usage State. ANL responded that this satisfies the request.</td>
</tr>
</tbody>
</table>
2012 Burning Issues Vote Results

- Issue 1: End to End Error Tracking
- Issue 2: Job Cancellation
- Issue 3: Decouple HPSS upgrade with OS upgrade
- Issue 4: Metadata migration and reversion
- Issue 5: Fixing Stuck I/O
- Issue 6: GHI problem isolation
- Issue 7: Fix VFS Security
- Issue 8: Short Tape Issue
- Issue 9: Migration Stream Granularity
- Issue 10: GHI Backup Validation
- Issue 11: Quota/Accounting Features
- Issue 12: RHEL new version support
- Issue 13: Media Read Flexibility
- Issue 14: VFS Stability
- Issue 15: Error Message Reduction
- Issue 16: Import Errors
- Issue 17: HTAR Limitations
### Burning Issues Complete / Rejected / Duplicate

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<tr>
<td>Issue 1 (2012): End to End Error Tracking</td>
<td>Complete</td>
<td>CR 279 “Need enough information in logs to track errors back to source”. Support has been working with customers to identify situations where log messages can be more meaningful. Some examples include: Bug 1725 “CORE2110 errors do not provide the filename or fileset in the log message” (available in 7.3.3.p5), Bug 1778 “Errors flooding HPSS - need to map back to client” (available in 7.3.3.p8), and Bug 2832 “Add list of exclusive bitfile locks to SIGHUP dump of core server” (available in 7.3.3.p9). The scope of this CR is too broad and affects all developers, components and clients. HPSS is always proactively identifying messages that can be made more meaningful. Collaboration recommends that that sites report these to their support rep so that they will be handled case by case. Closed.</td>
</tr>
<tr>
<td>Issue 2: Job Cancellation</td>
<td>Dup of 2013 Bi#5</td>
<td>CR 280 “Capability in RTM Summary to kill jobs”. Has not been formally accepted as a CR by the Collaboration and is not being developed.</td>
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<td>Issue 3: Decouple HPSS upgrade with OS upgrade</td>
<td>Complete</td>
<td>Evidence includes HPSS versions 7.3.3p9a (added DB2 9.7 and RHEL 6 mover support) and 7.3.3p9b (added RHEL 6 core server support); 7.4.2 will support both DB2 9.7 and 10.5. See also “HPSS Release and Development Plans” presentation for RHEL compatibility statement “…not necessary to re-test or re-certify applications between minor releases of RHEL…”</td>
</tr>
<tr>
<td>Issue 4: Metadata migration and reversion</td>
<td>Dup of 2013 BI#4</td>
<td>CR 272 “Capability to continue running HPSS during metadata conversion”. Will be satisfied via DB2 Q-replication. Q-rep will be tested/utilized at ECWMF during their upgrade to 7.4.1. Q-rep will be made available with 7.4.3. Reversion will not be addressed.</td>
</tr>
<tr>
<td>Issue 12: RHEL new version support</td>
<td>Complete</td>
<td>New releases of RHEL will be supported within 6 months of general availability for clients only (assuming hardware device drivers, etc. are available).</td>
</tr>
<tr>
<td>Issue 14: VFS Stability</td>
<td>Complete</td>
<td>VFS has been separated from HPSS resulting in fixes being released faster and stability has been improved.</td>
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<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
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<tr>
<td>Issue 15: Error Message Reduction</td>
<td>Complete</td>
<td>We have been making progress in correctly classifying log messages such that they do not cause spam. Support has been working with customers to identify situations where log messages need to be downgraded or reclassified. Some examples include: Bug 1778 “Errors flooding HPSS – need to map back to client” (available in 7.3.3.p8), Bug 2944 “Logs getting flooded with HPSS_ENOENT error” (available in 7.3.3.p9), Bug 3167 “Failure to create bfdesc message should be downgraded when error is exceeded quota” (available in 7.4.1.p2), Bug 3093 “Flood of CORE 3027 messages in log” (available in 7.4.1.p2). The scope of this burning issue is too broad and affects all developers, components and clients. Collab recommends that that sites report these to their support rep so that they will be handled case by case. Closed.</td>
</tr>
<tr>
<td>Issue 16: Import Errors</td>
<td>Complete</td>
<td>Bugs 1274 “Import of new tapes (e.g. TS1140 or LTO6) puts mover and device into suspect mode”, 2895 “New E06 tapes using 3592E06/3592E07 drives put mover and device into suspect mode” and 2957 “Mover still goes major on 3592 imports of unwritten tapes” resolved this issue. All are available in 7.3.3p9.</td>
</tr>
</tbody>
</table>
2011 Burning Issues Vote Results

- **Issue 1**: Need enough information in logs to track errors back to source
- **Issue 2**: Capability in RTM Summary to kill jobs
- **Issue 3**: Enhancements to Metadata migration; limit downtime, reversability
- **Issue 4**: RHEL 6 support for client API
- **Issue 5**: Selective Migration for the Purpose of Tape Shelving
- **Issue 6**: Re-add san3p to hsi
- **Issue 7**: Request ability to automate retries of repacks
- **Issue 8**: Request for dynamic monitoring tool
- **Issue 9**: Enhancement for all media-related utilities (lsvol, repack, recovery...) to take advantage of data still on disk cache

The chart shows the vote results with shade indicating the level of importance: light blue for highest importance, dark blue for 2nd highest importance, and yellow for 3rd highest importance.
## Burning Issues Complete / Rejected / Duplicate

<table>
<thead>
<tr>
<th>Burning Issue</th>
<th>Status</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011 Issue 1: Need enough information in logs to track errors back to source</td>
<td>Dup of 2012 BI#1</td>
<td>See 2012 Burning Issue 1.</td>
</tr>
<tr>
<td>2011 Issue 4: RHEL 6 support for client API</td>
<td>Complete</td>
<td>Done in HPSS 7.3.3 patch 6 for CLAPI, PIO, PFTP.</td>
</tr>
<tr>
<td>2011 Issue 5: Selective Migration for the Purpose of Tape Shelving</td>
<td>Rejected by Collab</td>
<td>CR 269 “Admin utility to move selected data from tape to tape”. Wants the ability to “sort material on tapes on demand”. CR was rejected by the Collaboration because File Families and Change COS can/should be used to accomplish this. Suggest closure.</td>
</tr>
<tr>
<td>Burning Issue</td>
<td>Status</td>
<td>Details</td>
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<tr>
<td>--------------------------------------------------</td>
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<td>-------------------------------------------------------------------------</td>
</tr>
<tr>
<td>2011 Issue 6: Re-add san3p to HSI</td>
<td>Complete</td>
<td>Available in HSI 4.0.1.3.</td>
</tr>
<tr>
<td>2011 Issue 7: Request ability to automate retries</td>
<td>Complete</td>
<td>Bug 2137 “Repack retry logic not always called when an error occurs” (available in HPSS 7.3.3.p8)</td>
</tr>
<tr>
<td>of repacks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2011 Issue 8: Request for dynamic monitoring tool</td>
<td>Rejected by Collab</td>
<td>CR 203 “Monitoring of tape media and tape drives for errors”. There are many third party tools (e.g. Crossroads Read-Verify Appliance) that offer this functionality. The new utility “lspvhistory” which is an HPSS system maintenance utility that lists tape physical volume history information can help. CR is not likely to be implemented and has been rejected by the Collaboration. Suggest closure.</td>
</tr>
</tbody>
</table>
Any Questions?

Jonathan Procknow
procknow@us.ibm.com

Kristy Kallback-Rose
kkr@lbl.gov