Hyperledger Mentorship Project Presentation

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Create a Solidity Language Server (SLS) using Solang Compiler

- **Introduction**
  - **Name**: Shivam Balikondwar.
  - **Location:** Pune, India.
  - **University:** Pune Institute of Computer Technology, Pune.
  - **Mentor(s):** Sean Young.
  - **Hyperledger Project**: To create a language server using Solang Compiler for Solidity language.

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- **Project Description**:
- A languager server is a software that processes editor requests for the respective language. The project goal is to create a language server using the existing solang compiler. The language server should be able to process requests from the editor(client) including syntax highlighting, bracket completion, diagnostic info(compiler errors, hints and warnings) and hovers.
- This project is built on the tower-lsp(a minimal Rust lsp server). A sample vscode extension(in TypeScript) is incorporated to test the implementation. During the mentorship, I have extensively referred to other language server implementations and involved myself in discussions with the tower-lsp developer.

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- **Project Objectives**:
  - To implement language server to process client(editor) requests.
  - To implement syntax highlighting and bracket completion.
  - Diagnostics info for compiler errors, warnings and hints.
  - Hovers for quick help on variable types, functions,..struct and documentation.

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- **Project Deliverables:**
  - Language server using Solang.
  - A sample vscode-extension to use the server.

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- **Project Execution & Accomplishments**:
- The initial phase of the mentorship was crucial, it involved implementing server to process basic requests and confirming that client and server communicate properly.
- It was followed by implementing diagnostics for compiler errors, warnings and hints.
- While implementing the diagnostics I had to perform offset conversions from file characters to those matching inside the Solang namespace to provide correct messages on correct lines,columns on client-side.
- Solang generates an extensive structured representation(AST) for given solidity code. Hover implementation first traverses this AST collecting and storing important definitions in a lookup-table which are then matched with cursor position on client-side thus returning correct hovers.
- During this process, I acquired ability to read more documentation, understood inner workings of language servers and was able to implement what I planned, this is a notable accomplishment for me.

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- **Recommendations for future work:**
- Currently the work is enough to be used as standalone but in future it'll be nice to have code formatting.

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- **Project Output or Results**:
- Language server and client are present on solang-vscode(https://github.com/hyperledger-labs/solang-vscode) repo under hyperledger-labs on github.
- Demo:(video uploaded on youtube : https://youtu.be/P0qjwtAhs4g)

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- **Insights Gained**:
- Importance of collaboration and writing code free to use and distribute.
- A friendly working experience with mentor, colleagues and organisers.
- Understood the benefit of planning before implementing any idea.
- Language servers and code editors are not as simple as you think.
- For anyone looking to contribute in open source, patience is important!


THANK YOU!