Scenario 3:
Execute a Workflow and catalog input and output products
Notions in Diagrams

• Connectors
  – One sided solid arrow – SOAP Request or SOAP response
  – Two sided solid arrow – SOAP Request & Response (either synchronous or asynchronous)
  – Dashed one side arrow – WS-Event publish or subscribe

• Numbering
  – Numbers 1, 2, 3…Control flow of Request/Response actions.
  – Prefix (1a, 1b ,1c..) After a asynchronous request if a service contacts a different service before responding to the request then the subsequent services actions will be numbered with prefixes.
  – A, B, C … Actions which occur periodically independent of scenarios
Scenario 3: Experiment Execution

Repeat Steps 7 to 9 for every service in the workflow.
Abbreviations

- GPEL – Grid Processing Execution Language
- WCS – Workflow Configuration Service
- DaMN – Data Movement and Name Resolver
- Gfac – Generic Factory Service
- HSS – Host Scheduler Service
- DSC – Dynamic Service Creator
Use Case: Experiment Execution

• Assumptions:
  – User has requested a portal account and has been approved.
  – User has logged into the portal and can browse their workspace.
  – User has permissions to run a workflow.
  – User has access permissions to each service in the workflow.

• Select and Configure Workflow:
  1. Portal (Experiment Builder) contacts myLEAD agent to get a list of workflows accessible by user.
     1a: myLEAD Agent contacts myLEAD server to fetch workflow collections under the specified project and propagates back to portal.
  2. Portal fetches the workflow from GPEL using the workflow template id and parses through inputs.
  3. Portal queries input data from Data Catalog based on the annotated metadata associated with workflow inputs
• Register inputs with myLEAD & Launch Workflow:

4. Portal registers workflow input data products to myLEAD Agent.
   4a: On request from myLEAD Agent DaMN Service registers the data products with
   name resolver and initiates the data transfer from community space to myLEAD
   controlled personal space.
   4b: DaMN requests a 3\textsuperscript{rd} party transfer of the data file contacting Reliable File Transfer
   (RFT) Service or uses alternate transfer mechanisms based on source and
   destination allowable file transfer protocols.
   4c: DaMN communicates back the file transfer success/failure to myLEAD Agent using
   Event Channel.
   4d: myLEAD Agent registers the metadata of the imported file with myLEAD Server
   concluding the data registration process.

5. Portal contacts auditing service to register the workflow and the user
   information. Auditing service starts to listen for events generated
   and published to the workflow topic.

6. Portal builds the soap input to workflow and invokes the workflow to
   GPEL Engine by setting the EPR of services to Dynamic Service
   Creator or (DSC).

7. GPEL invokes the services based on data dependencies. Since the
   EPR is set to DSC GPEL actually invokes DSC.
Experiment Execution Contd...

• Lookup/Create and Invoke Service:

8. DSC queries Xregistry for any running service instances (Concrete WSDL’s a.k.a CWSDLs). If a service instance is found DSC pings it to make sure it is running. If no service instance is found or ping fails then steps 8a, 8b and 8c or executed if not jump to step 9.

8a: If no running service instance is found DSC contacts Gfac to create a service instance.

8b: Gfac creates a service instance and returns back the EPR of the instance to DSC.

8c: The service instance registers itself (heart beat of 2 mins frequency) with XRegistry.

9. DSC invokes the service instance (found in xregistry or returned by gfac) with actual SOAP input message.

9a: Application Service (instance) queries Host Scheduler Service for the best host to run the application.

9b: Application Service requests DaMN service to transfer the file from input location to the scratch location on compute host.

9c: DaMN requests a 3rd party transfer of the data file contacting Reliable File Transfer (RFT) Service or uses alternate transfer mechanisms based on source and destination allowable file transfer protocols.

9d: DaMN communicates back the file transfer success/failure to application service using Event Channel.
9. **Service execution Contd...**

9e: Application Service launches the Globus GRAM job on the remote compute host and starts monitoring it and send periodic job status events.

9f: Application Service sends a event about job handle and associated workflow which the auditing service listens and catalogs.

9g: After the job execution is complete application service registers the output produced with myLEAD Agent.

9ga: On request from myLEAD Agent DaMN Service registers the data products with name resolver and initiates the data transfer from compute host to myLEAD controlled personal space.

9gb: DaMN requests a 3rd party transfer of the data file contacting Reliable File Transfer (RFT) Service or uses alternate transfer mechanisms based on source and destination allowable file transfer protocols.

9gc: DaMN communicates back the file transfer success/failure to myLEAD Agent using Event Channel.

9gd: myLEAD Agent registers the metadata of the transfred file with myLEAD Server concluding the output data registration process.

9h: Application Service send the SOAP output back to GPEL engine. (DSC before invoking the service instance sets the reply to address to GPEL hence the reponse is back to GPEL instead of DSC).

*Steps 7 through 9 are repeated for every service in the workflow.*