

# OpenROAD Update

Progress in the past year

Tom Spyrou  
June 2025

## Precision Innovations

*Precision Innovations' products and solutions based on OpenROAD provide Application Specific Integrated Circuit (ASIC) and System on Chip (SoC) design teams with an open source, no-human-in-loop, 24-hour place and route solution.*

*Precision Innovations is the primary industrial developer of OpenROAD and provides commercial support and customization for OpenROAD.*



SPONSORED BY



# Precision Innovations Overview

## Company/Team Overview

- Principal industrial developer and integrator of the OpenROAD RTL to GDS ASIC/SoC Development solution
- Founded 2019
- Electronic Design Automation (EDA) veterans – 22 employees / contractors
- HQ – San Diego, CA.





## History

- Transitioned in 2023 to primary funding from customer revenue.
- Continued Collaboration with UCSD and other Universities

## Technology overview

- OpenROAD is an EDA solution for hardware implementation of ASIC and SoC chips
- Tape-out proven, open source, physical design solution.
- Used on designs down to 12nm through GDS
- Use on designs down to 2nm for estimation
- A.I. based Autotuner to maximize results
- Fast estimation / new design feasibility analysis
- Professional Support Subscriptions are available

# R&D Leadership and Key Team Members

Team Member	Role	Background and Responsibilities
Tom Spyrou 	<b>President &amp; CEO</b>	Tom Spyrou is the CEO of Precision Innovation Inc and is the chief architect and technical program manager for the OpenROAD system. Tom is a well-known EDA system architect. He was most recently a Senior Principal Engineer in Intel's Programmable Solutions business unit working on the Quartus FPGA compiler. Tom has worked for over 30 years as an EDA Technologist and has gained extensive experience in areas including Static Timing Analysis, Logic Synthesis, Power Grid Analysis, Database Technology and Floor-planning. He has led the development of leading-edge commercial engines and products such as PrimeTime, Voltage Storm, First Encounter, and the Open Access Database. Tom has been driving EDA algorithms to utilize parallel programming approaches with both multi-process and multi-threaded techniques. He has a BS from Carnegie Mellon University in ECE and an MS from Santa Clara University
Matt Liberty 	<b>VP Engineering</b>	Matt Liberty is out most senior developer with the OpenROAD project and Vice President of engineer for Precision Innovations. He has worked at Intel, Altera, Cadence, Synopsys, and various EDA startups. Matt has nearly thirty years of experience in EDA. Particular areas of expertise include static timing, noise analysis, RC parasitic extraction, databases, routing, GUIs, FPGAs, and software system architecture. In OpenROAD he is our key routing and physical design technical leader. He also has very strong large project software development process and quality skills. Matt has a BSEE from University of Massachusetts at Amherst.
Cho Moon 	<b>Distinguished Engineer</b>	Experienced and hands-on software development leader in electronic design automation (EDA) industry. Excellent team builder who takes concepts from ground zero to deployment by leveraging innovation and cross-functional teamwork. Adept at distilling complex concepts into simple, easy-to-understand ideas. Organized and detail-oriented professional. With his decades of industry experience Cho has expertise in these areas. Experience at Cadence and Synopsys. Phd from Berkeley under Bob Brayton. His focus areas are in Static Timing & Power Analysis, Pre-Route & Post-Route Optimization. Cho is fluent in Korean
Andrew B. Kahng 	<b>Advisor:</b> Distinguished Professor, UC San Diego	Andrew B. Kahng is Distinguished Professor of CSE and ECE and holder of the endowed chair in high-performance computing at UC San Diego. He was visiting scientist at Cadence (1995-97) and founder/CTO at Blaze DFM (2004-06). He is coauthor of 3 books and over 500 journal and conference papers, holds 35 issued U.S. patents, and is a fellow of ACM and IEEE. He was the 2019 Ho-Am Prize laureate in Engineering. He has served as general chair of DAC, ISPD and other conferences, and from 2000-2016 served as international chair/co-chair of the International Technology Roadmap for Semiconductors (ITRS) Design and System Drivers working groups. He has been principal investigator of "OpenROAD" ( <a href="https://theopenroadproject.org/">https://theopenroadproject.org/</a> ) since June 2018, and until August 2023 served as principal investigator and director of "TILOS" ( <a href="https://tilos.ai/">https://tilos.ai/</a> ), a U.S. NSF AI Research Institute.

# Project Statistics show lots of contributions and activity

May 19, 2025 – June 19, 2025

Period: 1 month ▾

## Overview

162 Active pull requests

51 Active issues

148  
Merged pull requests

14  
Open pull requests

33  
Closed issues

18  
New issues

Excluding merges, **22 authors** have pushed **354 commits** to master and **354 commits** to all branches. On master, **756 files** have changed and there have been **187,708 additions** and **20,654 deletions**.



148 Pull requests merged by 19 people

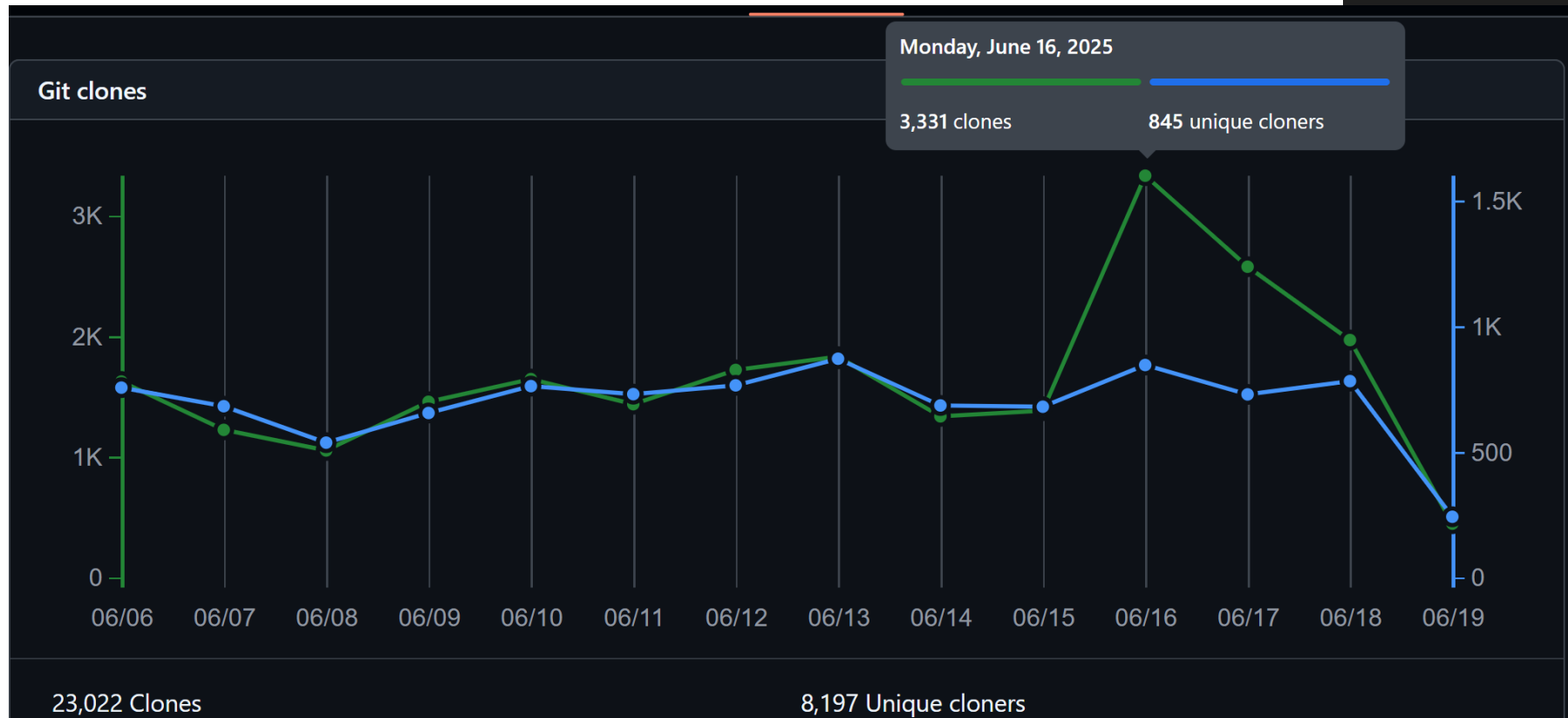
# Project Statistics show lots of usage

- OpenROAD usage has gone viral!
- RTL to GDS for supported nodes
- Estimation and RTL tuning for nodes down to 2nm

GitHub measures unique cloners by counting the number of unique people who have cloned your repository. [🔗](#)

This is determined by:

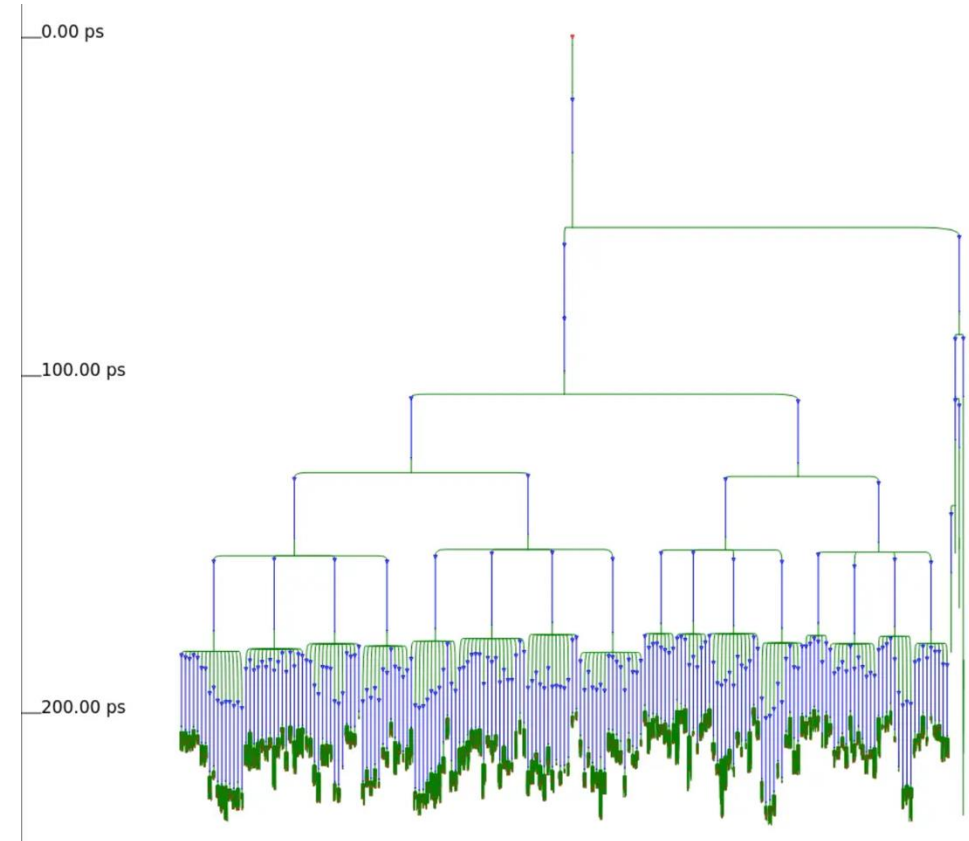
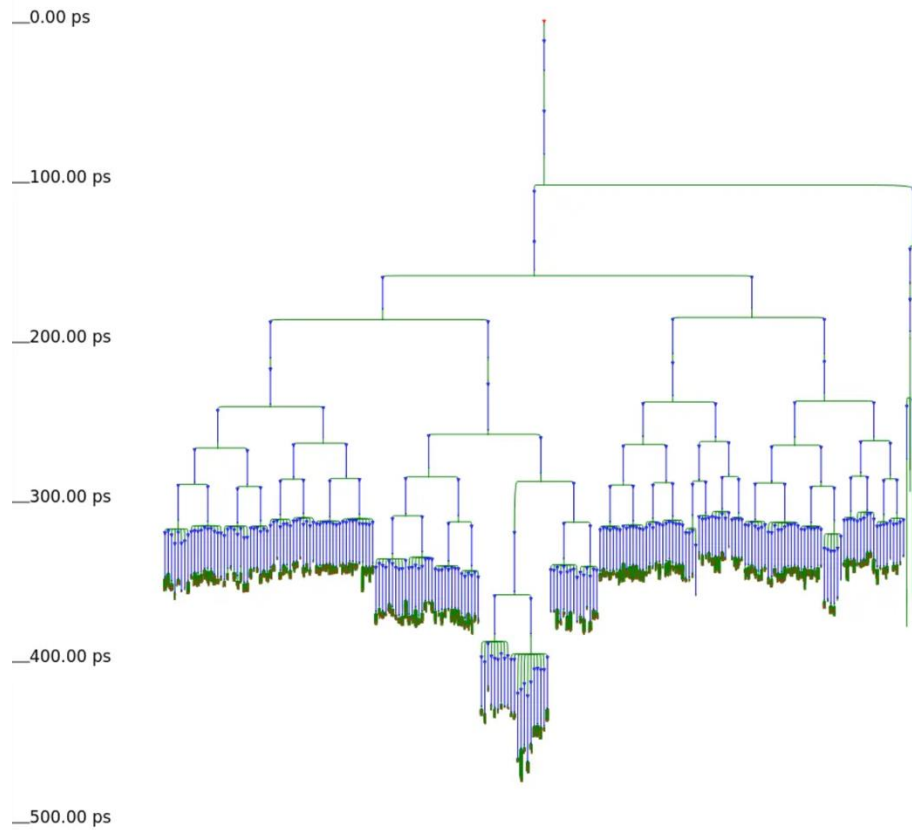
- Username: If a user is logged into their GitHub account when they clone the repository, their username is used to identify them as a unique cloner.
- IP address: For anonymous clones (users who are not logged in), GitHub uses the IP address to distinguish unique cloners. [🔗](#)



# Recent QoR Improvement

Setup TNS improved from -1174 ns to -35 ns in 7 nm cva6 design by improving CTS

- Enhanced logical DRC fixing
- Enhanced interconnect delay modeling





# OpenROAD use in Google XLS High Level Synthesis

## Overview of important links

<https://google.github.io/xls/>

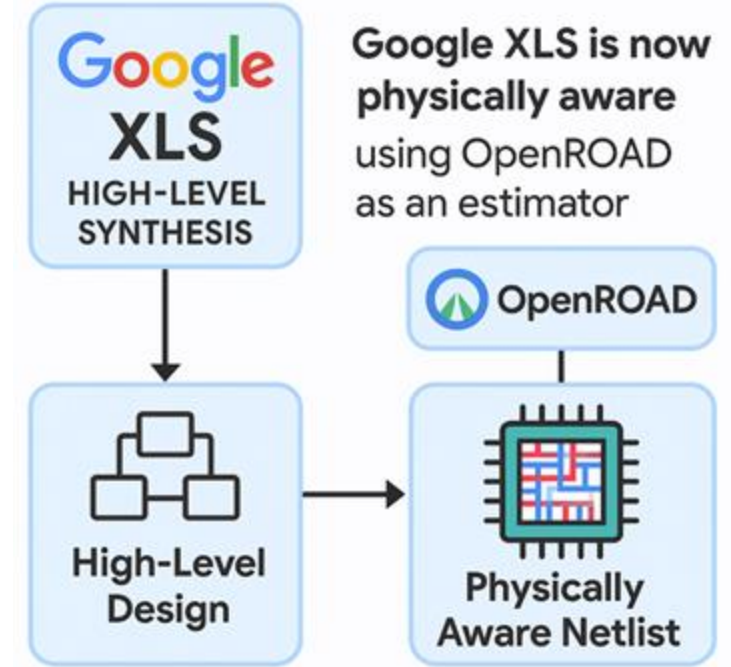
High level overview of using OpenROAD for metrics gathering and revisit of HLS decisions

[https://github.com/google/xls/blob/main/xls/synthesis/openroad/json\\_metrics\\_server\\_main.cc](https://github.com/google/xls/blob/main/xls/synthesis/openroad/json_metrics_server_main.cc)

Code to gather metrics

[https://github.com/google/xls/blob/main/xls/synthesis/openroad/sta\\_by\\_stage.tcl](https://github.com/google/xls/blob/main/xls/synthesis/openroad/sta_by_stage.tcl)

TCL code to pull timing metrics from OpenROAD's STA



# Precision Innovations' Redhat like business model

- There is a strong analogy between Redhat and Precision Innovations.
- OpenROAD is like Linux and Precision Innovations is like Redhat.
- OpenROAD usage is backed by Precision Innovations for those needing industrial support and/or additional capabilities in the tool.
- It uses a Redhat style model with all development contributed back to open source.
- Secure collaboration for customer design IP.
- Secure proprietary regressions for proprietary PDKs.
- Unique Processes for verifying releases.





# Did Linux help or hurt Microsoft?

- When Linux first arrived on the scene Microsoft panicked
- Would this replace windows and its applications?
- Today many Linux components are used in Windows
  - Windows WSL Linux Support
  - Virtual Desktops use model
  - Windows Package Manager “winget”
  - Systemd support
  - Linux in Azure
- Microsoft had some short-term worry but benefitted from both the new business model and key pieces of technology.
- We should expect EDA to benefit from open-source innovations as well and thrive

