

# Main

**Welcome to the Lanai Project!**

## blocked URL

The goal of this [Project](#) is to implement a new graphics rendering pipeline for macOS.

This is OpenJDK JEP 382 : <https://openjdk.java.net/jeps/382>

Early Access builds may be obtained from here : <https://jdk.java.net/lanai/>

**UPDATE:** As of March 15 2021 the JEP has been **INTEGRATED** into JDK mainline to be included in JDK17 when it releases in September 2021.

Project Lanai will no longer produce its own builds since the work is part of the regular JDK promoted builds.

- [High level milestones](#)
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## Where does a rendering pipeline fit in ?

It is transparent to applications but here's why it matters :

Most Java SE UI applications are written using the Swing toolkit. This is a lightweight toolkit that renders using the Java 2D API.

Internally Java 2D can use software rendering plus a blit to the screen or it can use a platform-specific API, such as X11/Xrender or Direct3D, or on MacOS, OpenGL.

These platform APIs often offer much better performance of the application than software rendering and generally off-load the CPU.

Metal is the new Apple platform API for such rendering replacing OpenGL. The name has NOTHING to do with the Swing Metal L+F. That is just a coincidence.

Information on Metal here : <https://developer.apple.com/metal/>

## Why are we doing this ?

1) OpenGL is deprecated :

<https://appleinsider.com/articles/18/06/28/why-macos-mojave-requires-metal----and-deprecates-opengl>

2) Metal offers a promise of better performance.

## Goals

- Fully functional pipeline
- Feature parity (at least) with the existing OpenGL pipeline
- Performance as good or better than OpenGL in real applications as well as benchmarks
- No regressions or TCK failures
- A clean architecture that both fits into the existing 2D design and takes advantage of Metal features such as greater support for concurrent rendering.=
- Leverage this work to also support development of a Metal rendering pipeline for the OpenJFX project which is similarly impacted.

## What has happened so far ?

When Apple formally deprecated OpenGL in Summer 2018, we realised we needed to begin looking into Metal ASAP.

Oracle engineers began prototyping to gain an understanding of the Metal API, motivated mainly by that announced deprecation of OpenGL.

This work was published in the openjdk sandbox as the metal-prototype-branch here : <http://hg.openjdk.java.net/jdk/sandbox> (This branch is closed now as we have moved the repository - see below)

The focus so far has been on mapping metal as a peer to the existing OpenGL pipeline and implementing basic geometric primitive rendering.

This was followed up by prototyping text and image rendering.

Independently JetBrains were also already working on a Metal pipeline, motivated mainly by the prospect of better performance.

Their prototype was published as an OpenJDK contribution in the webrev here : <http://cr.openjdk.java.net/~avu/JDK-8220154/webrev.00>

This was then merged with the Oracle work in the sandbox.

To foster easier collaboration, this project was then created.

On August 22nd 2019 we moved the code to the lanai mercurial project repositories and closed the sandbox branch where both Oracle and JetBrains engineers can both contribute.

In March 2020 we transitioned the Lanai repository from Mercurial to Git in March 2020 as early adopters of the OpenJDK Project Skara.

On the 14th May 2020 we determined that the state of the work had progressed far enough to publish the first Early Access build at <https://jdk.java.net/lanai/>

Refer "Early Access Release History" table at [High level milestones](#) for Early Access revision details.

## Resources

- [Lanai Project](#)
- [Repositories](#)
- Mailing list: [lanai-dev](#)

## Recent space activity



[Ajit Ghaisas](#)

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[High Level Milestones](#) updated Mar 19, 2021 [view change](#)



[Philip Race](#)

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## Space contributors

- [Ajit Ghaisas](#) (1075 days ago)
- [Philip Race](#) (1078 days ago)
- [Vitaly Provodin](#) (1415 days ago)
- [Alexey Ushakov](#) (1460 days ago)
- [Iris Clark](#) (1670 days ago)