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Code Development Discussion

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Caveats

- This is my perspective, not formal Sandia Policy.
  - True for department 1341, Radiation Effects Theory Department.
  - Mostly true for departments in the 1350s (electromagnetics, i.e. EMPIRE, EMPHASIS).
  - Very different than 1400 (DAKOTA) and 1500 (SIERRA).
- Lots has changed in the last three years:
  - Transition to agile code development from traditionally-managed projects,
  - Move to current set of tools (with dead-ends and detours along the way),
  - Four new staff in the last four years.
- We are a small department with highly fragmented staff.
  - 14 staff, 3 main codes (ITS, SCEPTRE, CHEETAH), 3 minor codes (CEPXS, RAPTURE, SKEPTXS), many scripts and tools.
  - Mix of C++11 with CUDA 9, C++03, Fortran 95, and Python; both CMake and Autotools build systems.
  - Our group does both methods development and applications work.

Code Development

Practices

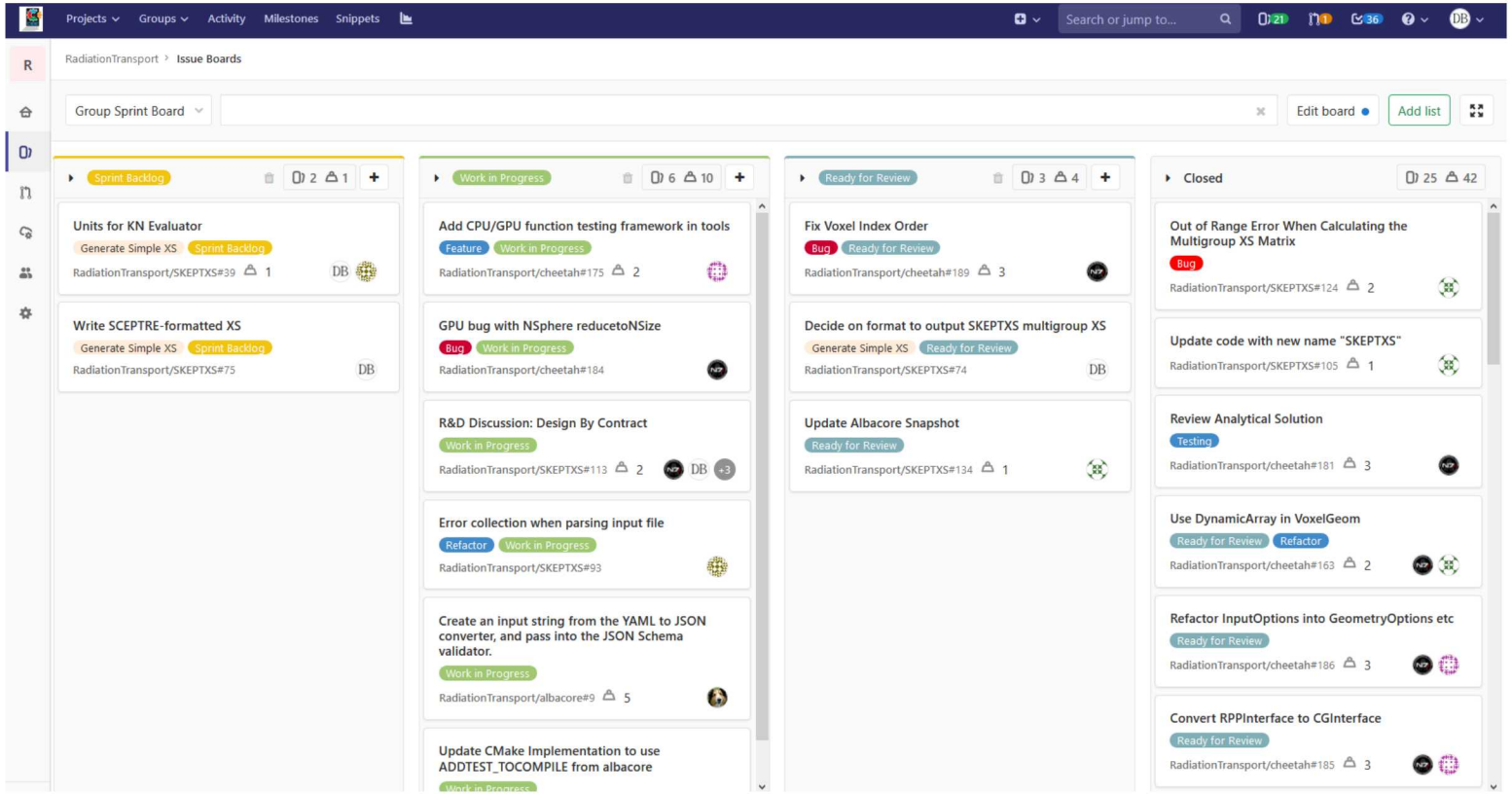
- Unit tests and code coverage analysis.
- Nightly regression tests on many SNL platforms.
- Agile software development (SCRUM).
- Version control and merge requests.

Tools

- All tools are Sandia-licensed and hosted on internal servers.
- Gitlab for repo management and SCRUM board.
- Confluence for documents, “wiki”-style documentation.
- Jenkins for automatic regression management.

AWE Collaboration

- Roughly 2 FTE across 4 staff at AWE.
- AWE access to gitlab, confluence, linux development machine.



Budgets and Standards

Budget

- Most of our code development projects receive funding form a variety of sources.
- Major sources of funding:
  - Advanced Simulation and Computing (ASC), subdivided into IC, PEM, V&V.
  - Advanced Technology Development and Mitigation (ATDM).
  - Campaign 7 Nuclear Survivability (C7).

SQA

- ASC has formal SQA procedures and requirements; we tend to apply these to all code projects.
- Audited every three years; audits have been very successful.
- One staff member with extensive SQA, Agile/SCRUM, software development background.