LibreMesh - Mesh Wide

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Agenda

- Libremesh
- Shared-state
- Mesh wide use cases

Libremesh

User aware mesh infrastructure, ment to be “easy” to use

- Open-wrt
- Lime-packages
- Lime-app
- Shared-state

Shared-state

- Is a small tool to exchange information between mesh nodes.
- Conflict-free replicated data type (CFRDT)
  - Nodes write their own information and send their full local state to other nodes
  - States are merged at the node
- Built on top of a small custom c++ lib that is based

  on c++ co-routines and Linux epoll (single thread, collaborative concurrency)

Shared-state operations

- Get
- Insert
- Sync
- ...more

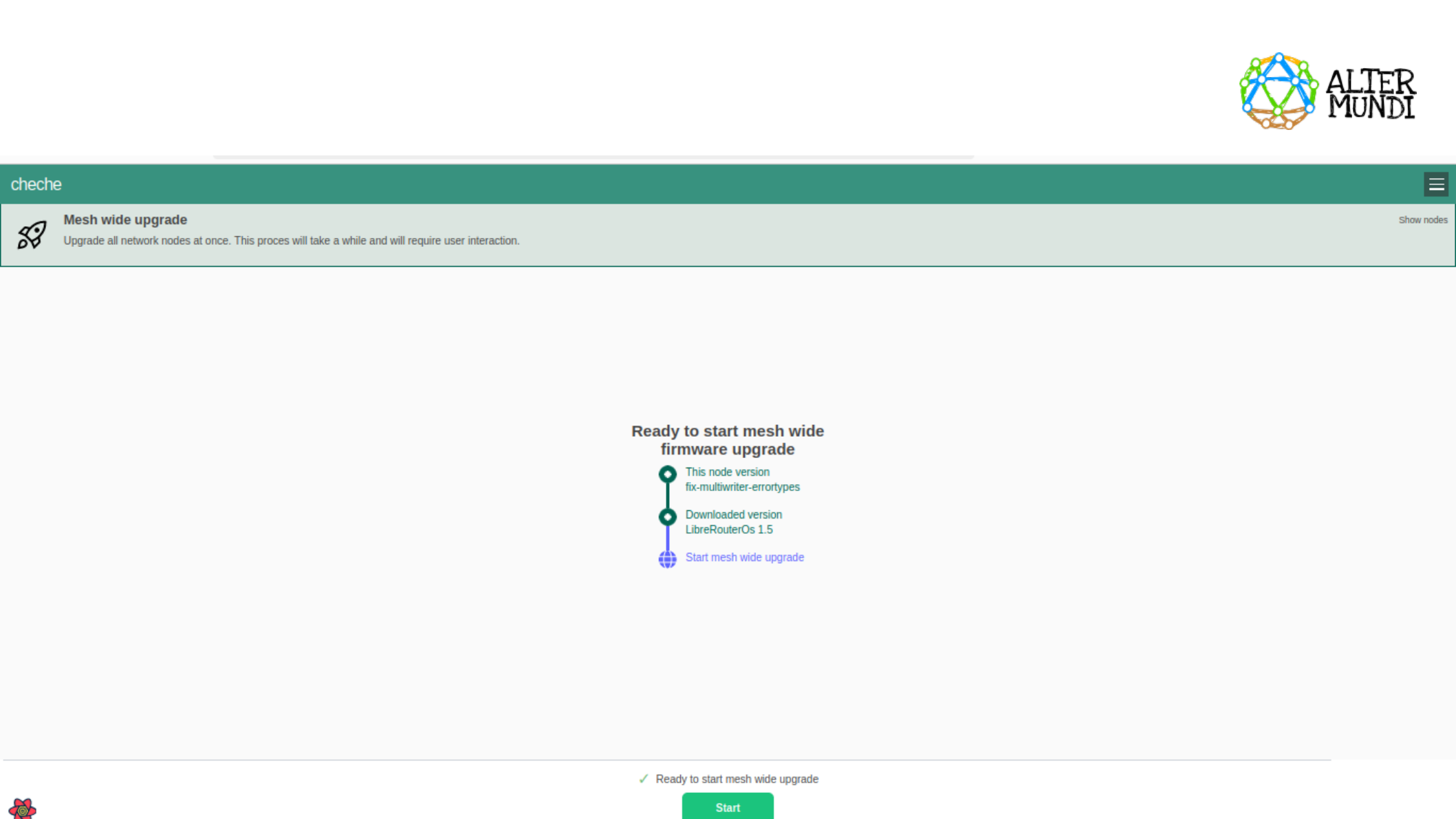
Mesh-wide use cases

- Full network firmware upgrade
- Network distributed monitoring

Full network upgrade

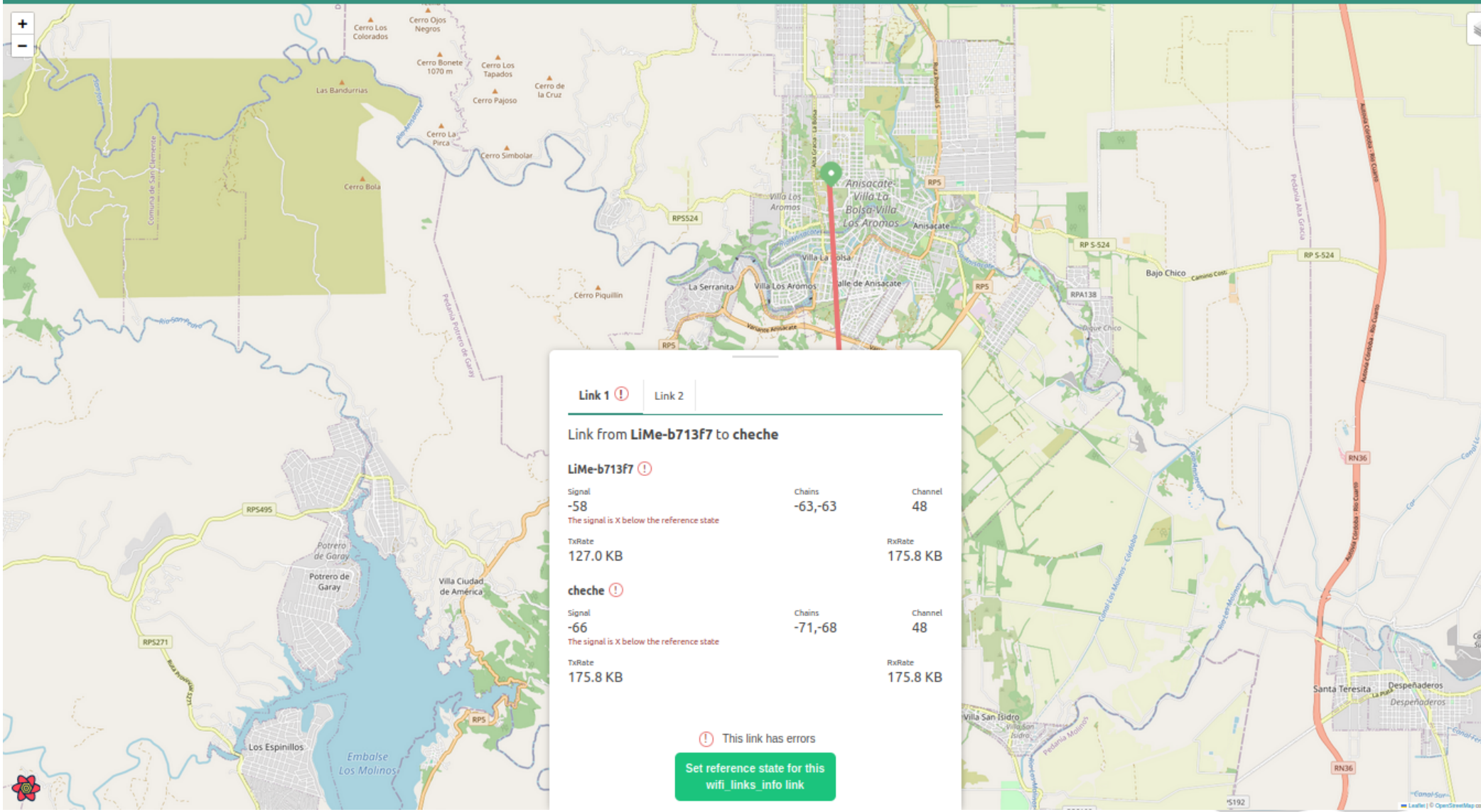
- The problem is with non compatible upgrades
- **Happy path :)**
  - A user connects to a node and gets the new firmware version (in ram)
  - The user starts an upgrade transaction and notifies every one using shared state
  - Every node that hears the news downloads the image and waits for the others to be ready
  - Once all the nodes have the image and are ready the user can schedule (synchronously) the new upgrade
  - Al nodes will reboot to the new image using **safe-upgrade**
  - If the network reaches a consistent state, the user can confirm the upgrade.

    Other wise all nodes will reboot to the previous firmware


ALTER MUNDI
cheche
Mesh wide upgrade
Upgrade all network nodes at once. This proces will take a while and will require user interaction.
Show nodes
Ready to start mesh wide firmware upgrade
This node version
fix-multiwriter-errortypes
Downloaded version
LibreRouterOs 1.5
Start mesh wide upgrade
✓ Ready to start mesh wide upgrade
Start

Network distributed diagnose

- Last known path to internet
- Mesh map
  - Actual state
  - Reference state
- Information
  - Node (location, macs, ip’s)
  - Wifi (signal, chanels, links)
  - Babel (links)
  - Batman (links, quality)



Link 1 ⓘ | Link 2

Link from **LiMe-b713f7** to **cheche**

LiMe-b713f7 ⓘ

Signal	Chains	Channel
-58	-63,-63	48
The signal is X below the reference state		

TxRate	RxRate
127.0 KB	175.8 KB

cheche ⓘ

Signal	Chains	Channel
-66	-71,-68	48
The signal is X below the reference state		

TxRate	RxRate
175.8 KB	175.8 KB

ⓘ This link has errors

Set reference state for this wifi_links_info link

Mesh-wide packages

- Mesh-upgrade
- Status Information
  - Node
  - Babel links
  - Batman links
  - Wifi-links
- Reference status

Production of appropriate and social technology

LibrePollo

Fabri, Pablo, Annie, Santi, Jere, Javi

Objectives

- Decrease time the workers expend in chicken production
- Improve the efficiency of chicken egg incubators
- Fight against programmed obsolescence, and make it simple enough so an electrician and a carpenter can repair it.
- Improve “Arraigo Rural” to show young people that technology development can be done in rural areas.
- Incubate lua programmers “hackers”

What are we doing?

- An appropriate design, for passive users and different levels of active users (with intentions to build it or change it) and people who can repair it.
- From the community perspective we are building a place to work and train people, we created a group of programmers to achieve innovation in rural areas. A group of people with production capacity is going to be trained. This will allow actors of the community to appropriate the tech. Documentation for all the process is under development.
- This will impact in the living conditions of familiar agriculture and rural and indigenous “Agricultura Familiar, Campesina e indígena (AFCI)”.
- Reaching young people in the communities with almost no experience in technology will also help this communities in other aspects in they daily life.

Actual state

Monitoring system implemented in LUA using NodeMcu on an ESP32

2 Prototypes working one in 220V and another being test in 24V most of the materials can be obtained in a hardware store.

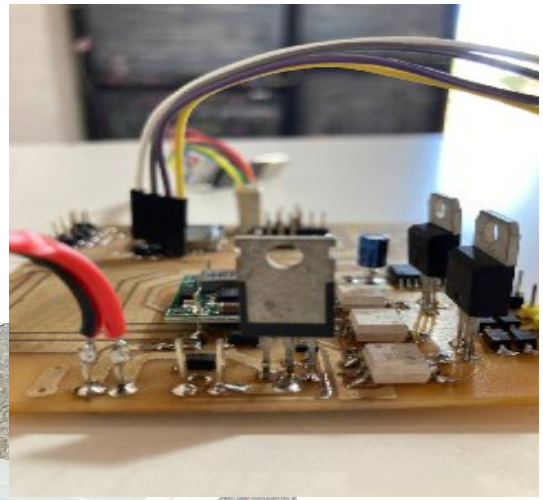
We also have a simple design that can be built in a simple way.

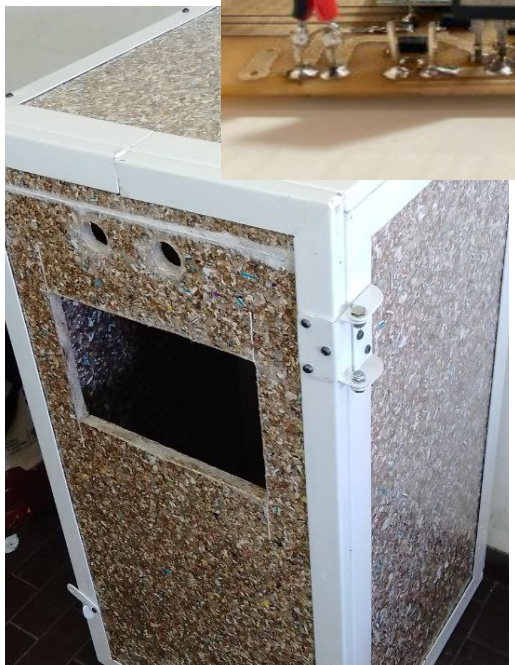
There is a simple electronic board which is going to be produced in rural areas

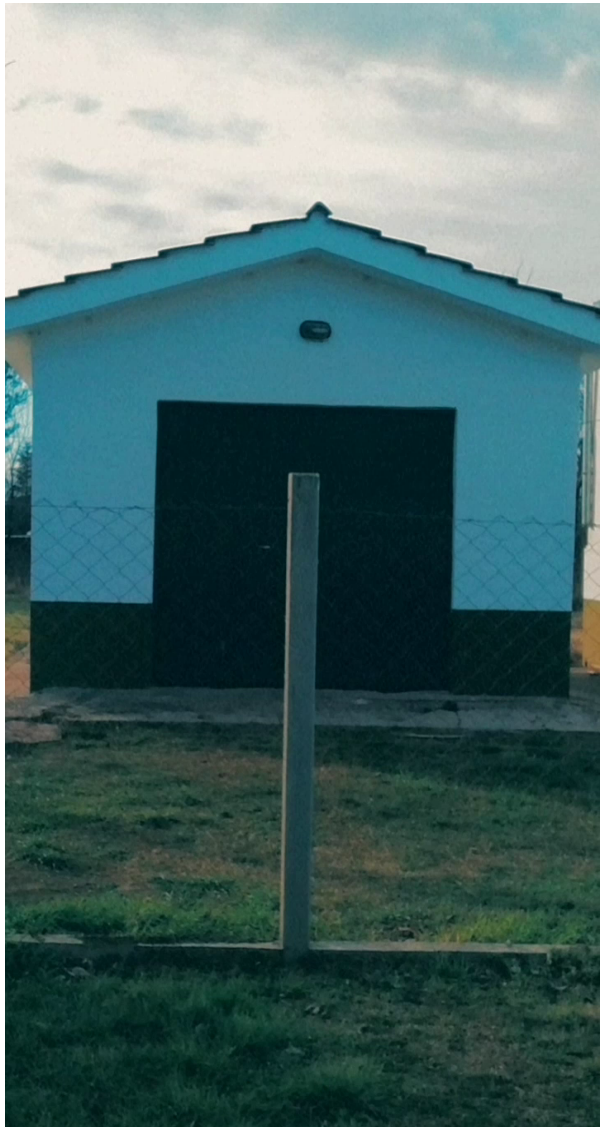
One of the prototypes has ben constructed with recycled materials.

An application written in flutter for user interaction.

Hardware, electronics, electric diagrams and mechanical designs are open and free as in freedom.







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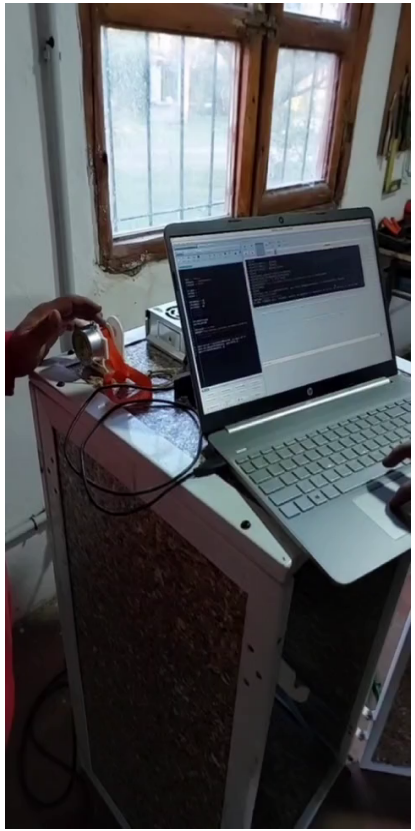

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