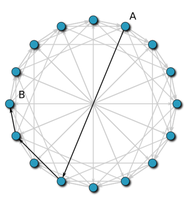
GR-114 GitSync: Decentralized Network on Git

INTRO/ABSTRACT

Git is a powerful distributed version control system used by millions of developers. Current solutions involve pushing and pulling to a centralized repository, which exposes a single point of failure. By capitalizing on Git's distributed nature, we improve on the original GitSync paper and develop a decentralized network that is resilient and self-healing, which transparently works with all current Git tools.

METHODS

We build upon the original GitSync paper by introducing the Chord DHT protocol and a local HTTP server which can be used by existing Git tools as a proxy to the distributed network. Git tools communicate to a local HTTP server, which then forwards this request to replicate cooperatively across the entire network eventually through broadcasts along various nodes.



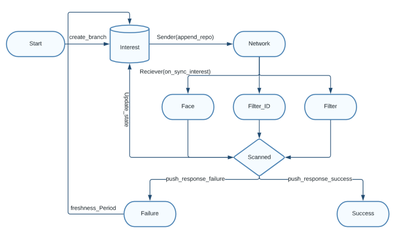


Fig.1 Left: Chord network route, provided by Wikimedia; Fig. 2 Right: Original GitSync communication diagram, self-produced

RESULTS

Our project has developed a working HTTP Git server, which is run locally and set as the remote for any working copy clones. The user and other tools push and pull from this remote as normal, eventually broadcasting to the full network according to the Chord protocol.

Resources:

https://pdos.csail.mit.edu/papers/chord:sigcomm01/chord_sigcomm.pdf

https://git-scm.com/docs/http-protocol

This project provides a fully decentralized network of Git servers, which is resilient and self-healing. Nodes cooperatively serve Git repositories, which can be used through standard Git tools.

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