AETHER

Budget Analysis & Financial Planning

High-performance memory-safe web browser

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Executive Summary

Aether is an open-source, high-performance web browser built on Rust, Servo rendering engine, and MPV media player. The project aims to address critical issues in current browsers: excessive RAM and CPU usage, security vulnerabilities from aging C++ codebases, privacy concerns with invasive trackers, and bloated user interfaces.

Key Competitive Advantages:

- Memory efficiency: 240-245 MiB startup (vs. Firefox 475-605 MiB, Chrome 1.2-1.5 GiB)
- Fast startup: 0.90s CPU time (vs. Firefox 3.27s, Chrome 1.15s)
- Memory safety through Rust language
- Optimized 4K video playback with MPV integration
- Built-in ad and tracker blocking

Part 1: Resource Identification

1.1 Infrastructure & Services (Cloud/SaaS)

Compute Resources

- Self-hosted CI/CD runners for building Rust binaries (Linux, Windows, macOS)
- Build servers with multi-core processors for parallel Rust compilation
- Test environment servers for automated browser testing

Storage & Database

- PostgreSQL database for telemetry data, crash reports
- Object storage for installer binaries (multi-platform releases)
- Artifact storage for CI/CD pipeline outputs
- Backup storage for critical project data

Network & Distribution

- Static IP addresses for web servers and build infrastructure
- Domain names: aether-browser.org, download subdomain, docs subdomain, ...
- SSL/TLS certificates for secure connections

DevOps & Tooling

- GitHub hosting for source code repository
- CI/CD pipeline services (GitHub Actions)
- Monitoring infrastructure (Graphana ?)

- Error tracking and crash reporting system (Sentry or similar)
- Performance monitoring (SHM – Self Hosted Metrics)

1.2 Hardware & Physical Equipment

Development Workstations

- High-performance computers for 5 developers
- Recommended specs per workstation: 32GB+ RAM, 8+ core CPU, NVMe SSD

Testing Devices (our materials and community participation)

- Multiple OS configurations for cross-platform testing:

- Windows 8/10/11 machines (various hardware profiles)

- Linux distributions (Ubuntu, Fedora, Arch, ...)

- macOS devices (Intel and Apple Silicon)

- Low-end hardware for testing on older systems (target market validation)

Build Infrastructure

- Self-hosted build servers (potential rack-mount servers or cloud instances)
- Network equipment (switches, routers if self-hosting)

Part 2: Financial Benchmark

2.1 Infrastructure for Builds and DevOps

Service	Provider	Estimated Cost (in eur)	Period
CI/CD Runners (3x large)	GitHub Actions / Self-hosted runners	0-400	Monthly
PostgreSQL Database	AWS RDS / DigitalOcean / Self-hosted	50-100	Monthly
Monitoring	Grafana Cloud / Datadog	0-150	Monthly
Error Tracking	Sentry / Open Source	0-80	Monthly
Subtotal (DevOps)		**50-730**	**Monthly**

2.2 Infrastructure for App Distribution and Website

Service	Provider	Estimated Cost (in eur)	Period
Object Storage	AWS S3 / Backblaze B2	€10-50	Monthly

Web Hosting	Netlify / Vercel / VPS / Self-hosted	€0-50	Monthly
Domain Names	Namecheap / Cloudflare	5-20	Yearly
SSL Certificates	Let's Encrypt (Free)	0	Free
Subtotal (Distribution)		**15-120**	**Monthly**

Part 3: The Budget (CAPEX & OPEX)

3.1 CAPEX (Capital Expenditure) - One-Time Acquisition

Item	Quantity	Estimated Cost (in eur)
Developer Workstations		
High-performance PC (16-32GB RAM, Ryzen 9 / Intel core i7, 1TB NVMe)	5	0-9,000
Software Licenses		
Windows 11 Pro licenses (if needed)	5	0-700
Linux (Ubuntu/Fedora/Arch) - Free	5	0
Testing Hardware		
Low-end test machines (validate old hardware)	3	0-1,000
macOS devices (Mac Mini M2 / used MacBook)	2	0-2,000
Total CAPEX		**0-12,700**

3.2 OPEX (Operational Expenditure) - Running Costs

Category	Monthly (in eur)	Yearly (in eur)
DevOps Infrastructure (CI/CD, Database, Monitoring)	0-730	0-8,760
Distribution Infrastructure (Storage, Hosting)	0-200	0-2,400
Domains	-0.5	3-5
Electricity (build servers, if self-hosted)	10-100	120-1,200
Miscellaneous (tools, services, testing)	0-100	0-1,200
Total OPEX	**10-1,130**	**123-13,565**

3.3 Scaling Scenarios

As Aether grows from alpha to public release, infrastructure costs will scale based on user adoption. Below are three scenarios:

Scenario 1: Alpha/Beta (100-1,000 users)

Current Phase - Minimal Infrastructure

- Monthly OPEX: 10-1130 €
- GitHub free tier and/or basic self-hosted CI/CD
- Free or low-tier hosting (Netlify/Vercel free tier)
- Limited telemetry and crash reporting

Scenario 2: Public Release (10,000-100,000 users)

Growth Phase - Scaled Infrastructure

- Monthly OPEX: 40-1300 €
- Increased CDN bandwidth for installer downloads
- Dedicated PostgreSQL instance with higher capacity
- Professional monitoring and error tracking (Sentry paid tier)
- Multiple build servers for faster releases
- Enhanced telemetry infrastructure

Scenario 3: Mass Adoption (500,000+ users)

Enterprise Scale - Full Infrastructure

- Monthly OPEX: 70-1800 €
- Global CDN with edge caching
- Distributed database infrastructure with replication
- 24/7 monitoring and alerting
- Dedicated security infrastructure and audits
- Load-balanced web servers
- Advanced analytics and user behavior tracking
- Potential for sponsorships or foundation support

Cost Optimization Strategies

Open Source Benefits

- Free GitHub hosting and Actions minutes (2,000-3,000 min/month free tier)
- Community contributions reduce development costs
- Potential for corporate sponsorships (GitHub Sponsors, Open Collective)
- Free SSL certificates via Let's Encrypt

Infrastructure Optimizations

- Use Linux-based development to avoid Windows licensing costs
- Self-host build runners instead of cloud CI/CD (higher CAPEX, lower OPEX)
- Leverage free tiers: Netlify, Vercel, Cloudflare
- Compress and optimize installer binaries to reduce bandwidth costs

Funding Opportunities

- Apply for grants from Mozilla Foundation, Linux Foundation
- GitHub Sponsors or Patreon for ongoing support
- Corporate sponsorships from companies interested in privacy/security
- Rust Foundation support for Rust-based projects

Budget Summary

Budget Category	Low Estimate	High Estimate
Initial CAPEX (One-time)	0	12,700
Monthly OPEX	10	1130
Yearly OPEX	123	13,565
Year 1 Total Cost	**123**	**27,265**

Recommendations

- **Start with minimal infrastructure: Target the low-end budget during alpha/beta phases using free tiers and self-hosted solutions.**
- **Leverage open-source ecosystem: Maximize free services from GitHub, Cloudflare, and community hosting options.**
- **Plan for scaling: Build infrastructure that can grow incrementally from 10 to millions users per month.**
- **Seek funding early: Apply for grants and sponsorships from Rust Foundation, Mozilla Foundation, and GitHub Sponsors before costs escalate.**
- **Monitor and optimize: Continuously review infrastructure costs and optimize based on actual usage patterns and user growth.**

Conclusion

The Aether browser project presents a compelling value proposition: high performance, memory safety, and user privacy at a fraction of the resource cost of mainstream browsers. With initial capital

expenditure monthly operational costs starting at 123 €, the project is financially viable for a small development team.

The benchmarks demonstrate clear technical advantages, positioning Aether as an ideal solution for developers and users with older hardware. By leveraging the open-source ecosystem, self-hosting infrastructure, and community support, the project can maintain low operational costs while delivering a superior browsing experience.

As the project scales from alpha to mass adoption, infrastructure costs will grow proportionally, but the foundation of Rust's memory safety, Servo's rendering efficiency, and MPV's optimized video playback will continue to provide competitive advantages against Chrome, Firefox, and emerging competitors like Ladybird.

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