User-side approach for censorship detection: home-router and client-based platforms

Two managed approaches complement server-side detection

**BISMark: Home-router based**
- Instrumented routers in homes
- Vantage point behind modem
- View into ISP and home network

**PRO**
- Continuous monitoring
- No user intervention
- Plug-and-play setup
- No personal-firewall issues

**CONs**
- Physical devices:
  - shipping issues and costs
  - Resource-constrained

**UBICA Architecture**
- UBICA portal
  - Multi-platform client application
  - Managed by a centralized Server
  - No strict resource constrains
  - No physical deployment issues
  - Easier distribution and deployment

**PRO**
- Limited by client uptime
- host-based restrictions
- User QoE

**UBICA: Client based**
- Multi-platform client application
- Managed by a centralized Server
- No strict resource constraints
- No physical deployment issues
- Easier distribution and deployment

**CONs**
- Limited by client uptime
- User QoE

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**Monitoring Cycle**

1. Collection of Targets
2. Scheduling of evidence collection
3. Evidence collection - active probing
4. Evidence reporting and data export
5. Censorship Tests
6. Update Targets and Scheduling criteria

**Evidence Collection**
- TCP connectivity
- DNS lookup
- HTTPScan (URL retrieval)
- Keyword-based HTTPScan
- (topology)
- (performance)

**Censorship Tests**
- IP / port filtering
- DNS tampering
- DPI filtering
- (content mangling)
- (localization)
- (performance throttling)

**Preliminary Runs**

**DNS lookup** evidences
- "Www.thepiratebay.org is quietly blocked"

**HTTP GET evidences**
- "Non-compliant" online betting services are hijacked to warning page

**Future Work**
- Wide scale deployment
- More evidence types
- More detection tests
- Complete integration BISMark-UBICA
- Incentives for user adoption
- Data sharing with related projects
- Integration with related projects

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* Giuseppe Aceto has been granted traveling support by Citizen Lab’s Connaught Summer Institute
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**UBICA: IT, home (red)**
- BISMark: US, university (blue)

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**UBICA portal**
- UBICA: IT, home (red)
- BISMark: US, university (blue)

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**External Sources**
- Probes (UBICA & BISMark)
- UBICA portal
- Third-party Storage & publishing
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**Network Link**
- Control Protocol
- Measurement
- Network Link
- Internet

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**Control Protocol**
- Measurement
- Internet
- Globally distributed UBICA Clients

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**Physical devices:**
- shipping issues and costs
- Resource-constrained

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**Future Work**
- Wide scale deployment
- More evidence types
- More detection tests
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- Incentives for user adoption
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