

# Software Development and Configuration Management

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Jerry Katzung / SW Engineer / AD EED Software

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# Software Development and Configuration Management

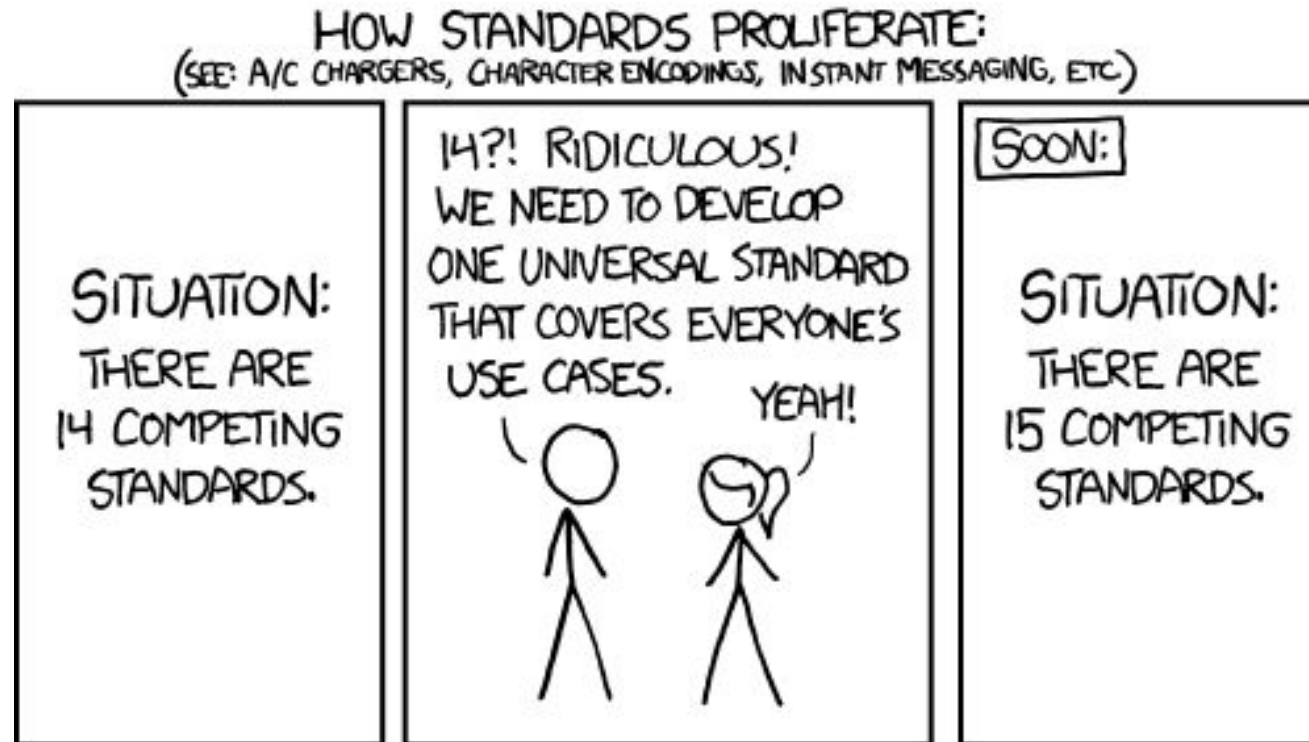
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## Goals

- Improve Software and Firmware Deployment
- Rigorous Test and Validation Process for All Software
- Traceability for All Deployed Software and Firmware
- Source Repositories with Controlled Changes/Configuration
- Up-To-Date Documentation Stored In Appropriate Repos
- Implement Process Improvements
- Standardize Configuration Management

# Software Development and Configuration Management

## Caution / Disclaimer



<https://imgs.xkcd.com/comics/standards.png>

Disclaimer: I am not trying to unify all the existing SLAC build and deployment processes.  
If this approach can work for other groups - that would be great!

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## Current Situation

- Deployment Requires Meticulous Filesystem Surgery
- Relies on Write Access for All Engineers
- Shared Accounts Obscure Who Actually Performed Changes
- Direct CVS (sometimes Git) Checkouts for Deployment
- Manual Tweaks Rarely Recorded or Tracked
- No Centralized View of Current Actual Deployment

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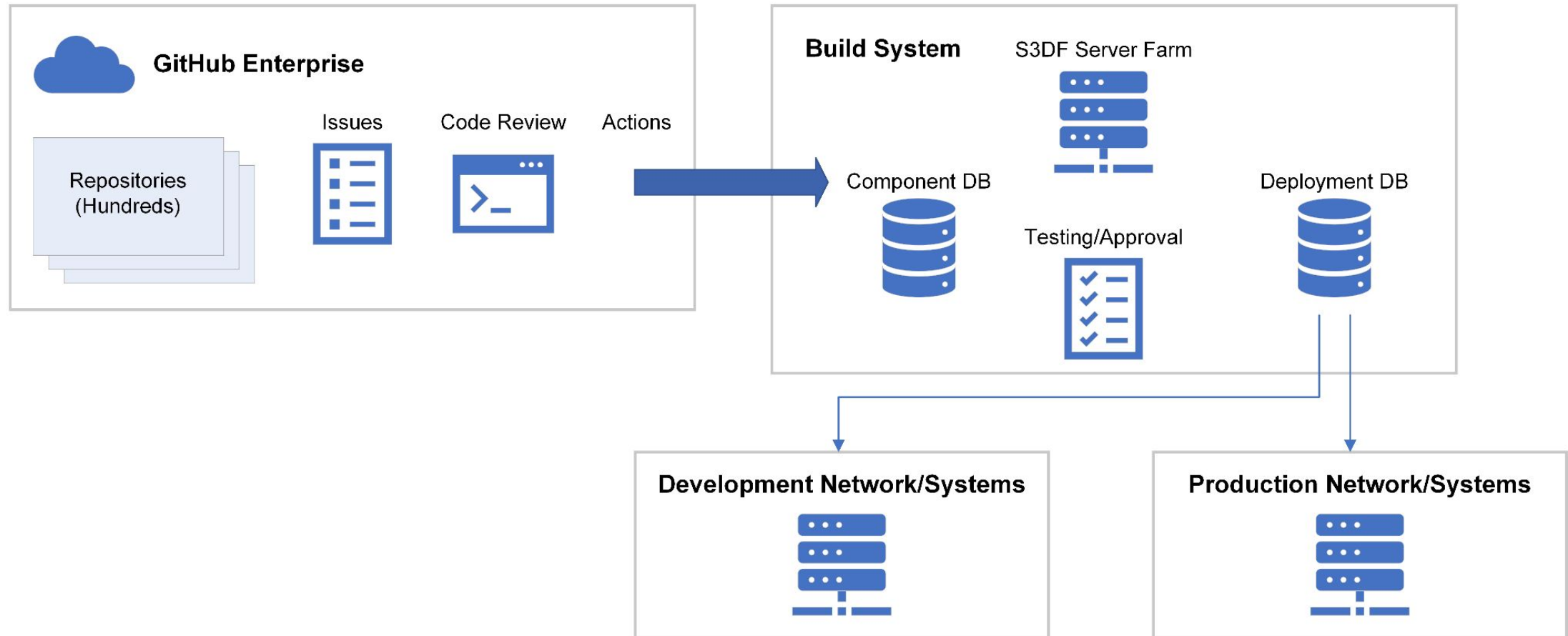
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## Initiatives/Goals/Constraints

- Reduce shared logins on various accelerator systems/servers
- Reduce file system write-accessibility for most individuals
- Reduce (and ultimately) remove dependency on AFS
- Adopt GitHub Enterprise
- Adopt Git while deprecating CVS
- Adopt S3DF for build and other infrastructure
- Adopt Containerized workflows where appropriate

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## Development and Deployment Environment/Infrastructure



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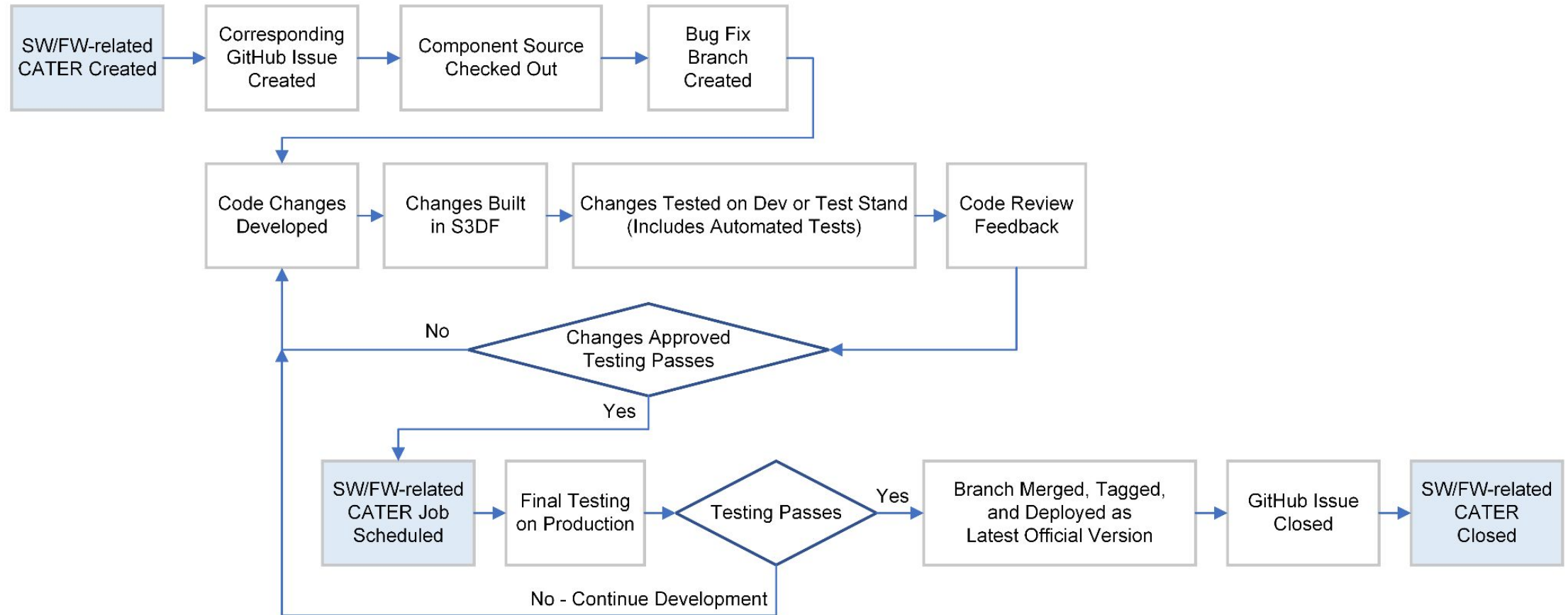
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## Technical Placeholders

- S3DF for Builds, Automated Test, and Dev Environment Support
- GitHub Enterprise for Repo Storage, Code Reviews
- GitHub Issues for SW Issue Tracking/Discussion/Resolution
- GitHub Actions to Initiate Continuous Integration Operations
- RPM for Build Results Packaging
- DNF for Package Installation/Deployment
- Ansible for Package Installation Control and Tracking
- Nagios/Ansible for Server/Service Status Monitoring
- Apptainer/Podman (in lieu of Docker/Kubernetes)
- MongoDB for Component and Deployment Database(s)
- CLI for Most Phases of Development/Deployment

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## Development and Deployment Workflow





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## Components

- Corresponds to One Repository
- Tracked in the Components Database
- Can Depend On Other Components
- Ideally Has One “Main” Branch
- Associated Bugs

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## New Support Software Required

- CLI (S3DF and Other Locations)
- Build Environment (S3DF)
- Component Database (S3DF)
- Deployment Database (S3DF)
- Artifact Storage (S3DF)

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## CLI

- Create/Relate GitHub Issue to CATER
- Checkout Component Repo
- Create Bugfix Branch From Designated Branch, Tag, or Commit
- Build - Locally or Remotely
- Deploy - Specific Location
- Test - Locally or At Specific Location
- Mark Branch as Ready for Official/Final Review
- Tag Management (Create, Modify, Mark as Bad, etc.)
- Likely Extensions to GitHub's 'gh' CLI Tooling

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## Build Environment

- Driven by GitHub Actions or CLI
- Dependencies Captured in Component Database
- Containers Provide Necessary Build Environment(s)
- Automated Testing Performed (As Applicable)
- Build Results Available For Deployment

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## Component Database

- Entries for Every Component/Repository
- Source Location
- Dependencies
- Build Environment (Container)
- Build “Methodology”/Command/Instructions/Options
- Code Review Acceptance Criteria
- Automated and Production Testing Acceptance Criteria
- Relatively Slow-Changing

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## Deployment Database

- Reflects/Governs Which Release of Each Component is Deployed
- Tracked per CPU or Network-Addressable Host
- Defined Test Deployment Locations, If Applicable
- Support For Different Nodes Running Different Component Versions
- Deployment Based on DNF Package Installation Process
- Ansible for Controlled Deployment Automation, If Necessary
- Ansible Also Used for Deployment Monitoring

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## Artifact Storage

- Storage for large binaries
- Build artifacts (Installer packages), images, tarballs, FW, etc.
- If Needed to Build/Deploy, Save a Copy
- Stored in S3DF
- Perhaps tracked by a database (size, signatures, etc.)
- CLI support to find and fetch artifacts
- Artifactory Community Edition Possible Candidate

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Questions





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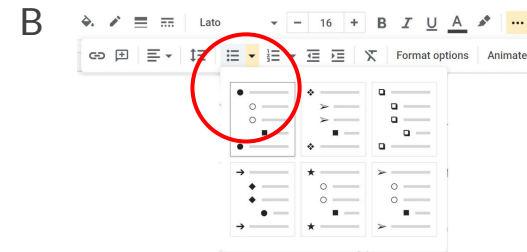
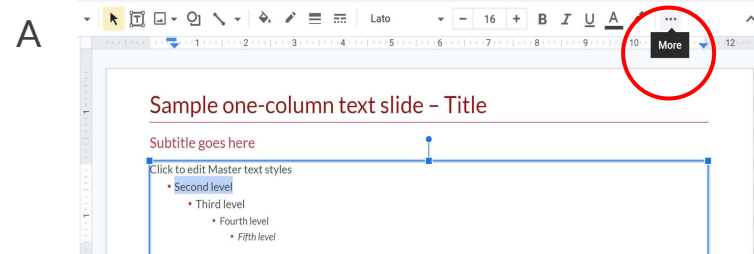
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# Google slides formatting for bulleted text

## Formatting for bulleted text:

Select the text box > Then select second level line (A) > click on More to display the format menu > Click on Bulleted List icon on the Format options ribbon (B) > The rest of your text will pick up the formatting when you use tabs to indent.



## Proper text formatting

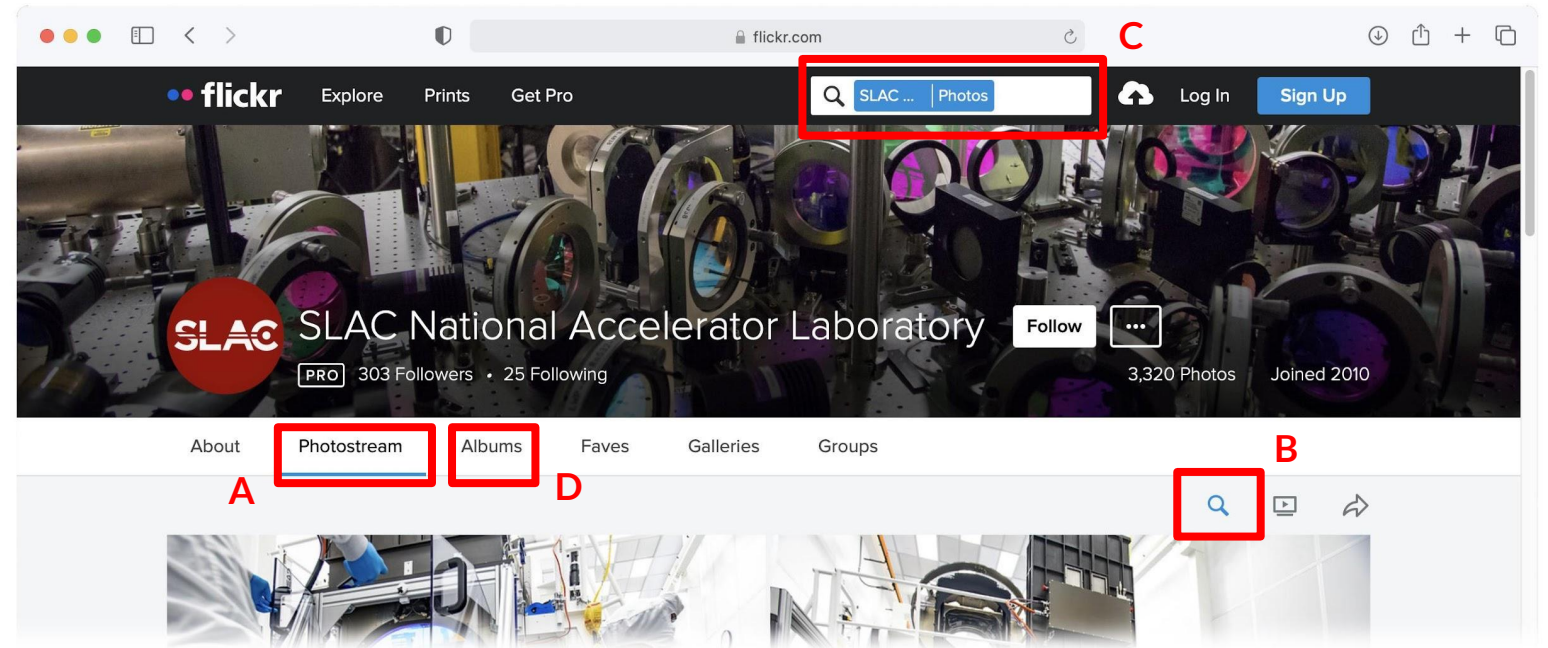
First level (16pt)

- Second level (16pt)
  - Third level (16pt)
    - Fourth level (14pt)
      - Fifth level (14pt)

# Photo Resources

Find the most comprehensive collection of images for your presentations in the SLAC Photo Library on [Flickr](#):

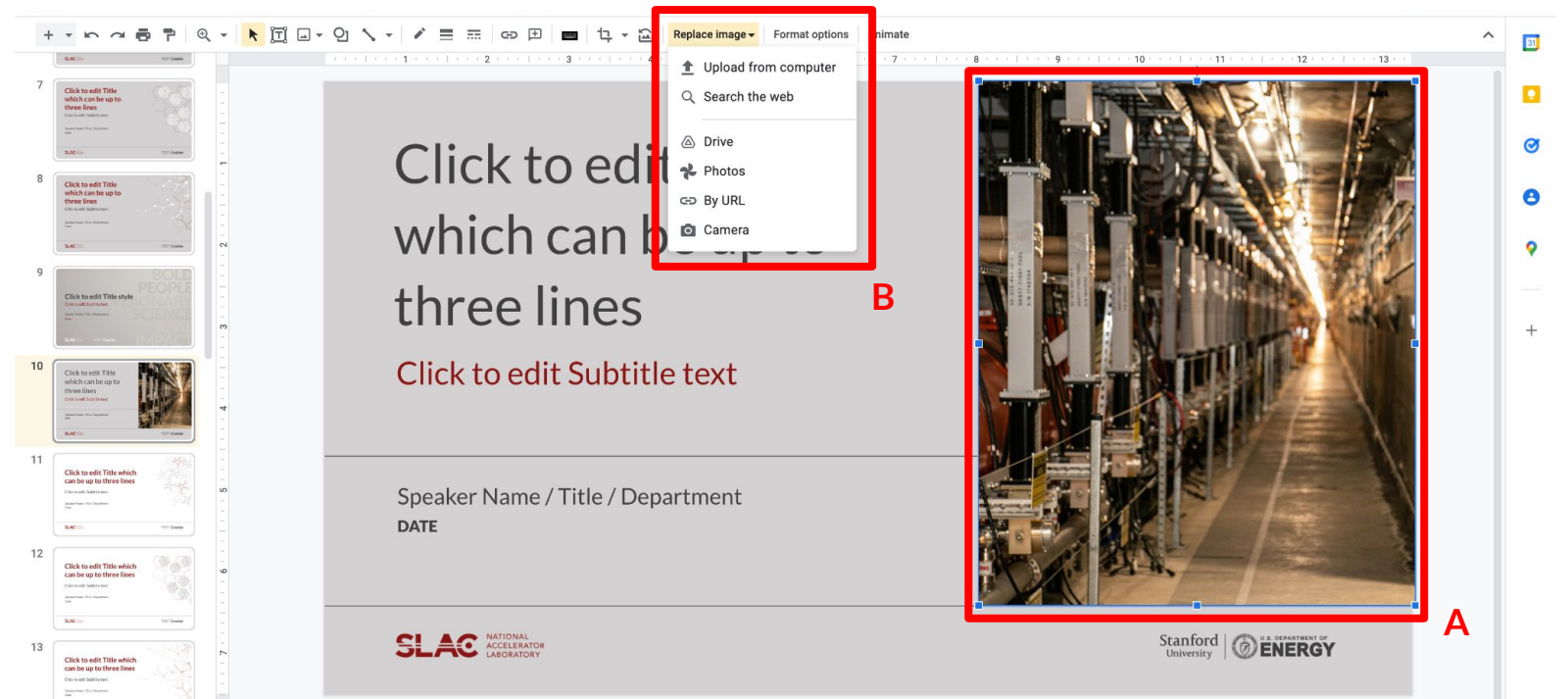
1. Select Photostream (A)
2. Click on the blue magnifying glass icon (B)
3. Enter search words in the SLAC Photos search bar (C)
4. Albums have curated sets of photos in collections (D)



# Updating photography

## To change an image:

1. Select the photo you want to change (A)
2. Choose Replace Image from the toolbar (B)
3. Upload a new image from one of the locations listed in the menu



The screenshot displays a presentation software interface. On the left, a vertical sidebar shows a list of slide thumbnails, with slide 10 highlighted. The main workspace shows a slide with a large image of a tunnel filled with scientific equipment. A red box labeled 'A' is drawn around this image. In the top toolbar, a red box labeled 'B' is drawn around the 'Replace image' dropdown menu, which is open and shows options: 'Upload from computer', 'Search the web', 'Drive', 'Photos', 'By URL', and 'Camera'. The slide content includes the text 'Click to edit Title which can be up to three lines', 'Click to edit Subtitle text', 'Speaker Name / Title / Department', and 'DATE'. At the bottom, there are logos for SLAC National Accelerator Laboratory, Stanford University, and the U.S. Department of Energy.