Hybrid Cloud Solutions

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Agenda

- Categorizing Cloud Systems
- Hybrid Strategies
- Lessons Learned


The Cloud

Cloud Alternatives

- Three levels of Engagement
  1. Infrastructure as a Service
  2. Platform as a Service
  3. Software as a Service

- Delegation of:
  - Just the Hardware
  - Software Components as well
  - Entire Application

Deployment Alternatives

- Deployment
  1. Private Cloud - ➢ Virtual Environment
  2. Managed Services - ➢ Delegated Maintenance
  3. Public Tenant - ➢ Centralized Maintenance
- Reduce
  - Responsibility / Risk
  - Administration
  - Customizations

SaaS Examples

- CAD - Fusion 360 Mechanical
- CRM - NetSuite
- PDM - CloudPDM
- PLM - Fusion Lifecycle
- ERP - NetSuite, Sage
- BI - Tableau, Fusion Connect
- Integration - Jitterbit Harmony/MuleSoft CloudHub

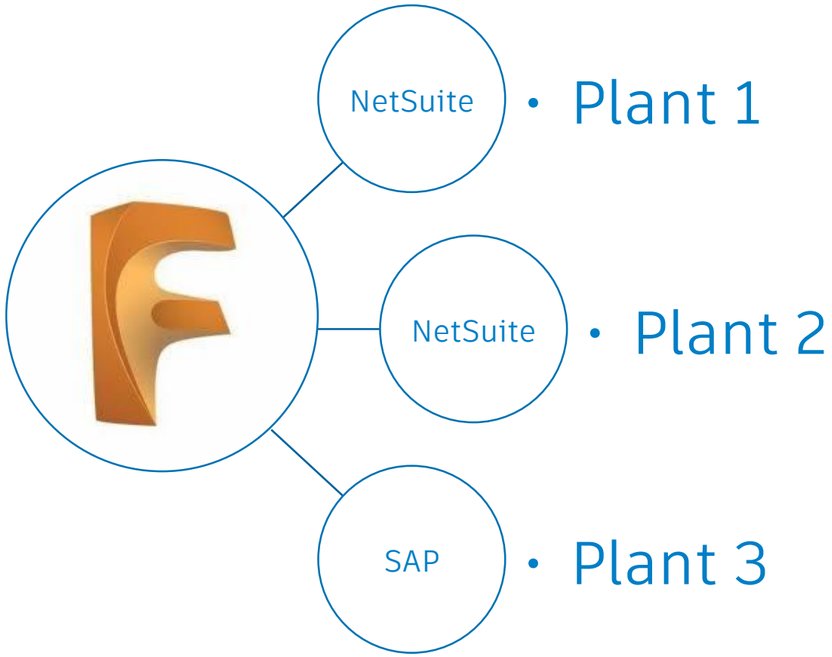
Mixing Cloud with Local systems is OK

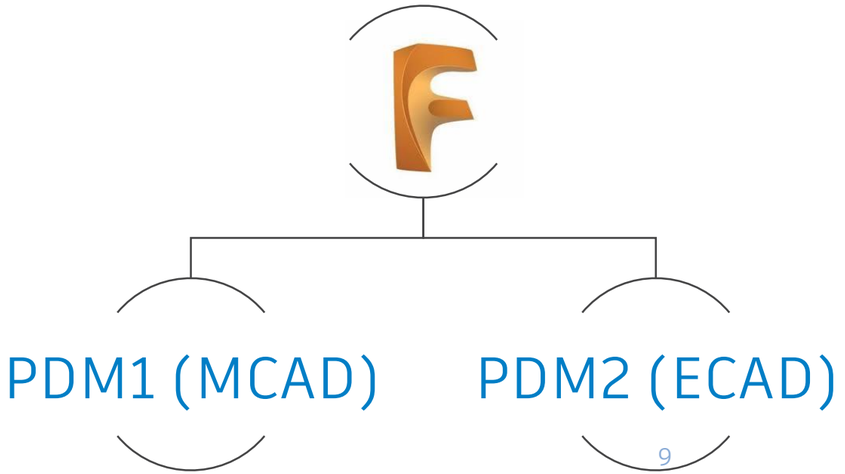
- **PLM**
  - Mostly metadata - easy fit for Cloud
- **PDM**
  - Security Concerns – ITAR requires data to be local
  - Performance concerns with large content
  - Localized Design – Different PDM systems for each type of Data
- **CRM/ERP**
  - Trending towards cloud systems

Hybrid Strategies

Mixed Systems

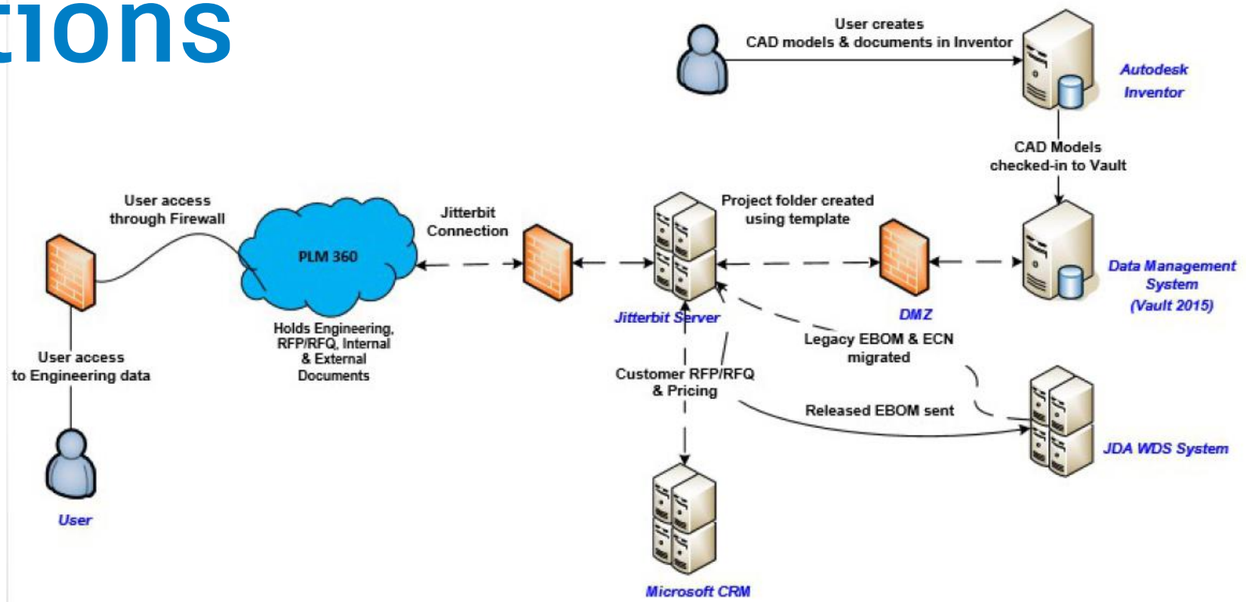
- Fusion Lifecycle is SaaS Public Tenant
- PLM / ERP
  - PLM is usually integrated to ERP
- PDM / PLM
  - Vault is our solution for PDM (MCAD)



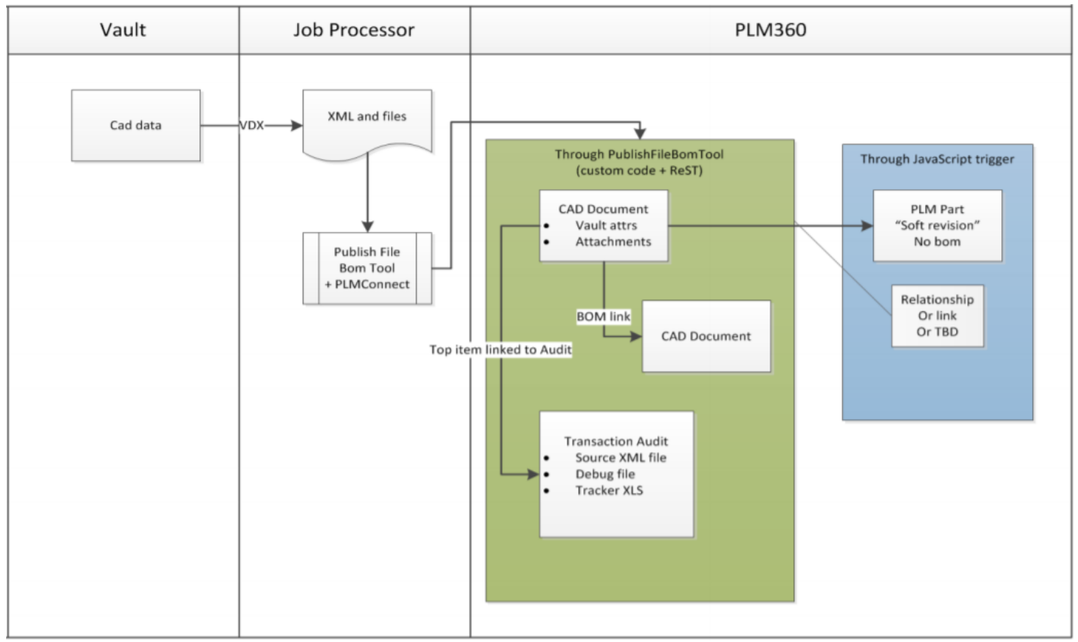


PDM/PLM Implementations

- Vault (local) and FLC (SaaS) via Jitterbit Harmony (SaaS)

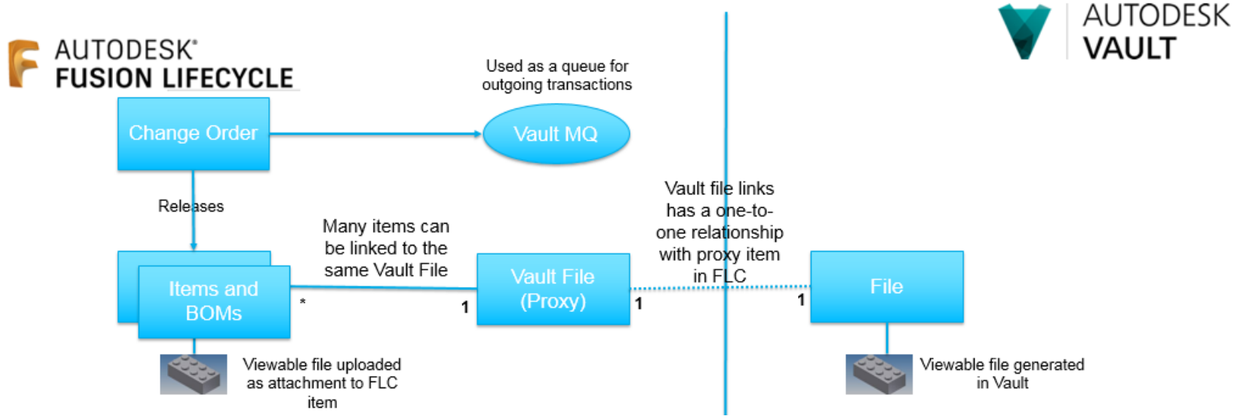


- Vault (local) and FLC (SaaS) via custom tools (local or IaaS)

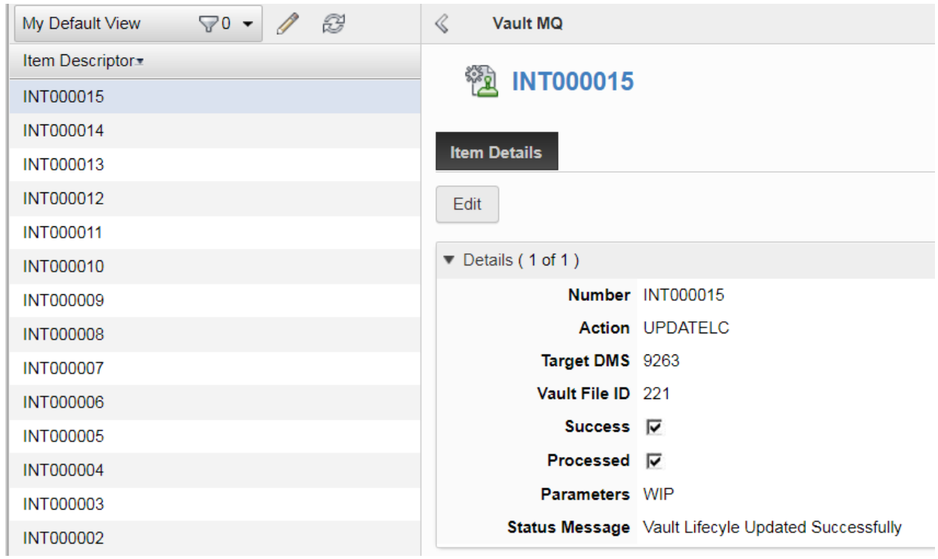


Similarities and Differences

- Similarities
  - Separating Documents Workspace
  - Queuing Workspace
  - Error Logging Workspace

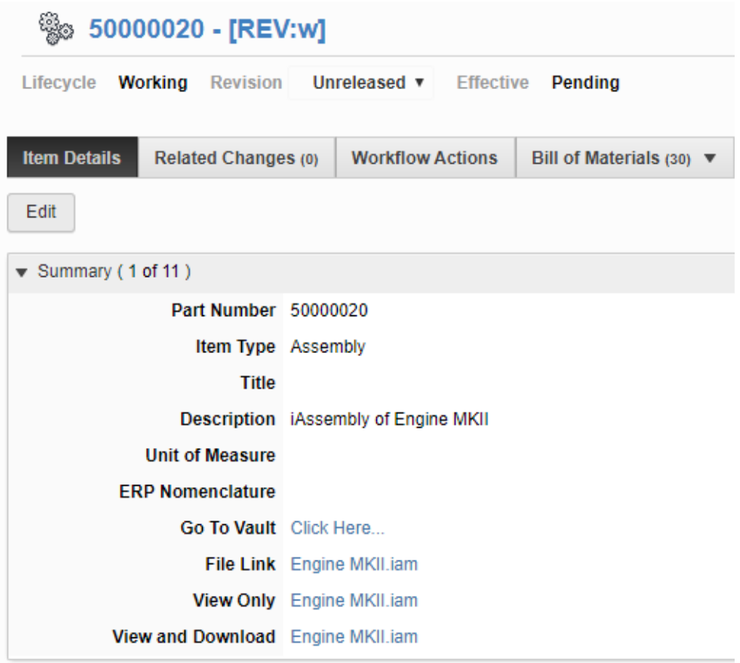


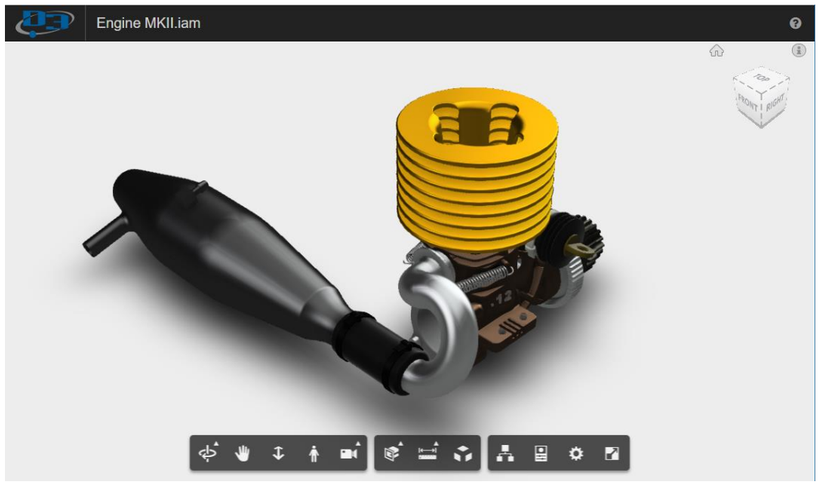
- Differences
  - Whether a BOM is extracted
  - Integration mechanism
    - Orchestration vs File Load



Where does Forge fit in?

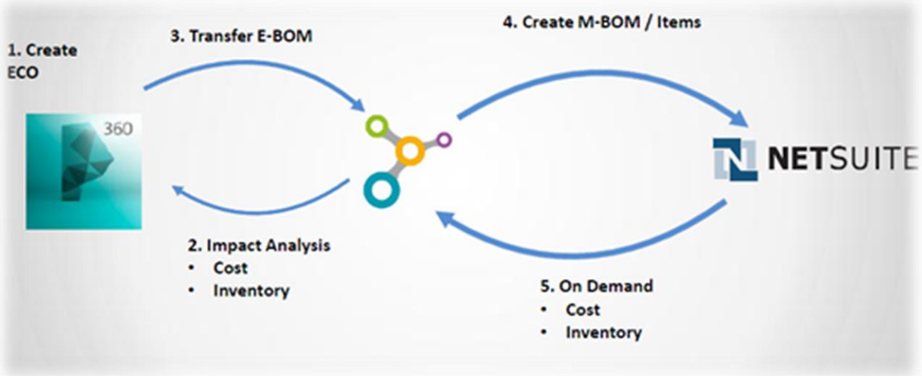
- Attractive Viewer
  - Offers a better viewer (SaaS)
  - Alternative to using native tools or alternatives
- Implementation by D3 on Deublin
  - Generate the Viewable
  - Make a link available





PLM/ERP Integrations

- FLC (SaaS) and SAP (Local) via custom tools (local)
- FLC (SaaS) and NetSuite (SaaS) via MuleSoft CloudHub (SaaS)
- FLC (SaaS) to JDE (local) via Jitterbit Harmony (SaaS)
- FLC (SaaS) to multiple (local) systems, Oracle and Vantage, via Jitterbit Harmony (SaaS)



Similarities and Differences

- Similarities
  - Single PLM System
  - Use Cases
    - Publish Items to ERP
    - Query Cost and Inventory on the Fly
    - Calculating Cost of Change (scrapped inventory, difference in the BOM costs)
- Differences
  - Diversity of ERP Systems
  - Integration Tool
  - Number of ERP systems
  - Which BOM is in FLC
    - EBOM, MBOM, Plant BOM
  - Use of Change Order and Item Versions in ERP

Lessons Learned

Decision Points

- Where data is authored?
- System / Role mapping
- Integration triggers
- Delineation of responsibility

Sometimes data starts in ERP and is pushed to PLM. And sometimes the Designer wants to start authoring in the CAD Tool

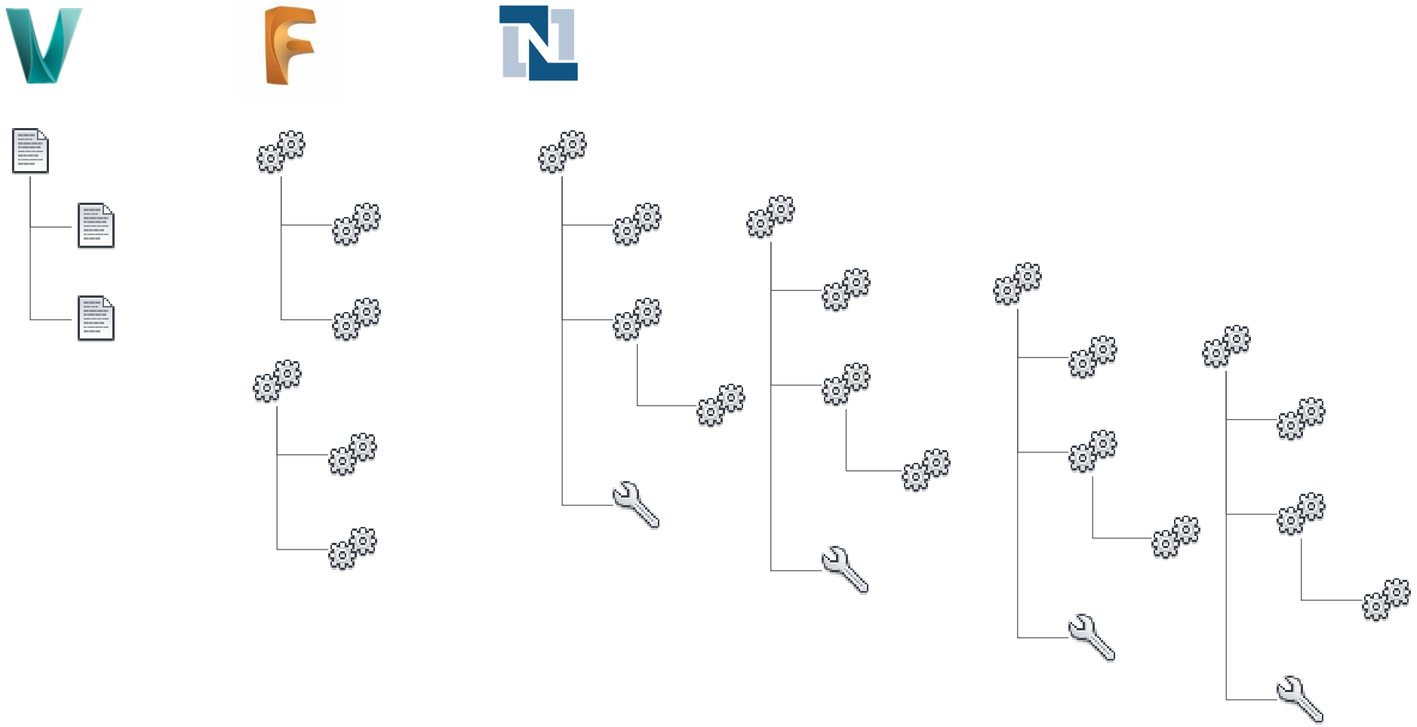
Which system am I going to use?

Usage Recommendations

- Identify main system for each user.
- Don’t make users wait for integrations to complete (fire-and-forget).
- Maintain Appropriate Data in each system – Make/Buy
- Use PDM systems appropriately – ECAD data in Vendor’s CDM
- Decide where each BOM resides EBOM, MBOM, SBOM
- Work within the limitations of the tools: Compliance & Quoted BOM
- Isolate the true purpose of each system
  - Limit the amount of data being copied around (… Classification)

Matching Items / Matching BOMs

- Do we need a one-to-one match on items across systems?
- Do we need BOMs matching between systems?

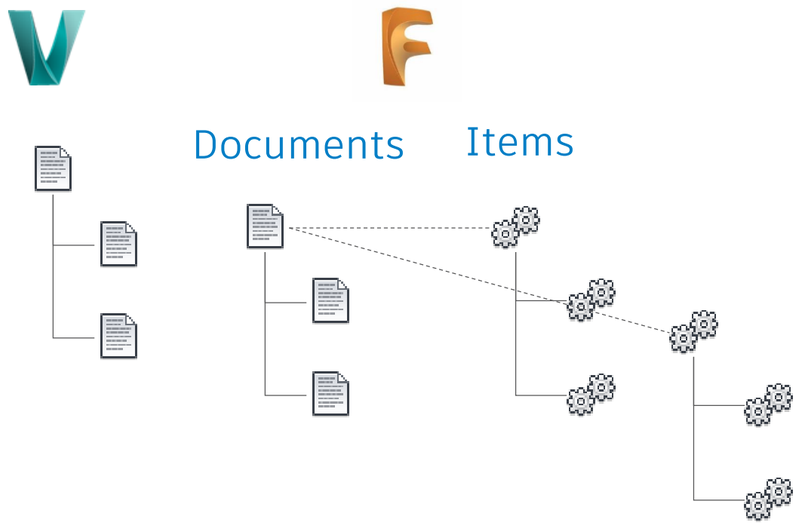


Solution Recommendations

- Choose a tool and stick with it.
- Use ReST API as a trigger for the middleware tool:
  - Heavy lifting should be done by a tool that doesn't timeout.
  - Avoid scripting updates directly from FLC (tightly coupled systems are fragile, so loosely couple and create a delineation)
- Use a queue workspace to overcome firewalls:
  - Safest to make the protected system pole for updates

Solution Recommendations (cont'd)

- Avoid 1-many Relationships across the integration
  - Use Proxy objects (Documents Workspace) to represent objects in the Integrated System
  - Part – Drawing relationships should be visible in FLC



Good Housekeeping

- ERROR Handling
  - Keep an Error Log – Integration failures should be communicated and escalated. Grounding the issue in the middleware tool only will make it difficult to correct and may cause hidden errors.
- OCM
  - Communication
  - Documentation and Handoff

Good Housekeeping

- Development
  - Use a development and test environments with full replicas of each production system (same size and version).
- Performance
  - Ensure that the solution can scale and support simultaneous transactions
  - Stress Test Integration
  - Ensure that an on-update trigger based bi-directional synchronization does not go into an infinite loop

System Specific

- Vault
  - Use the ADMS to Debug
  - IIS needs to configured to prevent conflict of HTTP port
- NetSuite
  - Use the standard NetSuite connector functions instead of direct web service calls
  - Executing concurrent transactions in NetSuite could be restricted by licensing
  - Activate the ‘Show Internal IDs’ option in NetSuite during development

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