AI Assistant for IPv6 Deployment & Operations

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Why: AI can Learn 500+ IPv6 RFCs/Manuals Better than Humans; can be a Good Assistant

- IPv6 complicated & difficult to learn
  - 500+ RFCs
  - Different config's for different vendors/devices
- IP no longer sexy, few people learning IPv6 (while IPv4 was sexy in the 1990s and many students learned it)

  → Lack of IPv6 engineers hinders IPv6 migration

What: AI Assistant to Make IPv6 Deployment & Operations Easier

- Answer IPv6 questions with 95+% accuracy
- Produce scenario-dependent IPv6 address planning suggestion with 90% accuracy
- Produce guidelines + device config for IPv6 lab testing with 80% accuracy (Phase 1)
- Produce guidelines + config for IPv6 enterprise deployment (incl. DNS, NAT etc) with 75% accuracy
- Provide IPv6 operational advices with 70+% feasibility

- Develop a methodology to break down complex IPv6 tasks into smaller and more LLM-suitable tasks

How: TBD, with Preliminary Results

- Develop methodology to break down a big tasks into smaller and more manageable tasks
  - For example, IPv6 knowledge → address planning → lab config → network config → operational advices
  - Further break-down?
- Evaluated 6 LLMs
  - Use some IPv6 tests to evaluate which popular LLMs have best IPv6 knowledge, and accuracy % - done

	Deepseek V3	Doubao	Qwen-Plus	ChatGPT-4	Claude 3.5	Grok 2	IPv6 Engineer
First set 35 questions	91%	94%	82%	94%	97%	91%	77%
Second set 45 questions	96%	93%	96%	93%	98%	98%	96%
Current ranking	**3**	**3**	**6**	**3**	**1**	**2**	**7**

- Combine multiple LLMs to achieve better results
  - Give an IPv6 task to multiple LLMs, find a methodology to combine the outputs for better result
  - Ithy.com
- Improve a chosen LLM
  - TBD

Call for Collaboration

- What we have
  - IPv6 experts at v6ops WG
  - 100K support cases
  - Collaboration interest from CNR, Sirius, HKUST
- What we are looking for
  - IPv6 network engineers (users of this AI Assistant) to provide requirements
  - AI expertise, esp. LLM evaluation methods, RAG
  - Data for training LLMs
  - Man power (e.g. graduate students, interns to undertake specific tasks)
- Benefits
  - For operators & enterprises: an IPv6-assistant to do some tasks (e.g. lab configs) for you
  - For researchers: apply for patents, publish papers and IETF drafts
  - For students: develop AI & IPv6 skills, find good jobs