



Remote Access for Monitoring and Data Downloads

Note: automatic realtime data downloads to motus.org do not work at this time.

Note: this page describes work in progress; it is not ready for end-users yet.

Software

Once a hardware internet connection is available, the sensorgnome will "phone home" i.e. establish an outgoing secure shell (SSH) connection to our server at sensorgnome.org. When used via our server, this connection will allow:

- live status and configuration via the sensorgnome's web interface page
- manual bulk data downloads via the sensorgnome's shared network drive
- automatic realtime data download, when configured
- software updates, when desired
- secure shell access, for expert configuration, troubleshooting, and maintenance

Eventually, we'll allow outgoing connections to be intermittently scheduled, rather than continuous, to reduce power consumption and bandwidth usage.

So far, power consumption figures show a continuous internet connection to a WiFi router adds approximately 0.5 watts. We haven't yet tested consumption for the wideband unit.

Hardware

1. Wired connection

The beaglebone computer in your sensorgnome has a 10/100 Mbps ethernet port. You can connect this to an ethernet router using a standard cable, and the sensorgnome will request an IP address via DHCP. The router must be configured so that outgoing connections on port 59022 (SSH) are permitted. This is the cheapest option, but of course requires an internet-connected router within a few tens of

metres of the sensorgnome.

The full list of ports and protocols used on the device's ethernet port is this:

- DHCP request to obtain an IP address
- DNS request to obtain the address for **sensorgnome.org** (131.162.131.200), **time.nrc.ca** and **time.nist.gov**
- NTP requests to **time.nrc.ca** and **time.nist.gov** (these might get redirected to closer clock sources)
These are not necessary if the device has an attached GPS which is able to obtain a time fix.
- SSH connection to port 59022 on sensorgnome.org
- UDP datagrams to port 59022 on sensorgnome.org
- HTTP requests to <https://sensorgnome.org/recv/XXXX> where XXXX is the device's serial number

All requests and connections are **outgoing**. No ports are listened to for incoming connections.

2. WIFI connection

Using an off-the-shelf USB wifi adapter, the sensorgnome will connect to a wireless router using the WPA2 protocol for security. You must use the sensorgnome web interface (via a USB cable) to configure the router's ESSID (i.e. broadcast network name), and PKS (pre-shared key, or passphrase). Currently, the USB wifi adapter must be connected to the sensorgnome's USB hub when the sensorgnome is booted. **WARNING**: Not all devices will necessarily work with the sensorgnome. For now, we will only support one wifi adapter, the [TP-Link TL-WN725N](#) (Version 2.0) adapter, available from many retailers including [this one](#). [Details here](#).

2014 Feb 7: this now works, and hotplugging the USB WiFi adapter is permitted.

3. Wideband Turbostick

Using a wideband turbostick from a cell-phone provider, the sensorgnome will connect to the internet from anywhere there is coverage from that provider. These devices will have to be tested and configured according to the details from the provider. **WARNING:** Not all devices will necessarily work with the sensorgnome, so please contact us before choosing one. So far, the [4G LTE Novatel Wireless U679](#) stick is known to work, with [bell.ca](#) as provider. In most cases, the turbostick must first be activated on a Windows PC or a Mac. Configuration of the turbostick on the sensorgnome must be done via the web interface when connected via a USB cable. [Details here.](#)