GatoLink Infrastructure Integration Blueprint

Self-Hosted Software Stack for RLR Global

Prepared for: Handsome Gato Inc / RLR Global
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Based on: awesome-selfhosted curated list + Cortejo v1 playbook

Executive Summary

This blueprint provides a complete, production-ready self-hosted software stack for **GatoLink**, your AI inference and GPU hosting platform. All software is open-source, Docker-compatible, and optimized for your NVIDIA RTX 6000 Ada infrastructure.

Key Benefits:

- **Zero vendor lock-in** – Full control over your infrastructure
- **Cost efficiency** – No per-user or per-API-call SaaS fees
- **Privacy-first** – All data stays on your infrastructure
- **Production-grade** – Battle-tested tools used by major enterprises

1. Core Infrastructure Stack

1.1 Container Orchestration

Portainer – Container Management UI

- **Purpose:** Visual management of all Docker containers
- **License:** Zlib (Free for up to 5 nodes)
- **Docker:** `portainer/portainer-ce:latest`
- **Access:** `http://localhost:9443`
- **Why:** Essential for non-CLI container management. Single pane of glass for all services[1].

Docker Compose – Multi-Container Applications

- **Purpose:** Orchestrate complex multi-service stacks
- **Why:** Your GatoLink stack has 10+ services. Compose makes it manageable[2].

1.2 Reverse Proxy & HTTPS

Traefik or **Caddy**

- **Purpose:** Automatic HTTPS, load balancing, service discovery
- **License:** MIT (Traefik), Apache-2.0 (Caddy)
- **Docker:** `traefik:v2.10` or `caddy:latest`
- **Why:** Auto-discovers Docker containers, handles Let's Encrypt SSL automatically[3].

Recommended: Caddy for simplicity, Traefik for advanced routing.

Cloudflare Tunnel (Optional)

- **Purpose:** Secure remote access without port forwarding
- **Why:** Bypass firewall/NAT issues, built-in DDoS protection[4].

1.3 Monitoring & Observability

Prometheus – Metrics Collection

- **License:** Apache-2.0
- **Docker:** `prom/prometheus:latest`
- **Purpose:** Scrape GPU, CPU, RAM, API metrics
- **Integration:** Track vLLM inference latency, Qdrant query times, Lago billing events[5].

Grafana – Visualization Dashboards

- **License:** AGPL-3.0
- **Docker:** `grafana/grafana:latest`
- **Purpose:** Build real-time dashboards for GPU utilization, revenue, API usage
- **Why:** Essential for production monitoring. Pre-built dashboards for Prometheus[6].

Netdata – Real-Time Host Monitoring

- **License:** GPL-3.0
- **Docker:** `netdata/netdata:latest`
- **Purpose:** Per-second metrics with minimal overhead
- **Why:** Lightweight, auto-discovers containers, beautiful UI[7].

Healthchecks – Uptime Monitoring

- **License:** BSD-3-Clause
- **Docker:** `linuxserver/healthchecks:latest`
- **Purpose:** Monitor cron jobs, inference endpoints, scheduled backups
- **Integration:** Send alerts to ntfy/Gotify when services fail[8].

2. AI Inference Layer

2.1 LLM Serving

vLLM – High-Performance Inference Engine

- **License:** Apache-2.0
- **Docker:** `vllm/vllm-openai:latest`
- **Purpose:** Serve Llama 3.1 70B on RTX 6000 Ada (144GB VRAM)
- **Performance:** 2-3x faster than HuggingFace Transformers. Supports continuous batching, paged attention[9][10].
- **API:** OpenAI-compatible REST API at `/v1/completions` and `/v1/chat/completions`
- **Integration:** Direct drop-in replacement for OpenAI API. Works with LangChain, LlamaIndex, OpenWebUI[11].

Ollama – Multi-Model Local Runtime

- **License:** MIT
- **Docker:** `ollama/ollama:latest`
- **Purpose:** Run smaller models (Mistral, Mixtral, embeddings)
- **Why:** Complementary to vLLM. Easy model switching, lower memory for dev/test[12].

TensorRT-LLM (Advanced)

- **License:** Apache-2.0
- **Purpose:** NVIDIA-optimized inference with quantization (INT8, FP8)
- **Why:** Maximize RTX 6000 Ada performance. 40-50% speedup over vLLM for production workloads[13].

2.2 Vector Database

Qdrant – High-Performance Vector Search

- **License:** Apache-2.0
- **Docker:** `qdrant/qdrant:latest`
- **Purpose:** Store embeddings for RAG, semantic search, memory systems
- **Performance:** 10M+ vectors, <10ms query latency
- **API:** REST and gRPC. Native integrations with LangChain, LlamaIndex[14][15].

Alternative: Milvus or Weaviate (heavier, more features).

2.3 Orchestration Frameworks

LangChain (Python Library)

- **License:** MIT
- **Purpose:** Build complex AI workflows, chains, agents
- **Integration:** Connect vLLM + Qdrant + external APIs[16].

LlamaIndex (Python Library)

- **License:** MIT
- **Purpose:** Data connectors for RAG. Ingest PDFs, websites, databases
- **Integration:** Auto-create Qdrant collections from documents[17].

3. Data Layer

3.1 Relational Database

PostgreSQL 15

- **License:** PostgreSQL (permissive)
- **Docker:** `postgres:15-alpine`
- **Purpose:** User accounts, billing records, API logs, audit trails
- **Why:** Industry-standard RDBMS. Required by Lago billing[18].

3.2 Cache & State Management

Redis 7

- **License:** BSD-3-Clause
- **Docker:** `redis:7-alpine`
- **Purpose:** Session management, rate limiting, job queues
- **Integration:** Used by Lago for async billing events. Also cache vLLM responses[19].

4. Billing & Monetization

4.1 Usage-Based Billing

Lago – Open-Source Billing Platform

- **License:** AGPL-3.0 (self-hosted free)
- **Docker:** `getlago/api:latest` + `getlago/front:latest`
- **Purpose:** Track API tokens, GPU hours, generate invoices

- **Features:**
  - Event-based metering (send usage events via API)
  - Hybrid pricing (subscription + usage)
  - Automated invoicing
  - Stripe/PayPal/Adyen integration
  - Prepaid credits[20][21][22].

Setup Complexity: Medium. Requires PostgreSQL + Redis.
Cost Savings: Stripe Billing charges 0.4-0.5% of revenue. Lago is free (self-hosted)[23].

Integration with GatoLink:

```
# Send token usage to Lago after each inference call
import requests

lago_event = {
    "event": {
        "transaction_id": f"txn-{uuid.uuid4()}",
        "external_customer_id": customer_id,
        "code": "gpu_inference_tokens",
        "timestamp": int(time.time()),
        "properties": {
            "tokens": response["usage"]["total_tokens"],
            "model": "llama-70b"
        }
    }
}

requests.post(
    "http://lago-api:3000/api/v1/events",
    headers={"Authorization": f"Bearer {LAGO_API_KEY}"},
    json=lago_event
)
```

4.2 Payment Processing

Stripe (External API)

- **Purpose:** Accept credit cards, ACH, wire transfers
- **Integration:** Lago natively integrates with Stripe webhooks[24].

5. Authentication & Security

5.1 Identity & Access Management

Authelia – SSO + 2FA Portal

- **License:** Apache-2.0
- **Docker:** `authelia/authelia:latest`
- **Purpose:** Protect dashboards (Grafana, Portainer, Lago) with SSO
- **Features:** TOTP, WebAuthn, LDAP/ActiveDirectory, session management[25].

Authentik (Alternative)

- **License:** MIT
- **More features than Authelia, heavier resource usage[26].

5.2 API Key Management

PostgreSQL + Redis (custom middleware)

- Store API keys in Postgres, validate in Redis for speed
- Integrate with Lago for usage tracking per API key[27].

6. Front-End & User Experience

6.1 Chat Interface

OpenWebUI – ChatGPT-like Interface

- **License:** MIT
- **Docker:** `ghcr.io/open-webui/open-webui:main`
- **Purpose:** Web UI for inference testing, multi-model support
- **Integration:** Connect to vLLM, Ollama, or any OpenAI-compatible API[28].

6.2 Analytics

Umami – Privacy-First Web Analytics

- **License:** MIT
- **Docker:** `ghcr.io/umami-software/umami:postgresql-latest`
- **Purpose:** Track GatoLink dashboard usage, API endpoint hits
- **Why:** GDPR-compliant, no cookies, lightweight[29].

Plausible (Alternative)

- **License:** AGPL-3.0

- **Similar to Umami, slightly heavier[30].

PostHog (Advanced)

- **License:** MIT
- **Purpose:** Product analytics, session replay, feature flags, A/B testing
- **Why:** Enterprise-grade analytics for SaaS products[31].

7. Automation & Notifications

7.1 Workflow Automation

n8n – Workflow Automation

- **License:** Apache-2.0 (self-hosted)
- **Docker:** `n8nio/n8n:latest`
- **Purpose:** Automate client onboarding, invoice generation, alert routing
- **Use Cases:**
  - New user signup → Create Lago customer → Send welcome email
  - Invoice generated → Send to accounting system
  - High GPU usage → Alert via ntfy[32].

Activepieces (Alternative)

- **License:** MIT
- **Simpler, more visual than n8n[33].

7.2 Push Notifications

ntfy – Push Notifications

- **License:** Apache-2.0
- **Docker:** `binwiederhier/ntfy:latest`
- **Purpose:** Push alerts to phone/desktop when inference fails, GPU overheats, invoice sent
- **Why:** No external dependencies. Works via HTTP POST[34].

Gotify (Alternative)

- **License:** MIT
- **WebSocket-based[35].

8. API Management (Advanced)

8.1 API Gateway

Kong – Enterprise API Gateway

- **License:** Apache-2.0
- **Docker:** `kong:latest`
- **Purpose:** Rate limiting, quotas, analytics, API versioning
- **Why:** Production-grade API management. Used by Netflix, NASA[36].

Tyk (Alternative)

- **License:** MPL-2.0
- **Lighter than Kong[37].

9. Storage & Backups

9.1 Object Storage

MinIO – S3-Compatible Storage

- **License:** AGPL-3.0
- **Docker:** `minio/minio:latest`
- **Purpose:** Store model files, user uploads, backups
- **Why:** Drop-in S3 replacement. Works with AWS SDK[38].

9.2 Backups

Restic or **Borg**

- **Purpose:** Encrypted, incremental backups to cloud/local
- **Integration:** Automate with cron + Healthchecks monitoring[39].

10. Business Intelligence

10.1 Data Visualization

Metabase – BI & Dashboards

- **License:** AGPL-3.0
- **Docker:** `metabase/metabase:latest`
- **Purpose:** Build revenue dashboards, query Postgres/Lago data visually

- **Why:** Non-technical users can create reports without SQL[40].

11. Deployment Architecture

11.1 Layered Docker Compose Approach

Organize your stack into separate compose files for modularity:

```
 gatolink-infra/
  ├── .env                            # Environment variables
  ├── docker-compose.core.yml         # Portainer, Traefik, Prometheus, Grafana
  ├── docker-compose.inference.yml    # vLLM, Ollama, TensorRT-LLM
  ├── docker-compose.data.yml         # PostgreSQL, Redis, Qdrant
  ├── docker-compose.billing.yml      # Lago API, Lago Front, Stripe webhooks
  ├── docker-compose.monitoring.yml   # Netdata, Healthchecks, ntfy
  ├── docker-compose.frontend.yml     # OpenWebUI, Umami Analytics
  └── docker-compose.automation.yml   # n8n, backup jobs
```

Deploy in stages:

1. `docker-compose -f docker-compose.core.yml up -d`
2. `docker-compose -f docker-compose.data.yml up -d`
3. `docker-compose -f docker-compose.inference.yml up -d`
4. `docker-compose -f docker-compose.billing.yml up -d`

12. Integration Roadmap

Week 1-2: Foundation

- [x] Deploy Portainer, Traefik, Prometheus, Grafana, Netdata
- [x] Configure reverse proxy for all services
- [x] Set up monitoring dashboards

Week 2-3: AI Stack

- [x] Deploy vLLM with Llama 3.1 70B
- [x] Deploy Ollama for lightweight models
- [x] Deploy Qdrant vector database
- [x] Test inference endpoints

Week 3-4: Monetization

- [x] Deploy Lago billing platform
- [x] Integrate Stripe payment processing
- [x] Deploy Authelia for SSO
- [x] Set up PostgreSQL + Redis

Week 4-5: Production Ready

- [x] Deploy Healthchecks for uptime monitoring
- [x] Deploy Umami for analytics
- [x] Set up ntfy for alerts
- [x] Deploy OpenWebUI for testing
- [x] Document all API endpoints

Month 2+: Scale

- [x] Deploy Kong API gateway
- [x] Deploy MinIO for storage
- [x] Deploy PostHog for product analytics
- [x] Deploy Metabase for BI dashboards
- [x] Set up automated backups with Restic

13. Cost Analysis

Self-Hosted vs SaaS

Service	Self-Hosted (Annual)	SaaS Equivalent (Annual)	Savings
Billing (Lago)	$0	Stripe Billing: 0.5% revenue (~$5K for $1M revenue)	$5K
Analytics	$0	PostHog Cloud: $2K/year	$2K
Monitoring	$0	Datadog: $3K/year	$3K
Inference	$0 (own GPU)	OpenAI API: $50K/year	$50K
Vector DB	$0	Pinecone: $3K/year	$3K
API Gateway	$0	Kong Enterprise: $5K/year	$5K
Total	**~$200/year (hosting)**	**~$68K/year**	**$67.8K**

Note: Self-hosted costs include hosting (~$200/year for VPS/Bandwidth). Does not include hardware amortization.

14. Security Checklist

- [ ] Enable API keys for all services (Qdrant, Lago, vLLM)
- [ ] Deploy Authelia for SSO across dashboards
- [ ] Use HTTPS for all external endpoints (Traefik + Let's Encrypt)
- [ ] Store secrets in `.env` file (never commit to Git)
- [ ] Enable firewall rules (ufw or iptables)
- [ ] Set up Fail2Ban for SSH brute-force protection
- [ ] Implement rate limiting on public APIs (Kong or Traefik middleware)
- [ ] Regular backups to off-site location (Restic + S3/Backblaze)
- [ ] Monitor logs with Grafana Loki (optional)

15. References

All software sourced from **awesome-selfhosted** curated list:
https://github.com/awesome-selfhosted/awesome-selfhosted

Key Documentation Links

- **vLLM:** https://docs.vllm.ai
- **Lago:** https://docs.getlago.com
- **Qdrant:** https://qdrant.tech/documentation
- **Prometheus:** https://prometheus.io/docs
- **Grafana:** https://grafana.com/docs
- **Traefik:** https://doc.traefik.io/traefik
- **Authelia:** https://www.authelia.com/overview/prologue/introduction
- **n8n:** https://docs.n8n.io
- **Portainer:** https://docs.portainer.io

16. Next Steps

1. **Review this blueprint** with your team
2. **Prioritize services** based on immediate needs (inference → billing → monitoring)
3. **Set up development environment** with Docker Compose
4. **Deploy Tier 1 services** (monitoring, proxy, containers)
5. **Deploy Tier 2 services** (inference, vector DB)
6. **Deploy Tier 3 services** (billing, auth)
7. **Test end-to-end workflow** (API call → inference → billing event → invoice)

8. **Document your setup** for team onboarding
9. **Scale to production** with load balancing and high availability

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