Faster Turnaround Improves Developer Productivity

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THE PROBLEM

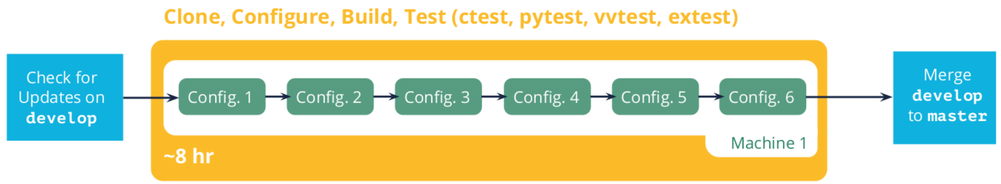
- Code development & process info for next generation electromagnetic/ electrostatic/fluid dynamic codes
- US Department of Energy
  - » Advanced Simulation & Computing
  - » Exascale Computing Project
  - » Advanced Technology Development & Mitigation
- 7 main code repos & 14 auxiliary ones
- Built on Kokkos, Trilinos

DIFFICULTIES

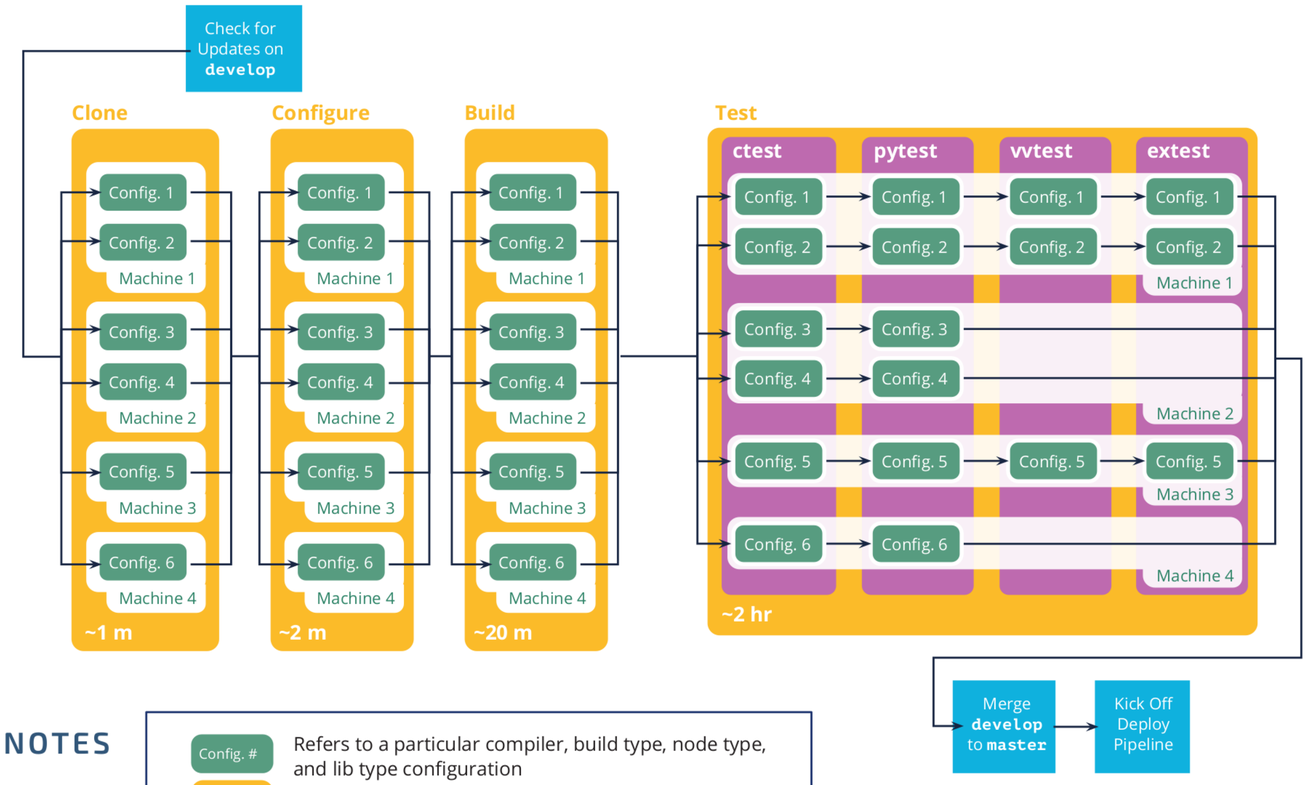
- Need to test the integration of the main repositories
- Initial turnaround time of ~8 hours
- Only able to run once per day
- Hard to tell which of dozens of commits cause failures
- New bugs introduced before old ones fixed
- Merge from **`develop`** to **`master`** every few weeks

THE SOLUTION

BEFORE



AFTER



NOTES

Config. #	Refers to a particular compiler, build type, node type, and lib type configuration
	Able to fail and notify team between **stages**
vvtest	verification & validation testing
extest	extended testing

IMPROVEMENT

MODULAR DESIGN

- All Config. # boxes controlled by Jenkins Pipeline script driving Python build script
- Improved maintainability/extensibility
- Easy to modify, swap out, or add new stages
- Fail as fast as possible
- Parallelize across machines

RESULTS

- Turnaround time decreased from ~8 hours to ~2
- Able to run 3x per day
- Fewer commits tested → easier to debug
- Bugs fixed as soon as they're introduced
- Merge from **`develop`** to **`master`** regularly
- Developers spend less time debugging, more time doing science
- DevOps spends less time babysitting, more time expanding the infrastructure feature set

U.S. DEPARTMENT OF ENERGY | NNSA National Nuclear Security Administration

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