VIRTUSLAB

Success story

Reducing compile times by 77% during MeWe's Scala 3 migration

Our client, MeWe, is a privacy-centric social network that serves over 20 million users globally. They prioritize an excellent user experience with robust protection of their users' data. As committed Scala enthusiasts for 12 years, they continuously modernize their tech stack to address emerging challenges effectively.

They aimed to migrate to Scala 3 to further optimize their system's capabilities. During this migration, MeWe faced transitive issues with the compiler. Leveraging VirtusLab's deep expertise - as the developers behind the Scala compiler - they achieved a significant performance spike with the new Scala 3 compiler, **reducing compile times by 77%**.

The Challenge

MeWe had proactively prepared their system for a potential migration to Scala 3.
Once they decided to proceed, they initiated the code conversion in-house and migrated most dependencies to Scala 3.

However, they soon experienced significant slowdowns in compilation times, which extended developers' working hours, impacting the entire system through a chain reaction.

Spanning over 200,000 lines of code, the issues were difficult to detect. Following our client's migration, MeWe engaged VirtusLab, the developers behind the Scala 3 compiler, to assist with the issue.

The solution

Initially faced with vague analysis tools and overly complex tracing outputs, VirtusLab introduced the -Yprofile-trace flag, a proven feature from Scala 2. This strategic move significantly enhanced the compiler's ability to generate visual and analyzable performance data, leading to valuable insights.

They quickly identified major bottlenecks.

- Inferring types for a long sequence of Tapir endpoints - a complex generic data type essential for HTTP servers.
- Inferring a type at each compilation stage or when defining parts of the endpoint, particularly when intersection types were involved in input or output type parameters.

Collaborating with the EPFL compiler team, VirtusLab conducted extensive tests across the Scala 3 ecosystem to avoid any risk of causing regressions that could impact the entire codebase or external projects.

Using the knowledge gained, VirtusLab proposed global changes to the compiler that resolved the issues for MeWe by simply using the newest Scala 3 compiler version.

The results

The new Scala 3 compiler version eliminated the issue in 1600 projects tested within our Open Community Build.

- The compile times were reduced by 77% from fifteen minutes to three and a half minutes.
- The whole Scala community benefits from an improved Scala 3 compiler performance.
- VirtusLab extended the compiler with detailed profiling capabilities, useful when optimizing large code bases.

About VirtusLab

At VirtusLab, we aim to lead in software technology, working consistently to enhance efficiency. Our profound commitment to research and development and a dedicated focus on emerging trends and inspirations fuels an innovative culture. This ethos precisely guides advancing our cutting-edge solutions, inviting collaboration to expand the boundaries of software technology collectively. We welcome you to be a part of this transformative journey.

Let’s connect

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