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| . phillymesh.net .          | State of  |          .        2018    .  |
| : ------|-----    |----------| The Network | ----------|  ----|-----  : |
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Philly Mesh is a community-owned mesh network in the Grester Philadelphia
Area (including Philly's suburbs, parts of New Jersey, and Delaware).
Philly Mesh is devised of volunteers consisting of networking enthusiasts,
cypherpunks, programmers, and general tinkerers. We aim to use
off-the-shelf hardware and open source-source software to create a robust
network for hobbyists, communities, or those in need of network access.

Chat with us via Matrix! -- #phillymesh:phillymesh.net
Email -- hello@phillymesh.net

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. Network Status . |----------|          |----------| .              .
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The heart of the Philly Mesh network is a software package (or networking
suite, if you'd like to call it) called cjdns. Cjdns handles routing and
addressing through implementing an IPv6 network using public-key cryptog-
raphy. Essentially cjdns creates a secure, robust logical network with
privacy in mind. Cjdns doesn't care what interface you run it on, and will
create networks over wireless links, Ethernet, fiber, and even the exist-
ing Internet, making it incredibly flexible for many types of deployments.
We are doing most of our experimentation currently with wireless links
over the IEEE 802.11s protocol amendment for wireless mesh networking.
802.11s handles ad hoc network creation and is comparable to similar tools
such as batman-adv and OLSR, primarily used by the Friefunk project. With
our software stack, cjdns does the heavy-duty work of secure routing and
addressing (logical), while 802.11s facilitates the wireless (physical)
mesh.

Many other localized mesh groups (or "meshlocals") use a similar setup,
and our ultimate goal is interoperability with other groups. While mesh
networks are currently physically contained to certain geographic regions,
we hope to see the distance between them shorten over time. One group we
collaborate with extensively is Toronto Mesh, though there are roughly a
dozen other groups we are in regular contact with.

Within Philadelphia and the surrounding area, we are recruiting as many
people as possible to set up nodes they can run perpetually at their resi-
dence, place of business, or community centers. In these early days of
creating a physical network, those who want to join might not be able to
find other node operators physically close by. Don't let this be a
deterrent! With cjdns, you can tunnel your mesh traffic over your existing
Internet connection and get full access to the network (a wide mesh net-
work known as Hyperboria) while also cementing a location for other mesh
enthusiasts in the greater Philadelphia area to easily connect to. Once
two or more people running nodes are physically close enough to connect
wirelessly, the Internet tunnel connection can be dropped in favor of
wireless links (or added in addition to it, the choice is yours)! While we
are called Philly Mesh, we don't discriminate geographically. We have
members in the city, the suburbs, and surrounding states. Come say hi!

We are currently looking at ways to expand the network and make network access easier for an end user. Much of our success has been through development of mesh nodes based on the Raspberry Pi, and other low-cost single board computers like the Orange Pi. Those interested can check out the prototype-cjdns-pi and mesh-orange projects started by Toronto Mesh. These projects offer mostly turn-key solutions to set up ad hoc mesh nodes simply by running a script.

If any of this interests you, or you'd like to learn more, get in touch!

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. Next Steps . |--------------|              |--------------| .        .
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There are a lot of things that are being discussed or considered for improving the network. A sample of them are listed below, in no particular order.

* Grow the network, get more people setting up nodes and keeping them set up.
* Make connecting to the network easier for less-technical enthusiasts.
* Enhance community outreach!
  + More people representing Philly Mesh at local groups like PLUG, Philly 2600, Security Shell, and Philly Sec.
  + Have ambassadors at local universities like Drexel (Are you a member of the CyberDragons?), Temple (Member of TUSec?), and UPenn (Member of Penn for Privacy?). Do you attend or work at one of these schools and have interest in organizing a group there?
  + Have a presence or give a presentation at a local event like BSides Philly, BSides Delaware, FOSSCON, PumpCon, or CryptoParty.
  + Have ambassadors at local hackerspaces. Are you a member or organizer at NextFab, The Hacktory, LocalHost Philly, or Hive76? Getting mesh nodes set up at these places would be huge.
* Devise a wireless backbone. Do you like playing with powerful wireless radios and creating point-to-point links to buildings around the city? How about worrying about all the fun stuff like signal strength, line-of-sight obstruction, or grounding? Do you have access to a rooftop where you can run hardware?
* Design the next generation of turn-key nodes. Let's create packaged devices that are as easy to use as plugging in and turning on.
* Standardize our egress traffic. Cjdns nodes can allow themselves to be exit-points for Internet traffic to exit the mesh network, but it would be ideal to not depend on local ISPs to get those done. Do you know of or have connections to and IXPs (Internet Exchange Points) in the area? Maybe you operate a datacenter in the area and have bandwidth to spare?
* Experiment with other mesh networking technologies. Maybe you'd like the experiment with Hamnet, AltheaMesh, or Libremesh. Not only is it good to approach mesh networking from other perspectives, but research here could help with interoperability down the road.

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