PL1 Grammar Support - PoC

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Agenda

- PL1 Programming Language

- LSP Support with Langium

- Xtext vs. Langium

- PoC – Hello PL/1 (Langium Supported VSCode Extension)

PL/I

First appeared	1964; 60 years ago

PL/I (**Programming Language One**, and sometimes written **PL/1**) is procedural, imperative computer programming language initially developed by IBM.

See PL/I Application Structure
PL/I – Language References:
V 6.1 (all)
V 5.3.0
V 5.1.0

Hello-World example ☺

Syntax for a PL/I statement

Syntax for a %directive

Syntax for a %statement:

Source Code

```
HELLO:    PROCEDURE OPTIONS (MAIN);

              /* A PROGRAM TO OUTPUT HELLO WORLD */
              FLAG = 0;

LOOP:     DO WHILE (FLAG = 0);
              PUT SKIP DATA('HELLO WORLD!');
          END LOOP;

END HELLO;
```
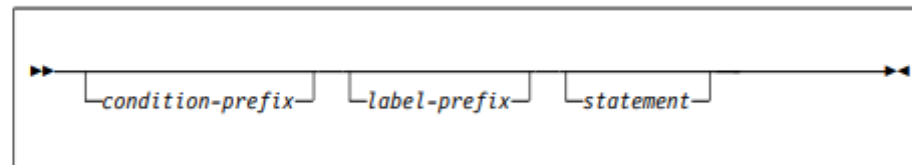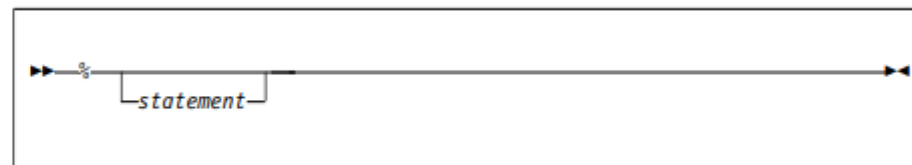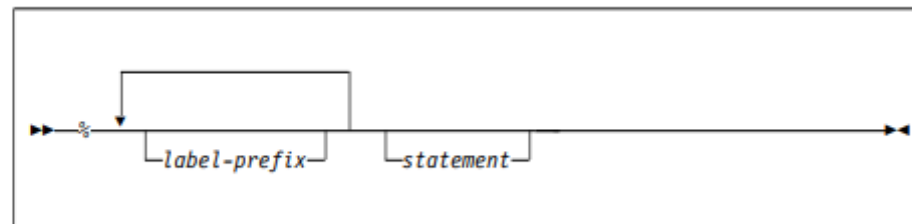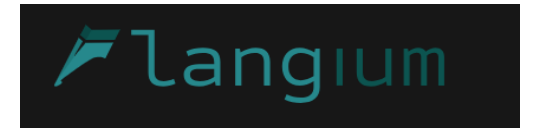
LANGIUM

Eclipse Langium [**lang**uage and equilibr**ium**] is an open source language engineering tool with built-in support for the Language Server Protocol (see blogs - LSP Magic, and DAP Magic, ANTLR4 Magic), written in TypeScript and running in Node.js, powered by Chevrotain (*very fast and feature rich JS **LL(k) Parsing DSL***).

Main reason not to adopt ANTL4 is JAVA on JS environment.

Langium is a future-proof technology stack enables DSLs in VS Code, Eclipse Theia, web applications (**on browser**), and more.

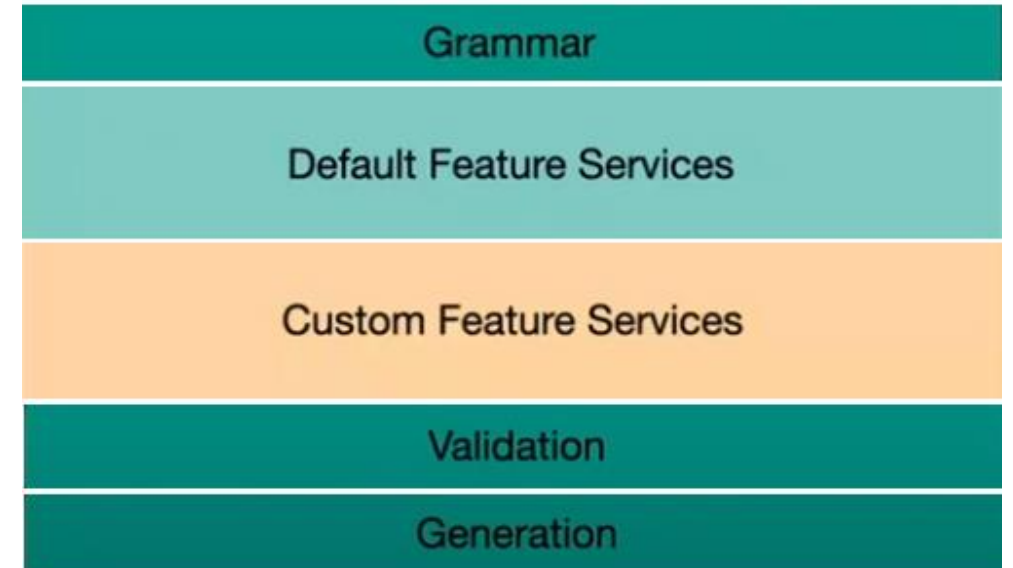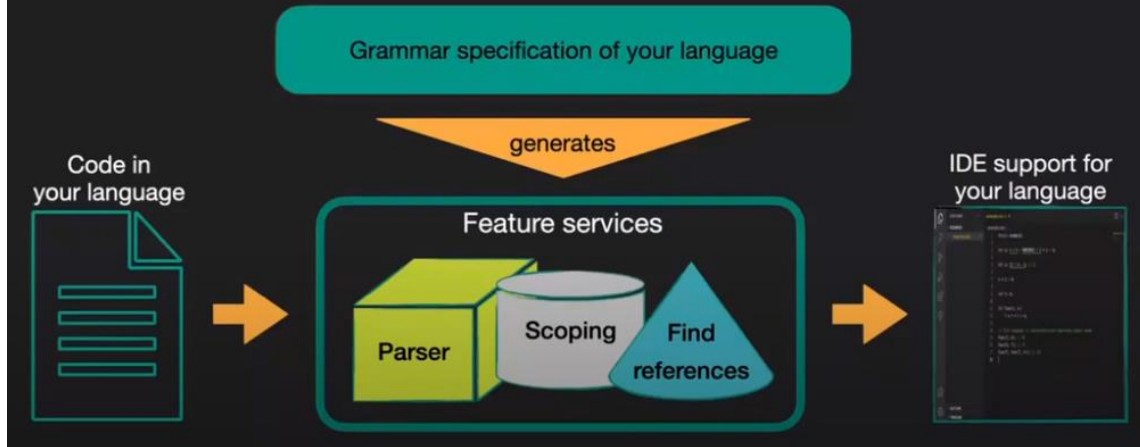Langium features a command line interface (**langium-cli**) that reads a grammar declaration and generates TypeScript type declarations for the AST and more.

Integration with the Language Server Protocol (LSP) is done with **vscode-languageserver**.

Xtext&Xtend vs LANGIUM

Xtext /Xtend	LANGIUM
Xtext is built upon **Eclipse** and **ANTLR -** Java technology stack.	Langium is built upon **Visual Code (+**Eclipse Theia**)** and **Chevrotain.**
Building a tool that uses an Xtext-based language server with VS Code or Theia means creating a hybrid technology stack Java [e.g. lang-server] and others in TypeScript [e.g. lang-client].	It enables language engineering in TypeScript, Vite/Vistes, and other Node.js libraries - same technology stack **Langium wants to keep the concepts that have made Xtext successful, but lift them onto another platform**
▪ GLSP, or CCF Broadcom can be adjusted for PL/1 ▪ Java, Eclipse, Xtext, EMF, Maven, Gradle, Tycho, Xtend ▪ biggest attraction of XText, it is deep integration with XTend for code generation ▪ LSP4J is a reference implementation of LSP for Java	▪ Langium meets Sprotty: combining text and diagrams in VS Code ▪ Node.js, VSCode, Typescript, Vite, ▪ relying on a mixture of TypeScripts template strings and our own generator utility ▪ LSP is designed for Typescript, so VSCode has build in support already

What is Langium?

Grammar specification of your language

generates

Code in your language

Feature services

Parser | Scoping | Find references

IDE support for your language

Grammar

Default Feature Services

Custom Feature Services

Validation

Generation

Define Grammar – Just define the syntax of defined language, all other artifacts are generated automatically
IDE support – highlighting, scoping, code completion, find references, validation, …

Langium Support for VS Code

Langium v3.0.0

Langium | 2,890 | ★★★

Support for the Langium Gramm...

Install | Auto Update ⚙

☆ This extension is recommended by users of the current workspace.

Language Features
▪ Syntax highlighting
▪ Completion
▪ Diagnostics
▪ Code actions
▪ Go to definition
▪ Find references
▪ Document highlighting
▪ Document symbols
▪ Semantic tokens highlighting
▪ …

Syntax Diagrams
Langium grammar files can be visualized as syntax diagrams using the *Show Railroad Syntax Diagram*
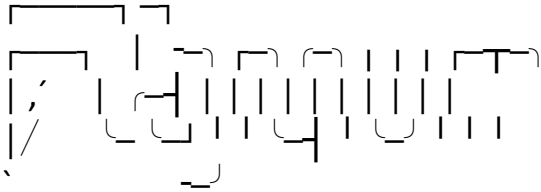
Prog

H— Progname — Loop — EndProgram —H
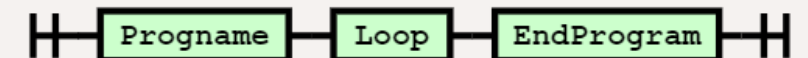
Langium offers a **Yeoman** generator to create a new language extension for VS Code.

>npm i -g yo generator-langium
Note: latest-version paradigm, VSCode…
C:\workspace-17\pl1-with-langium>yo langium

Welcome to Langium! This tool generates a VS Code extension with a "Hello World" language to get started quickly. The extension name is an identifier used in the
Your language name: pl-one
? File extensions: .pl1