

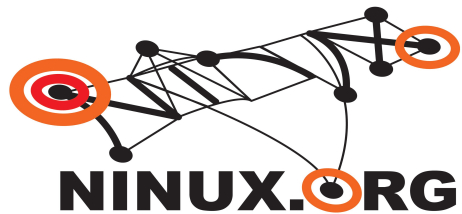
Ninux.org

Saverio Proto (ZioPRoTo)



Linux Day
2010
Firenze

<http://www.ninux.org>



Ninux: snapshot



Siamo una wireless community network!



Ninux Network Map - Mozilla Firefox

File Modifica Visualizza Cronologia Segnalibri Strumenti ?

http://map.ninux.org/

HotMail gratuita Personalizzazione coll... Windows WindowsMedia

Google Ninux Cerca Segnalibri Ortografia Traduci Invia a Impostazioni

Ninux Network Map Guida di Google Maps

Network Map Collegamento a questa pagina

Mappa Satellite Ibrida

Benvenuto*!
Benvenuto* alla mappa della rete Ninux.org!

- [Cos'è Ninux.org?](#)
- [Come si usa questa mappa?](#)

Trova Indirizzo
Indirizzo, via e città, stato o codice postale:

Imposta

- Visualizza nodi
- Visualizza potenziali collegamenti
- Visualizza nodi Internet

Nodi

Uniti

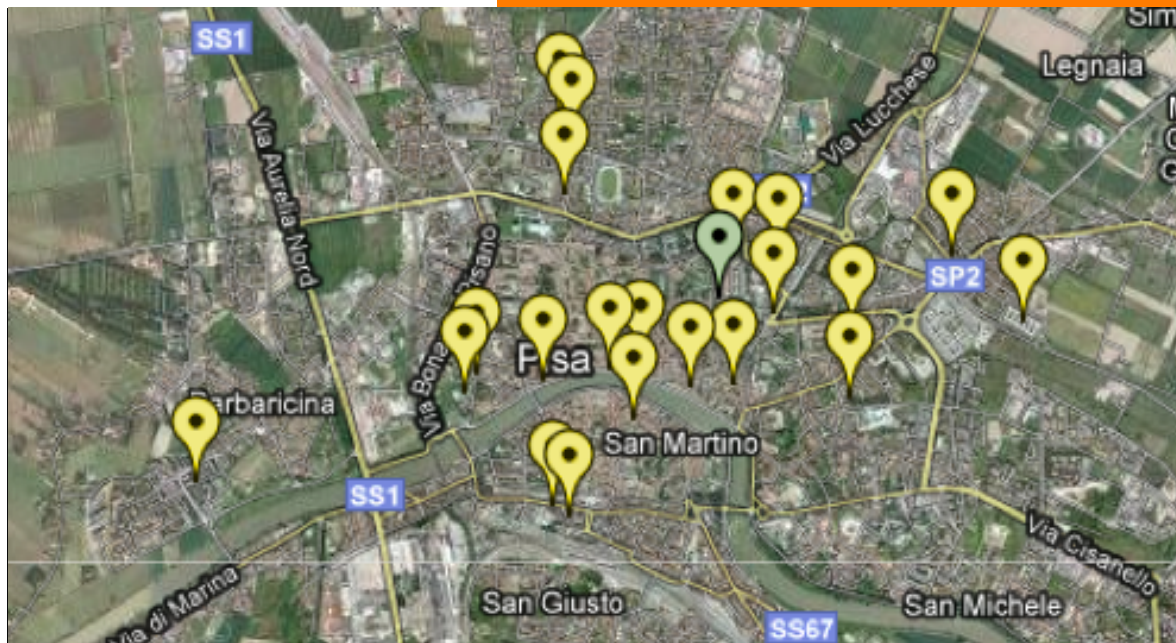
Completato

~30 nodi ninux +
~10 nodi tuscolo

Appassionati,
studenti, forte
collegamento con
università

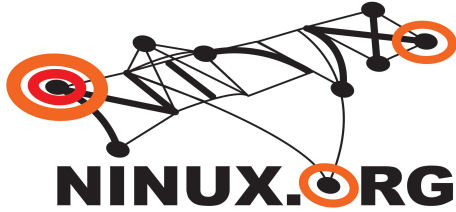
sperimentazione
tecnologie e
soluzioni





- ~20 nodi ninux
- Appassionati, collettivi di studenti (Eigenlab)
- Firmware autoconfigurante a livello IP sviluppato insieme a Freifunk e Ninux Roma
- Indirizzi IPv6 Pubblici

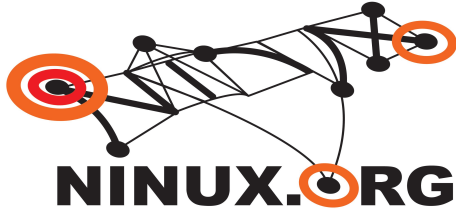




Layer 8 - People

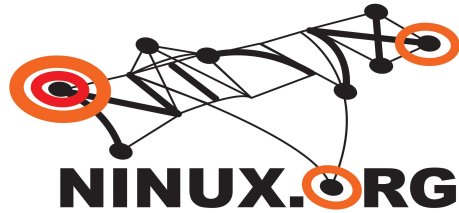
- Is not easy to explain to people what is a Wireless Community
 - People are confused about Internet
 - People are confused about Free Software
 - What is Wiki RSS Jabber torrent ... ??
 - If you are not selling something there is something wrong with you!
- Most people are willing to pay but now willing to learn
 - At least at the beginning
 - Not everyone is like this!
 - Cultural problem, not technological

- RFC 2460 – RFC 3513 – RFC 4193
 - December 1998 !!
 - RFC 3363 and 3364 for DNS support (AAAA records)
- More Addresses
 - 128 bit IP addresses
- Stateless autoconfiguration
- No checksums
- No fragmentation
- Multicast / Anycast



Layer 3 – IPv6 in the Kernel

- Check `/proc/net/if_inet6`
- `modprobe ipv6`
- `Networking - > Networking Options -> the IPv6 Protocol`
- Forget `ifconfig` !
- Use `ip`
- Compile your applications for IPv6



Layer 3 – IPv6 Address Types

■ Link Local

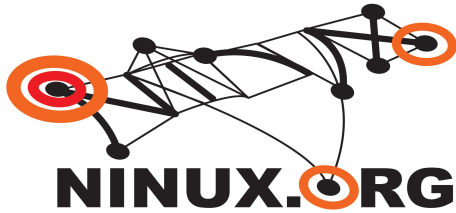
- Automatic (stateless) IP connectivity on same link
- fe80::/10
 - `ip addr show`
- Very good in combination with mDNS (Avahi, Bonjour)

■ Site Local

- Just like the old private IPv4
- fec0::/10

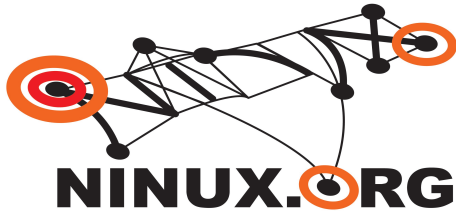
■ Global

- You can request addresses (many) at a Tunnel Broker
- 2001::/10
- 2002:: ... mapped to IPv4 addresses (more later)



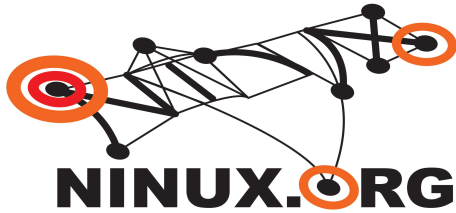
Layer 3 – IPv6 Address Types

- **With Global IP addresses for every one**
 - Network Address Translation (NAT) is not necessary anymore
 - End user routers are faster because they do not maintain a state
 - NAT tables
 - Most application problems are NAT problems
- **We can finally use IPSec !**
 - Without tunneling over UDP
 - With better security and performances!



Layer 3 – IPv6 Address Assignment

- **Manual Configuration**
 - Usually on routers
- **Statefull Autoconfiguration**
 - Basically DHCPv6
- **Stateless Autoconfiguration**
 - Routers Advertise prefix of current attached subnet
 - Hosts are able to set up their IP addresses without communication exchange with other peers
 - There is not 1 node that holds the state of the all network
 - Note that DNS server IP address can be provided with router advertisements, but also anycast should do the job

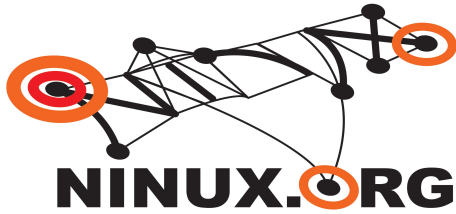


Layer 3 – IPv6 Address Assignment

```
interface br-lan
{
    AdvSendAdvert on;
    AdvManagedFlag off;
    AdvOtherConfigFlag off;

    prefix 2002:d985:b21a::2/64
    {
        AdvOnLink on;
        AdvAutonomous on;
        AdvRouterAddr off;
    };

    RDNSS fe80::500f:8fff:fece:be97
    {
    };
};
```



Layer 3 – IPv6 Packets are simpler

- **No checksum**
 - Avoid not necessary processing
 - Avoid checksum recalculation when changing options

- **No fragmentation**
 - VERY big benefit where a state is needed
 - Think of firewalls
 - Need to wait for all fragments before forwarding adding latency
 - Not all fragment are expected to flight on the same path



Layer 3 – IPv6 and IPv4

■ 6to4

- Let's you speak IPv6 whenever you have a public IPv4
- It is NOT a way to make a IPv4 only host speak with a IPv6 only host
- 2002:IPv4:IPv4:/48
- Route towards IPv6 Backbone with anycast address 192.88.99.1
- Route backwards to IPv4 host with original IPv4 address

■ 6in4

- It is simply a tunneling

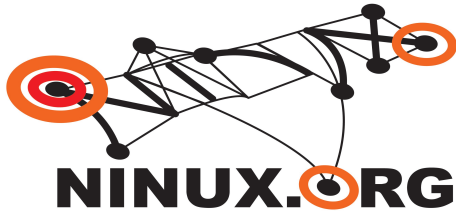
■ This is your sit0 interface on Linux

- Needs tun/tap drivers support in the Kernel

- 6to4

- Gentoo
- /etc/conf.d/net

```
link_sit0="eth0"  
config_sit0=( "ip6to4" )  
depend_sit0() {  
    need net.eth0  
}  
mtu_sit0="1280"
```



Layer 3 – IPv6 and IPv4

- 6to4

- Debian

```
ipv6calc --quiet --action conv6to4 192.0.2.3  
2002:c000:203::
```

```
auto tun6to4
```

```
iface tun6to4 inet6 v4tunnel
```

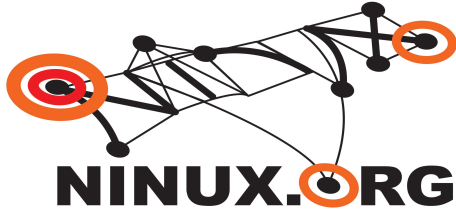
```
address 2002:c000:0203::1
```

```
netmask 16
```

```
gateway ::192.88.99.1
```

```
endpoint any
```

```
local 192.0.2.3 #fits address
```



Layer 3 – IPv6 and IPv4

- 6to4
 - By hand

Tnlifname = sit0

\$localip4 = 80.80.80.80

```
ip tunnel add $tnlifname mode sit remote any local $localip4 ttl 255
```

```
ifconfig $tnlifname up
```

```
ip addr add $localip6 dev $tnlifname
```

```
ip route add ::/0 via ::${remoteip4} dev $tnlifname
```

```
ip route add 2000::/3 via ::${remoteip4} dev $tnlifname
```

```
ip -6 addr add $prefix dev $LAN
```


- **IPv6 only host to IPv4 world**
 - **Special DNS resolver**
 - If the AAAA record does not exist provide a special A record with a site local prefix and the original IPv4
 - **Special Gateway dual stack that keeps state of connections**
 - Smart Gateway intercepts the site local prefix and forwards packets in a NAT fashion

- **A real story of IPv6 to IPv4 with proxy**
 - **Transmission bittorrent**
 - IPv6 support for bittorrent protocol
 - The web interface supports IPv4 only
 - **Apache2**
 - Supports both IPv6 and IPv4
 - Using mod_proxy you can proxy to a IPv4 only web server

```
ProxyPass /foo http://foo.example.com/bar
```

- www.ninux.org
- Domande ?

