Operational Practices for Digital Autonomy and Meaningful Connectivity through Circular Management of User and Network Devices

- draft-irtf-gaia-circular-device-practices-00
- IRTF GAIA Internet Draft
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What's new since previous draft

- **Adopted** by IRTF GAIA: version counter reset to -00
- "Digital sovereignty" → "community digital autonomy"
- New: what people do with the devices (meaningful use)
- Security split: reuse-chain integrity vs. user online safety
- Sharper problem statement, framing, open research questions

Motivation

- Connectivity infrastructure is deployed,
  but devices are treated as **one-off** inputs
- Many communities lack usable
  end-user and network devices
- Limited repair capacity and lifecycle management
- Networks, coverage alone do not ensure
  community digital **autonomy** or **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 (La Plata) programmes and TAU/RAEE cooperative (Rosario)
- Senegal: Hahatay initiative
- Deployments combine refurbishment, training, and community infrastructure
- *See section 7 Deployment Case Studies (Informative)*

Key Terms

- Meaningful connectivity: available, affordable, reliable and usable in ways that enable meaningful participation (ITU UMC, ISOC, APC, IGF PNMA)
- Community digital autonomy: ability of communities to make and implement decisions on the technologies and infrastructure they rely on *(replaces "digital sovereignty")*
- Circular device management: practices extending device lifecycles through reuse, repair, refurbishment, redistribution, end-of-life handling
- Connectivity infrastructure: devices, network segments (classic "access network"), facilities, and the governance that sustains them
- Collective access/ownership (commodatum): devices as a shared resource, use without transfer of ownership, allowing reassignment and traceability *(akin to a "Library of Things")*

Core Principles Observed from Operational Experience

- Device availability is part of connectivity infrastructure
- Local repair capacity strengthens community digital autonomy
- Collective access models (commons) improve equity
- Transparency and traceability build trust among stakeholders
- Repairability and lifecycle extension as env. & social strategies
- 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

Meaningful Use, Not Just Connectivity

- Digital literacy, schooling (incl. virtual secondary), e-government procedures
- Content production: documents, CVs, audiovisual, design, communications
- Tension seen across all cases: passive consumption vs. meaningful use
- Devices go together with training and a hosting institution to become participation

Human Rights, Security, Privacy, and Sustainability Considerations

- Human rights:
  - Device availability: ability to participate in and benefit from the Internet
  - Repairability & local capacity: community digital autonomy
  - Responsible reuse helps environmental justice concerns
- Security, two distinct aspects:
  - Secure circular management: sanitisation, quality, inventory Trusted refurbishment workflows and hw/sw integrity
  - User-facing online safety: through digital-citizenship training
- 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, replication guidelines**
- **Implications for Research and Deployment**
- 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
- **Open research questions**: federated registries; traceability vs privacy; lifecycle alignment; economic, social, and environmental sustainability impacts & tradeoffs

Discussion and Adoption

Understanding how device ecosystems interact with connectivity infrastructure, community participation, and sustainability objectives may contribute to more resilient and inclusive Internet connectivity models.

- What else needs to be included? *Editorial fixes welcome*
- Adoption?

References and ACKs

- https://datatracker.ietf.org/doc/draft-irtf-gaia-circular-device-practices/00/

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