

# DM Leadership Team Face-to-Face Meeting, 2018-05-22 to 24



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## Logistics

### Date

22 May 2018 - 24 May 2018

### Location

- [Petersen Room](#), Allen Library, University of Washington.
- Room 485 (fourth floor).
- Room is available 09:00 on 22 May to 13:00 on 24 May.

### Accommodation

- A hotel block booking is available at the [Residence Inn by Marriott Seattle University District](#).
- Contact [Erin Carlson](#) to secure your place.
- **Bookings must be made by 2018-04-20. \*\* The hotel block is now full, but [Erin Carlson](#) may be able to provide assistance. \*\***
- See details [here](#).

### Travel

- From Seattle-Tacoma International Airport, the [Link light rail](#) will take you to the University of Washington Station.
- The Allen Library (see location, above) is a [ten minute walk](#) from the station.
- Ride-share services (Lyft, Uber, etc) will likely cost around \$30-40 from the airport to the University District.

### Per Diem

Total	Breakfast	Lunch	Dinner	Incidentals	First & Last Day of Travel
\$74.00	\$17.00	\$18.00	\$34.00	\$5.00	\$55.50

### Attendees

### Traveling

- [Wil O'Mullane](#) (arriving SEA Monday May 21 at 16:54)
- [Frossie Economou](#) (arrive SEA Monday 14:36, depart SEA Thursday 14:40)
- [Tim Jenness](#) (arrive SEA Monday 14:36)

- [Kian-Tat Lim](#) (arrive SEA Monday 19:44, depart SEA Thursday 21:15)
- [Leanne Guy](#) (arrive SEA Sunday 14:36, depart SEA Thursday 17:05)
- [Unknown User \(xiuqin\)](#) (Arriving 6:47pm Monday, Alaska-589)
- [Fritz Mueller](#) (Arrive SEA Monday 14:10, depart SEA Thursday 09:10)
- [Vaikunth Thukral](#) (Arrive SEA Monday 16:25, depart SEA Thursday 17:10)
- [Jim Bosch](#) (arriving 19:06 Sunday on UA2151, departing 22:50 Thursday on UA1695)
- [Unknown User \(gcomoretto\)](#)
- [Simon Krughoff](#)
- [Yusra AlSayyad](#) (arriving 5/20 21:55 UA1807, departing 5/26 11:50 UA1730)
- [Unknown User \(mbutler\)](#) (5/21-5/23 only)
- [Margaret Gelman](#)
- [Jeff Kantor](#) (5/22 and 5/23 only, arriving 5/21 3pm, leaving 720am 5/24)
- [Michael Wood-Vasey](#) (5/20-5/23: arr SEA Sun 20:58 dep SEA Wed 22:23)
- [Robert Gruendl](#)
- [Gregory Dubois-Felsmann](#) (also attending DM-SST 5/21 and IVOA InterOp starting 5/27)
- ...

## Local

- [John Swinbank](#)
- [Eric Bellm](#)
- [Colin Slater](#)
- [Zeljko Ivezić](#)

## Remote

- ...



## Regrets




- [Mario Juric](#)
- [Robert Lupton](#)

## Agenda


Day 0: 2018-05-21			
Time	Topic	Chair	Notes
09:00	SST Meeting	<a href="#">Zeljko Ivezić</a> / <a href="#">Leanne Guy</a>	<ul style="list-style-type: none"> <li>• <a href="#">Agenda</a> provided by DM System Science Team.</li> </ul>
17:00	Close		
Day 1: 2018-05-22			
09:00	Welcome	<a href="#">Wiliam O'Mullane</a>	<ul style="list-style-type: none"> <li>• Review outstanding actions</li> <li>• Review &amp; adjust agenda</li> <li>• <a href="https://github.com/lst/wom_presentations/blob/master/DMLT-May-2018/DMLT-WOM-MAY-2018.pdf">https://github.com/lst/wom_presentations/blob/master/DMLT-May-2018/DMLT-WOM-MAY-2018.pdf</a></li> </ul>
09:30	Review outstanding DMLT action items and tickets	<a href="#">Wiliam O'Mullane</a>	<ul style="list-style-type: none"> <li>• <a href="#">Action items</a></li> <li>• <a href="#">Jira tickets</a></li> </ul>

10:00	Compression WG	Wil O'Mullane / Robert Gruendl	<ul style="list-style-type: none"> <li>Final close out of this working group.</li> <li>Please review the WG report in advance of the meeting. <a href="https://dmtn-068.lsst.io/">https://dmtn-068.lsst.io/</a></li> <li>Includes plans &amp; requirements for future work in this area.</li> <li><a href="#">LossyCompress_WG_20180522.pdf</a></li> </ul> <ul style="list-style-type: none"> <li>The proposal is that we can store compressed versions of PVIs for easy access for (e.g.) producing postage stamps. <ul style="list-style-type: none"> <li>Note that we are currently sized to store 30 days worth of (uncompressed) PVIs.</li> <li>Anything older than that needs to be recomputed (by imgserv).</li> </ul> </li> <li>We, as DM, need to develop a "menu" of ~3 options for science collaborations, including: <ul style="list-style-type: none"> <li>Time to produce calibrated image from raw;</li> <li>Compression level;</li> <li>Time range of compressed images stored.</li> </ul> </li> <li>This menu can likely be appended to the end of</li> </ul> <div>  <a href="#">RFC-325</a> - Jira project doesn't exist or you don't have permission to view it. </div> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> John Swinbank: Ensure pipelines code for regenerating images on demand is included in LDM-151, that an equivalent service is included in the appropriate DAX design documentation, and that both of them are included in the DM construction plan. 19 Jun 2018</li> <li><input checked="" type="checkbox"/> Wil O'Mullane, Kian-Tat Lim: Provide "menu" of compression of options as an addition to RFC-325. 19 Jun 2018</li> <li><input checked="" type="checkbox"/> Fritz Mueller: Develop a complete (to the best of our current understanding) list of data products that have to be accessible through DAX services, and a plan for extending that list in future. 19 Jun 2018</li> </ul> <div>  <a href="#">DM-15186</a> - Jira project doesn't exist or you don't have permission to view it. </div>
10:30	Break (Refreshments Provided)		
11:00	QA WG	John Swinbank	<ul style="list-style-type: none"> <li>Report on current status.</li> <li><a href="#">Slides</a>.</li> </ul>
11:30	Summit-Base ITC & networks status update	Jeff Kantor	<ul style="list-style-type: none"> <li>Provide a status of the Summit and Base IT infrastructure installation and networks.</li> <li><a href="#">Kantor Networks and Base.pdf</a></li> </ul>
12:00	Status of HEALPix/MOC	Unknown User (xiuqin) / Gregory Dubois-Felsmann	<ul style="list-style-type: none"> <li>Per <a href="#">RFC-441</a> HEALPix and MOC should be adopted as standard LSST data products.</li> <li>What is the plan for and status of implementation of this?</li> <li>Should we draft some requirements ?</li> <li><a href="#">Slides</a></li> </ul> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Gregory Dubois-Felsmann: Discuss potential HiPS/MOC plans with the SST. 19 Jun 2018</li> </ul>
12:30	Lunch (Provided)		
13:30	Next-to-database processing	Leanne Guy / Fritz Mueller	<ul style="list-style-type: none"> <li>Follow up on actions from <a href="#">DM Leadership Team Face-to-Face Meeting, 2018-03-08/09</a>.</li> </ul> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Colin Slater: Publish technical note on next-to-database processing use cases. 06 Jul 2018</li> <li><input checked="" type="checkbox"/> Wil O'Mullane: Following the publication of Colin Slater's technical note on next-to-database processing, decide what further meetings or discussions are required. 26 Jun 2018</li> </ul>

14:00	Pipeline s output metadata	Kian- Tat Lim	<ul style="list-style-type: none"><li>Plans for having LSST Science Pipelines provide the metadata that is required by DAX &amp; SUIT as part of standard processing.</li><li><a href="#">Slides</a></li></ul> <div><input checked="" type="checkbox"/> Gregory Dubois-Felsmann: Refresh Confluence page describing the mapping of the LSST data model to CAOM, then propose it for RFC. 19 Jun 2018</div> <div><input checked="" type="checkbox"/> Kian-Tat Lim: Map Butler v3 schema to CAOM. Delegated in</div> <div><div><div> DM-14555 - Jira project doesn't exist or you don't have permission to view it.</div><div>19 Jun 2018</div></div></div> <div><input checked="" type="checkbox"/> John Swinbank / Yusra AlSayyad: Schedule work during F18 to construct a task which translates pipeline outputs to a format consistent with the DPDD. 31 May 2018</div> <div><input checked="" type="checkbox"/> Gregory Dubois-Felsmann: Provide "meta-schema" of information which must be provided in pipelines output tables. 19 Jun 2018</div>
14:30	Nightly reporting	Wil O'Mullane	<ul style="list-style-type: none"><li>Status of <a href="#">LCR-1203</a></li><li>Its impact on DM requirements</li><li>Other reporting tools needed (? e.g. real time alert stream diagnostics)</li></ul> <div><input checked="" type="checkbox"/> Wil O'Mullane: Shepherd LCR-1203 to a useful conclusion. 24 Jul 2018</div>
15:00	Break		
15:30	Moderni zing the Science Pipeline s codebase	Jim Bosch	<ul style="list-style-type: none"><li><a href="#">Jim Bosch</a> writes:<ul style="list-style-type: none"><li>There is currently a lot of ad-hoc, grass-roots effort going into cleaning up the stack and its documentation that has at best inconsistent support from the DMLT, and this is both distracting developers from scheduled work and leaving them frustrated because the effort they're donating via free/science time isn't making a big dent. DMLT needs to agree to and present a united and coherent policy and plan for modernization so we aren't fighting our own devs (and each other) on this. I will come with at least one rough proposal, but it may be too ambitious to be tenable, and I'd really like other members of DMLT to come armed with additional proposals</li></ul></li><li>Please come to this discussion prepared as Jim suggests.</li></ul> <div><input checked="" type="checkbox"/> Frossie Economou &amp; Jim Bosch: Organize a three day "retreat" to discuss Pipelines codebase modernization. 19 Jun 2018</div>
17:00	Close		
18:00	Everybody is invited to join the DM Project Manager & the local UW LSST team for drinks at Ravenna Brewing, <a href="#">5408 26th Ave NE</a> (25 minutes walk from the meeting venue, 15 minutes by bus).		
19:30	Dinner at BaBar, <a href="#">2685 NE 46th St</a> (10 minutes walk from Ravenna Brewing).  If you <b>will</b> be coming for dinner, please provide <a href="#">Wil O'Mullane</a> with \$34 (your dinner per diem).  If you <b>will not</b> be coming for dinner, please let <a href="#">John Swinbank</a> know in advance so we don't wait for you.  The restaurant will accommodate all the dietary needs that we know of; <b>please make your needs known to the server.</b>		
Day 2: 2018-05-23			
09:00	EFD interface s & requirem ents	Frossie Econom ou	Discuss <a href="#">LCR-1344</a> and the path forward with starting to exercise DM interfaces to the EFD.  We agreed to appoint <a href="#">Simon Krughoff</a> as product owner of the DM-EFD. <div><input checked="" type="checkbox"/> Margaret Gelman: Organize a meeting with T&amp;S to decide whether we extract from the EFD databases or from DDL. 19 Jun 2018</div> <div><input checked="" type="checkbox"/> Simon Krughoff: Develop written use cases/requirements for DM-EFD. This is being handled in</div> <div><div><div> DM-15012 - Jira project doesn't exist or you don't have permission to view it.</div><div>19 Jun 2018</div></div></div>

09:30	Generation 3 Middlewares are next steps	<a href="#">Fritz Mueller</a> / <a href="#">Jim Bosch</a>	<ul style="list-style-type: none"> <li>What's the current status of Gen 3 Butler &amp; SuperTask as at the end of S18? <ul style="list-style-type: none"> <li>When will they be ready for widespread use?</li> <li>What's our migration plan?</li> </ul> </li> <li>What resources are needed to continue middleware development into F18 and beyond?</li> </ul> <p><a href="#">Fritz slides</a> (F18 Supertask status)</p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Fritz Mueller: Organize "mini review" of</li> </ul> <div>  <a href="#">RFC-484</a> - Jira project doesn't exist or you don't have permission to view it. 19 Jun 2018 </div> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Fritz Mueller / Jim Bosch / Yusra AlSayyad / John Swinbank: Discuss staffing plans for the F18 BG3 group. 25 May 2018</li> <li><input checked="" type="checkbox"/> Fritz Mueller: Provide example QuantumGraph to the Data Facility. 19 Jun 2018 Initial example (illustrative of QG API) was sent. Andy S. awaiting feedback/questions about the the API from NCSA.</li> </ul>
10:30	Break (Refreshments Provided)		
11:00	Test specifications in Jira	<a href="#">Unknown User</a> (gcomoretto)	<ul style="list-style-type: none"> <li>Can DM adopt the technology being developed by the Systems Engineering group?</li> <li><a href="#">GCM_TestApproach.pptx</a></li> </ul>
11:30	Status of documentation for this summer's reviews	<a href="#">Wiliam O'Mullane</a>	<ul style="list-style-type: none"> <li>Refer to <a href="#">this spreadsheet</a>.</li> </ul> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Leanne Guy: Coordinate production of test cases covering all LSE-61 requirements. 18 Jun 2018</li> </ul>
12:30	Lunch (Provided)		
13:30	Codebase consistency	<a href="#">Kian-Tat Lim</a>	<ul style="list-style-type: none"> <li>Portal, Firefly, Qserv, Header Service, "L1" Image Ingest, Workload/Workflow, Data Backbone, Jellybean, SQuaSH: these use different languages, different dependencies, different skills than Science Pipelines, Task Framework, Butler. Their code is generally not reviewed, understood, or maintained outside of their own groups. What standards and processes are we and should we be applying to these to ensure that they function well and are maintainable for the lifetime of the project?</li> <li><a href="#">Slides</a></li> </ul> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Kian-Tat Lim: Figure out which (project and/or DM level) documents need to be updated to better capture standards &amp; processes for development within DM and elsewhere.</li> </ul> <div>  <a href="#">LIT-337</a> - Jira project doesn't exist or you don't have permission to view it. and </div> <div>  <a href="#">DM-14570</a> - Jira project doesn't exist or you don't have permission to view it. 19 Jun 2018 </div>

14:15	Operations rehearsals	Margaret Gelman	<ul style="list-style-type: none"> <li>We have multiple "operations rehearsal" milestones scheduled through construction: <ul style="list-style-type: none"> <li>LDM-503-09 (2019-01-04)</li> <li>LDM-503-11 (2019-10-31)</li> <li>LDM-503-12 (2020-01-31)</li> <li>LDM-503-13 (2020-11-30)</li> <li>LDM-503-15 (2021-10-29)</li> <li>LDM-503-16 (2022-05-31)</li> </ul> </li> <li>We should start planning for what's involved in these activities.</li> <li><a href="#">Slides</a></li> </ul> <p>✓ Margaret Gelman: Circulate a skeleton plan for an operations rehearsal based on AuxTel. 19 Jun 2018</p> <p>✓ Margaret Gelman: Arrange for Felipe to construct realistic (in terms of file structure, headers, etc) images based on TS8 data. 19 Jun 2018</p>
15:00	Break		
15:07	Photo at the Fountain		- out the door turn right and its on the left ..
15:30	Internal on-disk data representations.	Simon Krughoff	<p>Currently, the standard processing results in FITS files containing the <code>afwTable</code> catalogs from the processing. These are then transformed to Apache <code>parquet</code> format for use in QA endeavors. This means we are storing the same information in two redundant formats. I would like to explore how we treat the various file formats.</p> <ul style="list-style-type: none"> <li>Do we treat some as transient and others as persistent?</li> <li>Can we settle on a single format that will serve multiple needs with the understanding that some transformation may be necessary to serve the community?</li> <li>Depending on the above, are there impacts on the sizing model that need to be taken into account (realizing that the sizing model is specifically for operations)?</li> </ul>
16:00	Product tree	Unknown User (gcomoretto)	Based on the different documents available (and in preparation), I would like to share some thoughts, maybe a proposal, for a categorization of the different products that can be identified (at the moment) inside DMS. ( <a href="#">GCM_ProductTree.pptx</a> )
16:30	Future software releases	Unknown User (gcomoretto)	<p>What's the plan for upcoming releases?</p> <ul style="list-style-type: none"> <li>Will the next release be 15.1 or 16.0? What's the timescale? What documentation and/or characterization needs to be prepared to accompany it?</li> <li>Are future releases time based, or linked to specific events in commissioning/I&amp;T/etc? <ul style="list-style-type: none"> <li>Note that we now have LDM-503 milestones described as "Science Pipelines Release" preceding major rehearsals.</li> </ul> </li> <li>Do these releases include just Pipelines or also Firefly, Qserv, Platform, Data Facility, ...? <ul style="list-style-type: none"> <li>If those are not included in the stack release, what are their release plans?</li> </ul> </li> <li><a href="#">GCM_Releases.pptx</a></li> </ul> <p>• Next release will be 16.0.0, coming in June. No changes to standard release process (modulo addition of extra "0").</p>
17:00	Close		
Day 3: 2018-05-24			

09:00	Plans for F18	John Swinbank	<ul style="list-style-type: none"> <li>Each T/CAM (or science lead, or their nominee) to give a ~10 minute presentation of plans for F18. <ul style="list-style-type: none"> <li>System Management (Wil O'Mullane)</li> <li>System Science (Leanne Guy)</li> <li>Architecture (Kian-Tat Lim)</li> <li>Science Pipelines: <ul style="list-style-type: none"> <li>Alert Production (John Swinbank)</li> <li>Calibration Products (John Swinbank)</li> <li>Data Release Production (Yusra AlSayyad)</li> </ul> </li> <li>SUIT_F18plan (Unknown User (xiuqin))</li> <li>DAX (Vaikunth Thukral)</li> <li>Data Facility (Margaret Gelman)</li> <li>SQuaRE (Frossie Economou)</li> </ul> </li> <li>✓ Margaret Gelman: Discuss infrastructure for notebook aspect in PDAC at infrastructure meeting. 31 May 2018</li> <li>✓ Colin Slater: Provide Frossie Economou with details on outstanding data products documentation request tickets. 19 Jun 2018</li> <li>✓ Unknown User (xiuqin): Discuss requirements for spectral data visualization with key stakeholders (primarily Patrick Ingraham and Robert Lupton). 19 Jun 2018</li> </ul> <div style="border: 1px solid orange; padding: 10px; margin: 10px 0;">  DM-15475 - Jira project doesn't exist or you don't have permission to view it. </div> <ul style="list-style-type: none"> <li>✓ Kian-Tat Lim: Work within a framework developed with Margaret Gelman to develop a list of all the various data products generated or managed by DM. 19 Jun 2018</li> <li>✓ Wil O'Mullane: Check prerequisites for LDM-503-10 and adjust dates (likely one year later). 19 Jun 2018</li> </ul> <p>Milestone "owners":</p> <ul style="list-style-type: none"> <li>LDM-503-05: Eric/John</li> <li>LDM-503-06: Margaret (to move to more appropriate date?)</li> <li>LDM-503-07: John (should be changed to say "making test stand data available through a Butler".)</li> <li>LDM-503-08: Michelle</li> <li>LDM-503-08b: Margaret</li> <li>LDM-503-09a: John</li> <li>LDM-503-09: Margaret (to move to more appropriate date)</li> </ul>
10:30	Break (Refreshments Provided)		
11:00	Plans for F18 (continued)	John Swinbank	<ul style="list-style-type: none"> <li>Resolve outstanding cross-team issues.</li> <li>Agree on final plan.</li> </ul>
12:30	Review action items & plans for next meeting	Wil O'Mullane	<ul style="list-style-type: none"> <li>Expected to be 2018-11-05/07 in Princeton.</li> <li>Also lets open diaries for the next meeting or two after that - Tucson and Illinois perhaps.</li> </ul> <ul style="list-style-type: none"> <li>Provisional dates for next-but-one meeting 26/27/28 February likely in Tucson.</li> <li>Provisional dates for next-but-two meeting 21/22/23 May likely at NCSA.</li> </ul>
13:00	Close		

## Pre-Meeting Planning

### Suggested topics for discussion

- Check on status of requirements for next to database processing, per discussion at [DM Leadership Team Face-to-Face Meeting, 2018-03-08/09](#).
- State of Butler Gen 3 and next steps - how are we preparing to make it work with Pegasus ?
- Status of documentation for JSR - <https://docs.google.com/spreadsheets/d/15WZbLHchZGEf4GzzSnmiklfnCw6Z8lwNDwP4Qvi2Dw/edit?usp=sharing>
- Technical topics
  - HEALPix/MOCs
  - Metadata (units, UCDs, descriptions, linkages, etc.) by the pipelines
  - Nightly reporting
  - The relationship between DBB and LSP user file storage space. This was brought up at the LSP workshop December 5, 2018. Several of us think there may need to be a working group for this.

Topic	Requested by	Time required (estimate)	Notes
Update on status of Summit - Base ITC and Networks	<a href="#">Jeff Kantor</a>	20 minutes plus questions	Provide a status of the Summit and Base IT infrastructure installation and networks.
Modernizing the Science Pipelines codebase, or agreeing how not to.	<a href="#">Jim Bosch</a>	60-90 minutes	There is currently a lot of ad-hoc, grass-roots effort going into cleaning up the stack and its documentation that has at best inconsistent support from the DMLT, and this is both distracting developers from scheduled work and leaving them frustrated because the effort they're donating via free/science time isn't making a big dent. DMLT needs to agree to and present a united and coherent policy and plan for modernization so we aren't fighting our own devs (and each other) on this. I will come with at least one rough proposal, but it may be too ambitious to be tenable, and I'd really like other members of DMLT to come armed with additional proposals.
EFD requirements and interfaces	<a href="#">Frossie Economou</a>	30 mins	Discuss <a href="https://project.lsst.org/groups/ccb/node/2470">https://project.lsst.org/groups/ccb/node/2470</a> and the path forward with starting to exercise DM interfaces to the EFD,
Test Specs in jira/MD with <a href="#">Unknown User (gcomoretto)</a>	<a href="#">Wil O'Mullane</a>	30 mins	Look at JIRA test director and how SE are using it. Also how might we use this to make our test specs, test reports and traceability. There is also some terminology difference to be covered (test spec = test run etc. ) .
Final Close out of Compression WG with <a href="#">Robert Gruendl</a>	<a href="#">@womullane</a>	20 mins	Assuming those interested will have looked at the report this would be highlights and potential work to be done in the future.
The DMS Product Tree	<a href="#">Unknown User (gcomoretto)</a>	20 mins	Based on the different documents available (and in preparation), I would like to share some thoughts, maybe a proposal, for a categorization of the different products that can be identified (at the moment) inside DMS.

## Attached Documents

File	Modified
PDF File KTL Metadata DMLT 2018-05.pdf	May 21, 2018 by Kian-Tat Lim
PDF File KTL Processes DMLT 2018-05.pdf	May 22, 2018 by Kian-Tat Lim
PDF File Kantor Networks and Base.pdf	May 22, 2018 by Jeff Kantor
PDF File LossyCompress_WG_20180522.pdf	May 22, 2018 by Robert Gruendl
PDF File 2018-05-22 — DMLT QA WG.pdf	May 22, 2018 by John Swinbank
Microsoft Powerpoint Presentation OpsRehearsalsv2.pptx	May 23, 2018 by Margaret Gelman
JPEG File DMLT-UW-2018.jpg	May 23, 2018 by Wil O'Mullane
PDF File SST Plans F18 .pdf	May 24, 2018 by Leanne Guy
PDF File 2018-05-24 — AP — F18.pdf	May 24, 2018 by John Swinbank
PDF File KTL Arch Epics DMLT 2018-05.pdf	May 24, 2018 by Kian-Tat Lim
PDF File DMLT-RFC-441_201805-v3.pdf	May 24, 2018 by Gregory Dubois-Felsmann
Microsoft Powerpoint Presentation SUIT_F18plan201805.pptx	May 24, 2018 by xiuqin
PDF File DAX_DMLT_05_2018.pdf	May 24, 2018 by Vaikunth Thukral



Microsoft Powerpoint Presentation DMLT_F2FMay2018_LDF.pptx	May 24, 2018 by Margaret Gelman
Microsoft Powerpoint Presentation F18 Supertask Update.pptx	May 28, 2018 by Fritz Mueller
Microsoft Powerpoint Presentation GCM_Product-Tree.pptx	May 29, 2018 by gcomoretto
Microsoft Powerpoint Presentation GCM_Releases.pptx	May 29, 2018 by gcomoretto
Microsoft Powerpoint Presentation GCM_TestApproach.pptx	May 29, 2018 by gcomoretto

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