

Network Operator Groups: The first 30 years



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Who am I?

- ❑ Senior Network Engineer at the Network Startup Resource Center (NSRC) since 2013
- ❑ Executive Director of APNOG Ltd, the legal entity responsible for APRICOT, and involved in guiding APRICOT since 2001
- ❑ Long career educating about BGP best practices, designing Internet backbones, building Internet Exchange Points, deploying IPv6, helping NOGs...
- ❑ Inducted into Internet Hall of Fame in 2021





Agenda

- ❑ The first 30 years
- ❑ Sample success stories
- ❑ Future role of a NOG
- ❑ Creating a successful NOG

Internet Operations Groups

- Where network engineers and operators meet their colleagues
 - Peering & Business relationships
 - Industry relationship
 - Technology discussions
 - Operational best practices
 - Compare experiences (supplier, operational,...)
 - Purchasing decisions influenced
 - Networking software features worked out
 - Employment opportunities
 - **Keeping the Internet Working**



THE FIRST 30 YEARS



NANOG

- ❑ North American Network Operators Group
 - Evolved from NSFNET 'Regional Techs' meeting in 1994
 - Mainly US and Canada but attracts participants from Europe and Asia too
- ❑ Three meetings per year in North America
 - One meeting held in conjunction with ARIN, the Regional Internet Registry for North America
- ❑ Inspiration for the NOG "movement"

- Asia Pacific Internet Operations & Technology Summit
 - Established in 1996
 - Directly inspired by NANOG
 - Co-located with one of two APNIC (Regional Internet Registry for the Asia Pacific) meetings
- Held annually in late February/early March
 - Participation from over 60 economies from the region and worldwide
- APNOG Ltd is the legal entity responsible for APRICOT



- African Network Operators Group
 - Established in 2000 following termination of the Internet Society's "Network Training Workshops" programme in 2000
 - Early focus was primarily on training
 - Now part of the annual African Internet Summit
- Meets once per year

- South Asia Network Operators Group
 - Established in 2003, focusing on South Asia
 - “Spin-off” from APRICOT – APRICOT could not come to South Asia often enough
 - Focus on training, two events per year, rotating around the region
- From 2025, SANOG became an annual conference, with the country NOG continuing the training activity
 - Now have NPNOG, BTNOG, BDNOG, LKNOG, INNOC, AFNOG, with PKNOC and MVNOG being formed, all serving local needs
 - Country NOGs created because SANOG cannot “visit” often enough

PacNOG

- ❑ (Central & South) Pacific Network Operators Group
 - Launched after APNIC meeting in 2004 in Fiji
 - Covers the Pacific Island nations
- ❑ Started meeting twice a year from 2009
 - Primary focus is (still) on technical training
 - Goal is to try and reach all the Pacific Island nations
- ❑ Support from:
 - NSRC
 - Pacific Islands Telecom Association
 - APNIC
 - Local host



Spin-offs / Inspiration

- The Regional NOGs gave rise to country NOGs
 - The regionals couldn't come to the country as often as the country wanted
 - Asia now: almost every single economy has a NOG
 - APNOG maintains a list: <https://apnog.org/ops/nogs.html>
 - Europe now: almost every single country has a NOG
- What about other regions?
 - A few country NOGs, plus SAFNOG, in Africa
 - But in South & Central America? Central Asia? Middle East? Pacific Islands?

Benefits

- ❑ Network and systems folks have a “local” opportunity for meeting their colleagues and peers
- ❑ In-person participation is far better than sitting watching training or presentation videos
 - In-person interaction is invaluable (we re-discovered this between 2020 & 2022)
 - Networking can only be done in-person
 - ❑ On the Internet, no one knows who you are, not in this world of fake “everything” online
- ❑ Several NOGs are trending towards being meeting places rather than just exclusively for knowledge sharing and training

Challenges

- The profusion of NOGs (a good thing!) gives rise to challenges
 - The international sponsorship pool is limited
 - The international expert instructor pool is limited
 - The international speaker pool is limited
 - Travel budgets are limited
 - Ever more events means participants and supporters have to make choices based on quality of experience and “return on investment”

Coordination

- ❑ NSRC maintains a calendar of NOG (and other technical/operational) meetings to help with coordination
 - <https://nsrc.org/calendar/>
 - A deep desire amongst NOGs in a region to avoid overlap, or organise events back-to-back for economies of scale for international participants
 - ❑ Budgets are more limited
 - ❑ Airfares and hotel accommodation more expensive
 - ❑ More events to go to, means participants have to choose
 - ❑ Visibility to potential sponsors and international participants



SOME SUCCESS STORIES

BTNOG (Bhutan)

- ❑ This year saw the 12th btNOG take place
 - <https://2025.nog.bt/>
 - Along with SANOG 43
- ❑ btNOG organised the training
 - 3 popular workshops
- ❑ SANOG organised the conference content
 - SANOG PC placed emphasis on Bhutanese presentation content
- ❑ Active and well coordinated local organising team, young and not-so young, from many entities involved in Internet (not just ISPs)



Photo: Namkha Zangpo



MNNOG (Mongolia)

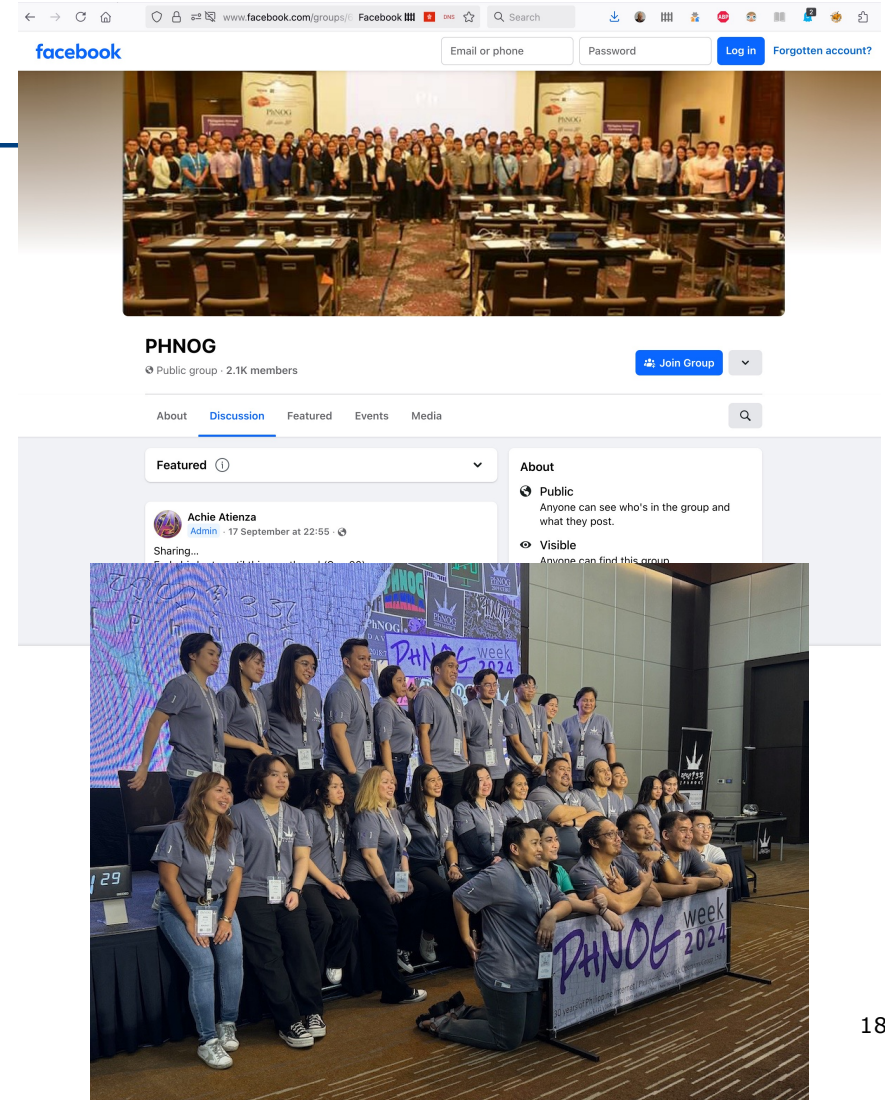
- ❑ This year sees MNNOG7 taking place
 - <https://2025.nog.mn/en/>
 - 4 days workshops, 1 day conference
- ❑ Catalyst:
 - APNIC training activity in Ulaanbaatar in 2018
 - Instructors invited local ops community participants in the workshop for socialising and discussion about creating a NOG
- ❑ A group who previously didn't know each other, ended the evening excited about creating future gatherings
- ❑ Now: an active and creative team from many Internet entities (not just ISPs) enthusiastic about the NOG



Mongolian **Network**
Operators Group

PhNOG (Philippines)

- ❑ After a first attempt (initiated by an ex-pat working with local friends) that failed, the reborn PhNOG is a success story
- ❑ PhNOG 2024 celebrated 30 years of Internet in the Philippines
- ❑ Modern interpretation of a NOG with training, tech talks, peering personals, selfies, sponsor giveaways, and game show, appealing to the Filipino community





FUTURE ROLE OF A NOG (?)

Do we still need NOGs?

- Look at AsiaPac as an example
 - Almost every country has a NOG
 - What format though?
 - “Grass roots” meeting – yes
 - Content?
 - Sales and marketing presentations by sponsors?
 - Technical presentations developed by a PC?
 - Sponsorship?
 - Technical training?
 - Or just one day talks with sponsor exhibition?
 - Or all of the above?
 - Format fits what the local community wants it to be!

Do we still need NOGs

- Regional NOGs today:
 - NANOG – North America
 - RIPE – Europe
 - APRICOT – Asia Pacific
 - LACNOG – Latin America
 - AfNOG @ AIS25 – here we are...
 - MENOG – Middle East
 - SANOG – South Asia
 - SAFNOG – Southern Africa
 - PacNOG – Pacific Islands

Do we still need NOGs?

□ Countries and their NOGs

- Almost every country in AsiaPac has a NOG, the latest are being established
- Europe is similar, with many countries having active NOGs
- But why are country NOGs harder to establish in other regions?

□ Drivers in AsiaPac include:

- Local community needs
- Local language & culture
- Urgency to have local get-togethers to deal with local issues

Do we still need NOGs?

- What do country NOGs look like today?
- Much more focus on social gathering across all
 - Technical community is much more interactive now
 - Social media has helped break down barriers
- Some are still technical operational focused:
 - Technical training (brain drain, industry newcomers, graduates)
 - Technical & operational conference programme
- Others are more mixed:
 - Sponsor exhibition
 - Technical talks
 - Sponsor “privilege” talks (aka paid-for sales & marketing)

Do we still need NOGs?

- “Peering Fora” have replaced NOGs?
 - Not really – that’s the peering community
 - Peering Community participants are more often business development and sales than BGP network engineers

- IXP Member Meetings have replaced NOGs?
 - There is considerable overlap – but IXP meetings focus on the issues relating to the IX rather than general operational
 - And member meetings also involve the member executives rather than the network/systems engineers

Do we still need NOGs?

- RIR meetings have replaced NOGs?
 - These tend to involve Policy makers and the member administrative contacts
 - An RIR cannot get around its entire region every year
- Other specialist groups have replaced NOGs?
 - Specialist groups look at subsets of the technologies and operational issues found at NOGs, like DNS, RPKI, Routing Security, end-user Security...
 - Some NOGs encourage specialist interest groups to co-locate...

Do we still need NOGs?

- What can be concluded if a country has no NOG?
 - Internet working perfectly
 - Every operator is interconnected locally
 - No problems need to be solved
 - Technology suppliers handle infrastructure growth
 - Staff gain all expert skills needed from education institutions and employers
 - Internet operations outsourced, therefore don't care
 - No "brain drain"
 - Rigid top-down hierarchy where the transit provider dictates policy
 - Indifference => Someone else can make the effort
 - Fear/distrust/dislike of competitors
 - Community too small



RECIPES FOR SUCCESSFUL NOGS

Ingredients for NOG creation

- A catalyst is needed
 - One person cannot do everything themselves
- Local “group of friends” who get together on a regular basis
 - Widening the scope, including more friends, including tech talks in their meetings,...
 - Motivation to know who to contact in another operator in case of connectivity troubles
 - Get together does not need fancy venue or organisation
 - Restaurant? College tutorial room? Social club meeting room?

Ingredients for NOG success

- ❑ Strong technical programme
 - (priority and emphasis on **local talks**)
 - A NOG is not a sales & marketing talk venue!
 - *Use local language if it helps encourage local talks*
- ❑ Coordination and Programme team
- ❑ Meet regularly
 - Formal: once or twice a year
 - Informal: much more frequently
- ❑ Simple events, avoid complexity
- ❑ Consistent sponsorship, outreach, and visibility
- ❑ Keep participants / volunteers interested
- ❑ Provide opportunities for new helpers

What doesn't work (1)

- ❑ Setting up office bearers, committees, hierarchy, process, legal entities, bank accounts, etc before any gathering has taken place
 - Workplace may need all this structure, but we are not setting up a company!!
 - A NOG is about Internet network and systems folks meeting like minded in a social yet educational setting
 - After a few informal gatherings, roles will become clearer about who is interested in doing what...
 - ...and after that, a bit of structure can be put in place...
 - ...and a more formally organised event could be considered

What doesn't work (2)

- ❑ Trying to create a big budget event at launch
 - Few will sponsor anything that is unknown
 - No one will attend anything that is unknown
 - Speakers might be uncertain about supporting (budgets too)
- ❑ Transit provider / incumbent / Govt / regulator setting up the NOG
 - What is their vested interest?
 - A customer meeting is not a NOG
 - A licenced provider meeting is not a NOG

What doesn't work (3)

- Helpful foreigners flying in:
 - Offering to help set the NOG up
 - Offering lots of tools and facilities
 - What incentive is there for locals to do anything? None
- *But: The helpful foreigner is often a catalyst, the enabler...*
- Without local leadership and champions of the NOG
 - Nothing will happen after the helpful foreigner departs
 - Local community just sits and waits for the helpful foreigner to return
 - The offered tools are meaningless unless the local community has identified the real requirements

What doesn't work (4)

- NOGs must be run “this way” and are for “this purpose”
 - Those helpful foreigners again
 - New NOGs trying to be like long running NOGs or Regionals like APRICOT and NANOG
- Local community has to experiment to find what works for them
 - Local community is the audience
 - Audience will come because of the content
 - Participants need to justify the time “out of the office” to management
 - Fundamentally it is about technical **operation** of the Internet
 - But needs to be a fun, attractive, and fulfilling event too

What doesn't work (5)

❑ NOG only on-line

- Sometimes on-line is unavoidable as an in-person meeting is not possible
 - ❑ We learned this during 2020 and 2021
- NOGs are about in-person meeting and getting to know fellow network and systems engineers
 - ❑ Not just the technical presentation content
- There is so much content available online already
 - ❑ Sitting watching even more online content ☹
 - ❑ Cannot interact with the speaker 1:1 or few:1

The final lesson?

- Setting up a NOG takes effort and persistence
 - Bring the community along with you
 - Encourage volunteers to contribute their talents
 - People attend, and return, if the experience is positive and the content is worth coming for
 - Include all sectors and regions the NOG claims to cover (it's not just for ISPs)
 - Budget needs to be neutral, sponsorship generous, participant costs low
 - No bureaucracy!