

# Accelerating Performance Tuning with Linaro MAP for Seismic Data Processing: the Shearwater Case

## CASE STUDY

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shearwater

In the world of seismic data processing, achieving optimal application performance across diverse HPC (High-Performance Computing) environments is no easy task. The performance of seismic processing applications is impacted by various factors, such as hardware configurations, system software, and the size of the datasets.

For Shearwater, ensuring that their geophysical software could fully utilize computational resources and deliver consistent performance required a solution that simplified the performance workflow for both their internal developers and end-users.

Linaro MAP, part of the Linaro Forge Suite, proved to be a critical tool for providing an adequate solution. By integrating MAP into the workflow, Shearwater enabled effective performance analysis, streamlined collaboration between end-users and developers, and reduced the complexity of diagnosing bottlenecks.

### Bridging the Gap Between HPC Expertise and End-User

Seismic processors often possess deep scientific knowledge but lack specialized HPC skills. Profiling tools, though essential for optimizing performance, traditionally require expertise that can limit their usability for the end-user. Additionally, stringent security policies on proprietary HPC systems prevent direct developer access, making it difficult to diagnose performance issues remotely.

For Shearwater, these challenges translated into:

- Complex workflows to evaluate and fine-tune performance.
- Difficulty sharing performance insights from end-users to developers.
- Limited visibility into bottlenecks without access to the underlying HPC infrastructure.

To address this, Shearwater required a profiling solution that was both accessible to non-HPC experts and powerful enough to deliver meaningful performance insights.

## Linaro MAP: The Best-in-Class Solution for Accessible and Powerful Profiling

By integrating Linaro MAP directly into the user interface of Shearwater's processing software Reveal, they were able to revolutionize their performance tuning process:

### Ease of Use for End-Users

Linaro MAP's intuitive profiling capabilities allows the end-user, who may not necessarily have deep HPC expertise to generate quantitative performance data effortlessly. This significantly lowers the barrier to performance analysis, enabling seismic processors to evaluate how efficiently they were using computational resources. Along with enabling developers to remotely analyze bottlenecks and implement targeted optimizations without requiring direct access to HPC systems.

### Detailed and Actionable Insights

While Linaro Performance Reports provides high-level summaries of application efficiency, Linaro MAP delivers

in-depth profiling across multiple metrics, such as CPU usage, memory consumption, and communication overhead. Developers could quickly identify performance hotspots and fine-tune application parameters, ensuring optimal performance on a wide variety of architectures.

### Improved Performance and Streamlined Workflows enable

1. Enhanced User Experience & Increased Collaboration
2. Reduced Time-to-Resolution
3. Optimized Resource Utilization

The adoption of Linaro MAP highlights the transformative impact of integrated profiling tools in complex HPC workflows. For organizations striving to maximize application performance across diverse and secure HPC environments, Linaro MAP offers the perfect balance of ease-of-use and technical depth, empowering teams to innovate and accelerate performance tuning effectively.

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