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Overview, Use Cases & Deployment

Use Case: Education — Schools, Universities & Research Labs

Local-first. Always on. Works anywhere there is WiFi.

What TreeTalk Node Does

TreeTalk Node is a serverless, local-first file sharing and communication platform that works on any WiFi network — including a teacher's smartphone hotspot in a rural classroom, a cheap consumer router in a university seminar room, or the dedicated LAN of a research laboratory. Staff and students share files of any size, send encrypted messages, and exchange voice notes directly between devices on the local network, with no cloud, no external servers, no internet connection, and no IT setup required.

One small executable file on each device. No installation, no registration, no accounts. A shared digital workspace created in seconds — anywhere there is a WiFi signal.

The Spectrum: From Rural Classroom to Research University

TreeTalk Node covers the full range of educational environments because it has only one requirement: that devices are connected to the same LAN, VPN or WiFi network. Everything else — internet access, servers, IT infrastructure, cloud subscriptions — is optional:

- A rural primary school teacher with no reliable broadband can create a shared classroom network by enabling the WiFi hotspot on their smartphone. Every student device connects to that hotspot. TreeTalk Node runs on each device. The teacher distributes worksheets, reading materials, and exercise files to every student simultaneously in seconds. Students submit completed work back to the teacher the same way. No internet. No cloud. No subscription. No IT department.
- A secondary school computer lab can use its existing wired LAN or WiFi network. TreeTalk Node replaces the slow, unreliable process of copying files to USB drives / shared folders or uploading assignments to cloud platforms that require student accounts and parental consent. Files move between the teacher and students at full LAN speed.
- A university lecture hall or seminar room with a basic consumer WiFi router — available for under 30 euros — becomes a fully functional local network. The lecturer distributes slides, datasets, and case study materials to all students simultaneously. Students submit group project files back. No institutional IT involvement. No cloud storage account required.
- A university research laboratory with its own dedicated LAN uses TreeTalk Node for sharing large research datasets, simulation outputs, and documentation between workstations and between lab members — without routing sensitive research data through cloud services that create intellectual property exposure and GDPR complications.
- A university campus under cyber isolation following a ransomware attack continues to function for internal file sharing and communication between departments, because TreeTalk Node has no external dependencies to cut off.

The Problems TreeTalk Node Solves in Education

Educational institutions at every level face a common set of collaboration and communication challenges that existing tools address poorly:

- Cloud platforms require internet connectivity that is unreliable or unavailable in many rural and under-resourced schools. When the connection drops, cloud-based learning tools stop working entirely at the moment they are needed most.
- Most cloud education platforms require individual student accounts, parental consent for minors, and ongoing subscription costs. For under-resourced schools, this creates both administrative burden and budget constraints that TreeTalk Node eliminates entirely.
- Student personal data and learning records processed through commercial cloud platforms are subject to FERPA (US), GDPR and COPPA considerations, and state-level student privacy laws, including the California Student Privacy Act. Data that never leaves the local network is exempt from the most complex of these obligations by design.
- Research universities handling grant-funded data, proprietary research, and pre-publication findings face intellectual property risks when using commercial cloud storage. Funders, including the NSF, NIH, and EU Horizon programme, increasingly require data management plans that account for where research data resides. Local-first architecture is the most straightforward way to keep research data under institutional control.
- Ransomware attacks on educational institutions have increased dramatically. Universities are specifically targeted because they combine valuable research data with relatively weak security perimeters. When a ransomware attack forces network isolation, cloud-dependent communication and collaboration tools become unavailable. TreeTalk Node continues to work.
- Large academic files — research datasets, simulation outputs, video lecture recordings, 3D model files, high-resolution microscopy images — are impractical to share via email and slow to upload through cloud storage. On a local network, TreeTalk Node transfers files of any size at full network speed.

Real-World Context: The Sapienza University Ransomware Incident

Why Universities Need Local-First Communication: The Sapienza Case

In 2025 - 2026, Sapienza University of Rome — one of Europe's largest and oldest universities — suffered a significant ransomware attack that forced the extended isolation of its network infrastructure from the public internet. For a period of months, systems dependent on external connectivity were severely disrupted.

The incident highlighted a structural vulnerability that affects virtually every university: when external network connectivity is severed as a security measure, the tools that academic and administrative staff rely on for daily collaboration — cloud storage, email systems, video conferencing, online learning platforms — become partially or completely unavailable.

TreeTalk Node addresses this vulnerability directly. Because it operates entirely on the local network with no external dependencies, it would have continued to function throughout the isolation period. Researchers could have continued sharing datasets and documents. Administrative teams could have maintained internal communication. Academic departments could have coordinated without cloud access.

Deploying TreeTalk Node as a standard communication layer across a university campus costs nothing beyond the devices already present. It requires no servers, no IT configuration, and no internet access. It is, in effect, a free insurance policy against exactly the kind of network isolation event that Sapienza experienced.

Deployment Scenarios by Institution Type

Scenario 1: Rural Classroom — Smartphone Hotspot

A primary or secondary school teacher in a location with no reliable broadband connection enables the WiFi hotspot on their smartphone. Students open TreeTalk Node on their tablets, laptops, or shared classroom computers, which connect

automatically to the hotspot. The teacher distributes the day's materials — worksheets, reading files, exercise documents — to every student simultaneously in under ten seconds. Students complete the work and submit it back via TreeTalk Node before the end of class. The entire session requires no internet connection, no student accounts, and no cloud platform.

Required infrastructure: one smartphone with a data plan. Cost of additional equipment: zero.

Scenario 2: School Computer Lab — Existing Network

A computer lab with 20 workstations connected to the school's existing LAN or WiFi network. TreeTalk Node is copied to each workstation once — no installation process. The teacher distributes software files, datasets, and project templates to all students simultaneously. Students collaborate on group projects by sharing files directly between workstations. Completed assignments are submitted to the teacher's workstation at full LAN speed. No USB drives. No cloud uploads. No student accounts required.

Scenario 3: University Lecture Hall or Seminar Room — Standalone Router

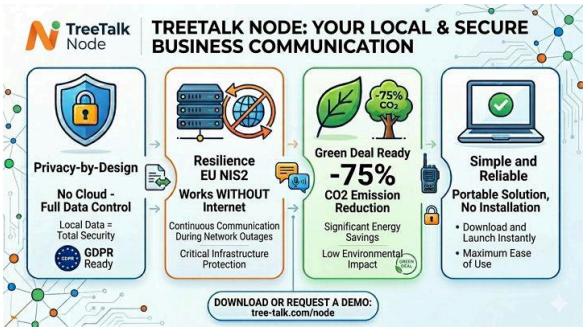
A lecturer brings a small consumer WiFi router to a seminar room — available for under 30 euros. Students connect their laptops to the router's local network. The lecturer distributes slides, reading materials, case studies, and large data files to all participants in seconds via TreeTalk Node. Students submit group work and individual responses back during the session. No institutional WiFi required. No VPN. No IT support. The local network exists only during the session and leaves no data on any external system.

Scenario 4: University Research Lab — Dedicated Local Network

A research group working on sensitive data — clinical trial data, proprietary algorithms, pre-publication findings, or government-classified research — uses TreeTalk Node on the lab's dedicated LAN to share large files between workstations without routing research data through cloud services. A simulation output of 40GB transfers between two lab workstations in minutes at full LAN speed. Pre-publication manuscripts are shared among team members for review without ever leaving the institution's network. Intellectual property stays under institutional control.

Scenario 5: University Campus — Cyber Isolation Continuity

Following a ransomware attack or other cybersecurity incident requiring network isolation, the university's external internet connectivity is severed. Cloud-based systems — email, shared drives, learning management systems, video conferencing — become unavailable. TreeTalk Node, already running on departmental workstations across campus, continues to function without modification. Administrative departments maintain internal communication. Research teams continue sharing files. Faculty coordinate with departmental support staff. The institution does not go dark.



Privacy and Compliance in Education

Educational institutions handle particularly sensitive categories of personal data, including data relating to minors, academic records, health information, and research subject data. Local-first architecture addresses the most complex compliance requirements across all education levels:

- FERPA (Family Educational Rights and Privacy Act): US educational institutions receiving federal funding must protect student education records. Data that never leaves the institutional network eliminates the most common FERPA risk: unauthorized disclosure through cloud vendor breaches or data sharing.
- COPPA (Children's Online Privacy Protection Act): Services collecting personal data from children under 13 in the US require verifiable parental consent. TreeTalk Node collects no personal data at all — no accounts, no registration, no usage tracking — making it fully exempt from COPPA obligations.
- GDPR and EU student data protection: European educational institutions processing student personal data are subject to GDPR. For data relating to minors, the requirements are particularly strict. Local-only data flow satisfies the data minimization principle at the infrastructure level.
- California Student Privacy Act (SOPIPA) and state equivalents: Many US states have enacted student data privacy laws that restrict how ed-tech vendors can use student data. TreeTalk Node has no vendor data collection component — it processes no student data on external systems.
- Research data compliance — NSF, NIH, EU Horizon: Research funders increasingly require data management plans specifying where data is stored and who has access. Local-first architecture is the most straightforward compliance position: data remains on institutional infrastructure, accessible only to authorised researchers.
- GDPR Article 9 — Special category data: Research involving health, biometric, or other sensitive personal data requires heightened protection. TreeTalk Node provides this protection architecturally by keeping all data on the local network, with no external transmission at any point.

Four Core Benefits Across All Education Levels

Works Anywhere	Zero Setup	Research Safe	Cyber Resilient
Smartphone hotspot, cheap router, or campus LAN. Any WiFi network is enough.	No accounts, no installation, no IT support. One file, run it, share files in seconds.	Large datasets, pre-publication findings, and sensitive research stay on institutional infrastructure.	Continues working during ransomware isolation. No external dependencies to cut off.

How TreeTalk Node Compares

	TreeTalk Node	Cloud / Email	School LMS / VLE
Works without internet	**Yes**	No	No
Smartphone hotspot is enough	**Yes**	No	No
No server or IT needed	**Yes**	No	No
Large file sharing	**Yes**	Slow	Limited
Student data on-premises	**Yes**	No	Partial
Works during cyber isolation	**Yes**	No	No
Free to use	**Yes**	Partial	No

What You Need to Get Started

TreeTalk Node has the lowest infrastructure requirement of any collaboration tool available:

- Rural classroom with smartphone hotspot: one smartphone (any platform) + Windows devices for students. Cost of additional equipment: zero.
- School computer lab: existing LAN or WiFi network + Windows workstations already present. Cost of additional equipment: zero.
- University seminar room without institutional WiFi: one consumer WiFi router (under 30 euros) + student laptops. Total infrastructure cost: under 30 euros.
- University research lab: existing departmental LAN + Windows workstations already present. Cost of additional equipment: zero.
- University campus resilience layer: TreeTalk Node installed on existing workstations across departments. Cost: zero. Configuration time: under five minutes per workstation.

Key Benefits for Educational Institutions

- Creates a shared digital classroom or workspace anywhere there is a WiFi signal — including a smartphone hotspot
- Distributes files to an entire class or research team simultaneously at full network speed
- Requires no student accounts, no parental consent forms, no cloud subscriptions, and no IT department
- Keeps student and research data on institutional infrastructure — fully compliant with FERPA, COPPA, GDPR, and research funder requirements
- Continues to function during internet outages, infrastructure failures, and ransomware-forced network isolation
- Transfers large research files, video recordings, and datasets at LAN speeds without cloud upload delays
- Costs nothing beyond devices already present in the institution
- Free to download and use, with no registration, no commitment, and no usage tracking

Download free and create your shared learning space in seconds — wherever you are.

tree-talk.com/node | No installation. No registration. Just run and go.