

### Pat Notz

Sandia National Laboratories

### Site: https://sierra-trac.sandia.gov:4443/

### Wiki: http://sierra-trac.sandia.gov/trac/sierra/wiki/Gerrit

version: 0.3-3-gc050fb7 (slides)

SAND2010-7768P



Sandia is a multiprogram laboratory operated by Sandia Corporation, a Lockheed Martin Company, for the United States Department of Energy's National Nuclear Securify Administration under contract DE-ACO4-94AL85000.





I'm neither a Gerrit expert nor a code review expert.





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### This is about a code review tool, **not policies** – TF Policies : http://sierra-trac.sandia.gov/trac/sierra/wiki/Modules/Aria/PeerReview



Front Matter

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This is about a code review tool, **not policies** – TF Policies : http://sierra-trac.sandia.gov/trac/sierra/wiki/Modules/Aria/PeerReview



Smart Bear has a free book on code review http://smartbear.com/codecollab-code-review-book.php

There's a copy in the TF team room



- Make better software and teams Avoid duplication, share knowledge, encourage good design and consistent style
  - Decide as a team what you want out of reviews...
- Reduce Defects and Support Costs Best Kept Secrets of Peer Code Review, Code Complete
- **1540 Strategic Plan** "We will also incorporate peer review into both our code development and research activities. In the area of code development, this includes things like code and design reviews and software quality assessments."
- SNL ASC Software Quality Plan ASC Software Quality Engineering Practices, Version 3.0
  - PR28 Conduct independent technical reviews to evaluate adequacy with respect to requirements
  - AR24 Technical reviews (evidence that review occurred and review results) (PR28)



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- 3 Set Up & Usage
- 4 Change-Ids
- 5 Sierra Expreience



### Outline

### Screenshots

- 2 About Gerrit
- 3 Set Up & Usage
- 4 Change-lds
- 5 Sierra Expreience



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<u>Iee317d8f</u>	unit test for deformation gradients	Patrick K Notz	code	master (unit-test-improvements)	Oct 6	✓	
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Learn more: Sierra Gerrit HOW-TO.



Powered by Gerrit Code Review (2.1.5) | Report Bug







- 3 Set Up & Usage
- 4 Change-Ids
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## The Gerrit Project

### About the project

- Designed for Git
- Primary developers at Google, BDFL is #2 contributor to Git
- Both Git server and code review tool
  - Lots of access controls, Contributor Agreements
- Open Source Apache License 2.0
  - http://code.google.com/p/gerrit/
- Notable public projects using Gerrit:
  - Android: https://review.source.android.com/
  - Kitware: http://review.source.kitware.com/
- Full Java stack (web server, Git, SSH)
- Can install/run as ordinary user
- Code submissions stored in Git repo, other data in Gerrit db



### Gerrit is designed to be the sole interface to the Git repository:

- Developer uploads proposed changes
- Developers conduct review
  - Acceptance defined as cummulative scores of +1 Verified and +2 Code Review
- If not accepted: Developer fixes and re-uploads
- If accepted, code incorperated into target branch via Submit button
  - Fast-forward, merge, cherry-pick
- If changes are undesired, submission is "abandoned" via Abandon button



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## Gerrit on Sierra-Trac

### Notes About Sierra's Gerrit Configuration

- Sign in using Kerberos username/password (uses LDAP)
- Must be in wg-sierra-dev meta-group to sign in and see code
- Gerrit coexists with Git looking at same repository
- Hosting code, docs and toolset repos repositories are available
- Gerrit will not merge/ff/cherry-pick to target branches
  - Submit button will never appear
  - User must still use standard git push to push changes to master etc. branches.
  - After you're done with the submission, Abandon it just note in the abandon comments that it was accepted









- 3 Set Up & Usage
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## Set Up

### One Time Set Up

- Create an SSH key different from Kerberos ticket (sorry)
- 2 Set Up Gerrit Account
  - Sign in to Gerrit
  - 2 Add SSH public key to Gerrit
  - In the settings: Watched Projects
- Verify SSH connection
- Add a Git remote for Gerrit

git remote add gerrit ssh://sierra-trac.sandia.gov:5915/code

Details also at

http://sierra-trac.sandia.gov/trac/sierra/wiki/Gerrit



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Changes are submitted using standard Git but with a special ref-spec:

\$ git push gerrit master:refs/for/master/sanity-check-src

- gerrit is the Git remote we configured earlier
- Git ref-spec has the syntax: my-ref: your-ref
- The left-side master refers to the master branch in my project
- The **refs/for/master** tells Gerrit that the submission is destined for the master branch in the main Git repository
- The optional /sanity-check-src is an called a "topic name". Topic names are displayed in Gerrit change lists – they do not affect Git



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Changes are submitted using standard Git but with a special ref-spec: \$ git push gerrit master:refs/for/master/sanity-check-src

- gerrit is the Git remote we configured earlier
- Git ref-spec has the syntax: my-ref:your-ref
- The left-side master refers to the master branch in my project
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## **Open Reviews**

🔿 🔿 📴 sta	tus:open   sierra-trac.san )	< (#)						
← → C f	🖌 🏠 https://sierra-	trac.sandia.gov:4443/#q	,status:open,n,z 🛛 🛕	🕨 🔛 🔰	3 🖹 🛛	) 🕘 💩 🖴 🗉 G	) 🖂 🗅 -	ŗ.
All My A	Admin Documentat	ion		P	atrick K No status:open	otz <pknotz@sandia.gov></pknotz@sandia.gov>	Settings Sig	gn Out Search
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ID	Subject			Owner	Project	Branch	Updated V	' R
▶☆ <u>1bdb9b832</u>	Make specifying source equat	terms an error if the SRC to	erm is not active on the	Patrick K No	z <u>code</u>	master (sanity-check-src)	Sep 1	
Pushing new ch Learn more: <u>Sie</u>	<b>anges</b> : \$ git push g <u>rra Gerrit HOW-TO</u> .	errit local-branch:	cefs/for/master/clev	er-name		🍎 🛛 🔅 trac		
					Pow	Press '?' to view ered by Gerrit Code Review	(2.1.5)   Repo	ortcuts ort Bug

### Example Push to Gerrit

#### \$ git push gerrit bc-fix:refs/for/master/bc-fix

```
Warning: the RSA host key for 'sierra-trac.sandia.gov' differs from the ke
Offending key for IP in /ascldap/users/pknotz/.ssh/known_hosts:90
Matching host key in /ascldap/users/pknotz/.ssh/known_hosts:152
Are you sure you want to continue connecting (yes/no)? yes
Enter passphrase for key '/ascldap/users/pknotz/.ssh/id_rsa':
Counting objects: 29, done.
Delta compression using up to 8 threads.
Compressing objects: 100% (16/16), done.
Writing objects: 100% (16/16), 8.97 KiB, done.
Total 16 (delta 15), reused 0 (delta 0)
remote:
remote: New Changes:
remote: https://sierra-trac.sandia.gov:4443/2
remote:
To ssh://sierra-trac.sandia.gov:5915/code
* [new branch] bc-fix -> refs/for/master/bc-fix
```



- Note, some submissions may include multiple commits (topic names are useful)
- Browse the diffs, leave comments
- You're not done until you press **Review** and then **Publish Comments**
- Comments recognize ticket:1234 (Trac links)
- Convention is that a change needs a +1 Verified score and a +2 Code Review score for acceptance
- "Verified" is undefined by Gerrit what it means is up to users





#### Screenshots

- 2 About Gerrit
- 3 Set Up & Usage
- 4 Change-Ids
- 5 Sierra Expreience



## Changes vs. Patches

#### Change

A "change" is a change to the code that attempts to do one thing. Ultimately, it will be committed as a single commit. However, it may go through multiple iterations (patches).

Changes are identified by Gerrit specific hashes prefixed by 'I'.

#### Patch

An iteration to a change. A change may go through many versions before it is approved and allowed to be submitted.

Patches are identified by Git commit hashes.



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Patches are identified by Git commit hashes.



### Change View with Multiple Patches

Change lea58f1e5: BCs shou ×		
← → C 🔒 https://sierra-trac.sandia.gov:4443/#change,3	<b>公</b>	🚼 🔀 🛓 🔝 🙆 📸 🚞 🖸 🔾 🔍
🚰 Apple 🦳 Sandia 🦳 Code 🔛 Data 🦳 Me 🔛 ToRead 🚞 W	ant 🖂 m 🛃 r 🚔 so 🎄 a 🞯 y	🥟 S 🧕 g 📮 p 🛛 » 🥅 Other Bookmarks
All My Admin Documentation	Patr	ck K Notz <pknotz@sandia.gov>   <u>Settings</u>   <u>Sign Out</u></pknotz@sandia.gov>
Open Merged Abandoned	st	atus:abandoned Search
Change lea58f1e5: BCs shouldn't need to p	provide DOF expressions	
Change-Id: lea58f1e52735b4c556ac4fde3870ea65b3228e1c	BCs shouldn't need to provide DC	F expressions
Owner Patrick K Notz	The EQ_Description classes shoul provide field expressions while	d take care of calling
Project code	Change-Id: Tea58fle52735b4c556ac	4fde3870ea65b3228e1c
Branch master		
Unloaded Sep 9, 2010 2:25 PM		
Updated Sep 9, 2010 4:04 PM		
Status Abandoned		
Permalink 🛍		
Reviewer Verified Code Review		
Patrick K Notz	ood to me, but someone else must appro	ve
David Jason Glaze ✓ Looks good to m	e, approved	
Dependencies		J
Patch Set 1 9114eade9ab05661aea113eab069402bbebcb136		
Patch Set 2 f3621247f1a6f210f76725e09ebc7925de212ccd		
Author Pat Notz <pknotz@sandia.gov> Sep 9, 2010 2:04 PM</pknotz@sandia.gov>		
Committer Pat Notz <pknotz@sandia.gov> Sep 9, 2010 2:27 PM</pknotz@sandia.gov>		
Deverteed checkout pull cherry-pick patch SSH	15/code refs/changes/03/3/2 && git	cherry-pick FETCH_HEAD
git fetch ssh://pknotz@sierra-trac.sandia.gov:59		
Download         git fetch ssh://pknotz@sierra-trac.sandia.gov:59           Review         Restore Change         Diff All Side-by-Side         Diff All U	nified	
Download         git fetch ssh://pknotz@sierra-trac.sandia.gov:59           Review         Restore Change         Diff All Side-by-Side         Diff All O           File Path         Comment         Comment	nified Is Size Diff	Reviewed
Commit Ussage     Commit	nified s Size Diff Side-by-Sid	e Unified ✓

### **Diff View for Multiple Patches**

O O O Read Change leas 8/1e5: Aria_8C_ X	
← → C 🔒 https://sierra-trac.sandia.gov:4443/#patch,sidebyside,3,2,aria/src/Aria_BC_Desc 😭 🔀 🔀	🛓 🔲 💩 🚔 🗖 🗿 📜 🔌
🎑 Apple 🔛 Sandia 🔛 Code 🔛 Data 🔛 Me 🔛 ToRead 🔛 Want M m 😚 r 🚖 so 🎄 a 🎯 y 🥔 s 🧕	g 🗜 p 🔅 🔪 Solver Bookmarks
All My Admin Documentation Patrick K Notz <pknotz@sandia.gov> Settings Sign Out</pknotz@sandia.gov>	
Open Merged Abandoned status:abandoned	Search
Change lea58f1e5: aria/src/Aria_BC_Description.C	
▼ Patch History BCs shouldn't need to provide DOF expressions	
Old Version New Version Comments	escription classes should take care o
Base 💿	include and the second
Patch Set 1 O O	
Patch Set 2	
Ignore Whitespace: All Tab Width: 8 Strata Coloring Whitespace Errors Reviewed	
Context: 10 lines Columns: 100	
Cudiffinit wessage Up to trainge	
(Download) (skinka 95 commo fires )	
> 966]}	966 }
967 968 void FluxBP_BC::create_provided_expressions(Expression_Manager * expression_manager, const Subdomain _Tag & subdom_tag, const String & purpose) 	967 968 void FluxBP_BC::create_provided_ _Tag & subdom_tag, const String
970 /* %TRACE[oN]% */ 971 Trace trace("signa::riuxBP_BC::create_provided_expressions(Expression_Manager * expression 971 Trace trace("signation track subdom track create provided_expressions(Expression_Manager * expression)	970 /* %TRACE[ON]% */ 971 Trace trace_("sierra::Aria::F
<pre>BC_Description::create_provided_expressions(expression_manager, subdom_tag, purpose); 972</pre>	972 BC_Description::create_provide 973
974 const Expression_Factory factory(expression_manager); 975	974 const Expression_Factory facto 975
976 Const Dool real_dor = true; 977 const Int tensor_order = get_tensor_order(); 978 factory provide field expression(tensor_order, subdem tag, def volume element, def noon expr tag.	976 const Int tensor_order = get_t
<pre>dof_noop_expr_tag, Expression_Tag(dof_volume_element_name), real_dof); 979</pre>	977
980 factory.provide_element_expression(subdom_tag, dof_surface_element, Expression_Tag(dof_surface_ele ment_name, NO_OP, NO_SUBINDEX, PHASE_ALL));	978 factory.provide_element_expres ment_name, NO_OP, NO_SUBINDEX, P
981 982 factory.provide_element_expression(subdom_tag, dof_volume_element, Expression_Tag(dof_volume_eleme nt_name, NO_OP, NO_SUBINDEX, PHASE_ALL));	9/9 980 factory.provide_element_expres nt_name, NO_OP, NO_SUBINDEX, PHA
983 factory.provide_element_expression(subdom_tag, dof_volume_element, Expression_Tag(dof_volume_eleme nt_name, GRAD_OP, NO_SUBINDEX, PHASE_ALL));	981 factory.provide_element_expres nt_name, GRAD_OP, NO_SUBINDEX, P
984 factory.provide_element_expression(subdom_tag, dof_volume_element, Expression_Tag(dof_volume_eleme nt_name, GRAD_OP_REF_FRAME, NO_SUBINDEX, PHASE_ALL));	982 factory.provide_element_expres
T 261 LALIULY ULVE ELEMENT EAVIESSION SUDDER LAG. OUT VOLUME ELEMENT, EXOLESSION LAGIOUT VOLUME ELEME	

You can re-use the Change-Id when you re-submit changes. Just put a Change-Id line at the bottom of your commmit message.

```
commit b408dc9f00eb6bc0d64f593c469b31d9549fb364
Author: Pat Notz <pknotz@sandia.gov>
Date: Mon Sep 13 11:33:14 2010 -0600
```

Add a viscous traction post-processor

This post-processor omits the pressure contribution to the stress when computing the traction vector.

Change-Id: Ic4352c0e1c7c948ff78926acd60910cb90b227ab



Gerrit comes with a Git hook that can automatically create Change-Ids in your commit messages for you.

Having Change-Ids in commit messages makes it easy to keep the same ones across rebase, ammend, etc.

If Gerrit hasn't seen the Change-Id before, it will create a new Change using the provided Change-Id.



### Outline

### Screenshots

- 2 About Gerrit
- 3 Set Up & Usage
- 4 Change-lds
- 5 Sierra Expreience



## **Experience To Date**

Gerrit available since mid September 2010

- 59 chnages submitted (excluding 'test' submissions)
- 77 patches reviewed
- 30 registered users
- 11 users submitted code for review
- 21 users provided feedback on changes



### **Patch Sizes**



Studies show that reviews should cover  $\lesssim$  400 LOC and review rates are typically between 200-400 LOC/hr [Smart Bear book].



### Usage among code teams

- Framework/STK team heavy usage
- Thermal/Fluid team moderate usage
- Infrastructure team beginning to use it
- Solid Mechanics team experimenting
- Multi-commit changes are clumsy
- "Gerrit removes all of the annoying work of sharing code and collecting feedback"
- "Anyone who is serious about peer review no longer has an excuse!"
- "Sometimes in-person reviews are faster and easier"
- "... if it is not in your culture, no matter how easy you make it, peer review is not going to happen"



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## - Questions? -

- RTFM
- Contributor Agreements; Single Sign-On
- Dependencies
- Download submissions to your project
- Search Operators (see TFM)
- Dig around the UI
- Restore Change (i.e., undo Abandon)
- Starred changes
- Many preferences for viewing diffs

### http://code.google.com/p/gerrit/