



Circular Device Operational Practices

- [draft-gaia-circular-device-practices-01](#)
- Operational Practices for Digital Sovereignty and Meaningful Connectivity through Circular Management of User and Network Devices
- IRTF GAIA Research Group: discussion and possible adoption
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Motivation

- Connectivity deployments often assume devices already exist
- Many communities lack usable end-user and network devices
- Limited repair capacity and lifecycle management
- Networks alone do not ensure digital sovereignty and meaningful connectivity



Research Contribution

- Documents operational practices from real deployments
- Treats device ecosystems as part of connectivity infrastructure
- Focus on reuse, repair, lifecycle governance
- Informational document, no protocol specifications



Evidence Base

- Spain: eReuse ecosystem and social enterprises
- Argentina: EKOA/UNLP programmes and TAU/RAEE cooperative
- Senegal: Hahatay initiative
- Deployments combine refurbishment, training, and community infrastructure

Key terms

- **Meaningful connectivity:** Connectivity that is affordable, reliable, and usable in ways that enable meaningful participation in society, including access to devices, skills, relevant services, and locally meaningful content
- **Digital sovereignty:** The ability of communities and organisations to exercise agency and choice over the technologies, infrastructure, data, and services that shape their digital environment
- **Circular device management:** Operational practices that extend device lifecycles through reuse, repair, refurbishment, redistribution, and end-of-life handling
- **Collective access:** A governance model where devices are treated as shared resources rather than permanently assigned to individuals, allowing reassignment, maintenance, and reuse across users
- **Commodatum (loan for use):** A legal arrangement where a device is provided for use without transfer of ownership, typically for a defined or renewable period, allowing reassignment while preserving traceability and stewardship



Core Principles Observed from Operational Experience

- Device availability is part of the connectivity
- Local repair capacity strengthens digital sovereignty
- Collective access models (commons) improve equity
- Transparency, traceability of lifecycle management builds trust among stakeholders
- Repairability and Lifecycle Extension as Environmental and Social Strategy
- Privacy and Security Embedded in Reuse Workflows
- Environmental Responsibility across the Full Device Lifecycle
- Community-rooted Governance and Social Relevance



Operational Practices

- Digitalised Circular Device Management
- Repair, Training, and Capacity Building
- Alignment with Connectivity Infrastructure
- Community-centred Meaningful Connectivity
- Collective Access & Commons-based Device Governance
- Federated Registries and Cross-community Coordination
- Secure Data Sanitisation, verifiable proof
- Architectural Considerations for Connectivity Infrastructure



Human Rights, Security, Privacy, and Sustainability Considerations

- Human rights:
 - Device availability: ability to Internet access and benefits
 - Repairability & local capacity: autonomy, self-determination
 - Responsible reuse helps environmental justice concerns
- Security and privacy:
 - Secure data sanitisation before reuse
 - Trusted refurbishment workflows and firmware integrity
 - Controlled access to lifecycle records and inventories
- Sustainability:
 - Extending lifecycles reduces e-waste, resource extraction
 - Reuse and repair create local economic inclusion and skills
 - Circular management: environment responsible connectivity



Relevance for GAIA Research

- **Deployment Case Studies (Informative)**
- **Replication Guidelines**
- Device lifecycle management influences connectivity sustainability, not an external dependency
- Repairability and reuse improve resilience of deployments
- Reduction of remote dependencies through capacity building, local maintenance and governance
- Operational insights complement GAIA architectural research



Discussion and Adoption

- Is the scope appropriate for GAIA?
- Are lifecycle practices relevant architectural considerations?
- Should additional deployments be included?
- Interest in adopting the draft within GAIA?

References and ACKs

- <https://datatracker.ietf.org/doc/draft-gaia-circular-device-practices/>

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