



# Natural Language Interaction Protocol

*Ecma TC56*

## What is NLIP?

- *What is NLIP?*
- *What Problem does it solve?*
- *What does it look like technically?*
- *What are its use-cases?*

## Why should one use NLIP?

- *What are the alternatives?*
- *How is NLIP Different?*

**NLIP: a universal application-level protocol for any client service interaction.**

**A standard defined by Ecma – Technical Committee 56**

**Available Standards:**

**[ECMA-430: Natural Language Interaction Protocol \(NLIP\)](#)**

**[ECMA-431: Binding of NLIP over HTTP/HTTPS](#)**

**[ECMA-432: Binding of NLIP over WebSocket](#)**

**[ECMA-433: Binding of NLIP over AMQP](#)**

**[ECMA-434: Security profiles for NLIP](#)**

**Technical Report:**

**[ECMA TR/113: Explanatory guide to NLIP](#)**

**There will be several multi-agent systems working within an enterprise and across enterprises**

**These agents need a standard common protocol to communicate**

**NLIP provides a standard common protocol for agents to communicate with each other**



# What problem does NLIP solve?

**When computers in our control (our phones/personal devices) need to conduct our affairs with various types of businesses**

- *Banks*
- *Retail Shops*
- *Telecommunication Vendors*
- *Restaurants etc.*

**Each business server uses its own proprietary application-level protocol to communicate with the clients**

- *Resulting in an explosion of mobile apps and application-level protocols*

**When we need to conduct our affairs with various types of businesses**

- *Banks*
- *Retail Shops*
- *Telecommunication Vendors*
- *Restaurants etc.*

**We just use one common language to interact with the business person on the other side**

- *And the common language is good enough to get all the work done*

## A common chat interface

- *Independent of any specific model or data*

## A common proxy service

- *Integrating multiple other agents*

## Business applications

- *Troubleshooting telecom device problems*
- *Providing customer service in natural language*

## A universal application

- *Same application for taxi service in any city*
- *Same application for conferences that one attends*
- *Same application for any bank service access*

## A swarm of agents

- *Allowing dynamic formation*
- *Allowing self-adjustment of swarms universally*

## Promotes an intuitive human-centric communication

- *Primary mode of interaction is natural language*
  - **Could be typed text or spoken text with speech to text conversion**
- *Vision, Audio and other modalities are supported*
  - **Some business interactions require transmission of images and videos**
- *Structured text supported but not intended as a primary interaction mode*
- *No custom configuration – All configuration and policy exchanges made using natural language*
- *The AI models used by different end-points (clients and servers) in a NLIP session can be different*

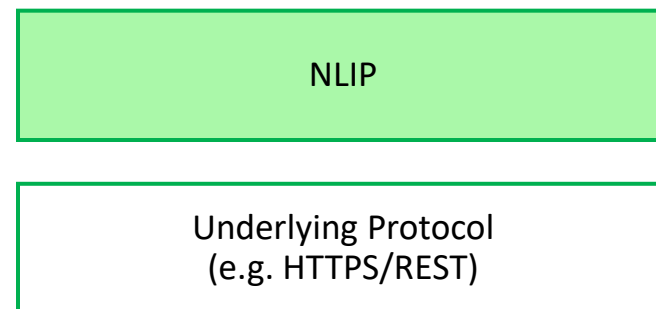
## NLIP defined as a layer above HTTPS/REST

- *Can leverage other equivalent layers as well*

## Assumes the following functionality from the underlying layer

- *A request response paradigm*
- *Encrypted communication of information*
- *Support to carry authentication tokens*

## NLIP is developed around an exchange of JSON messages



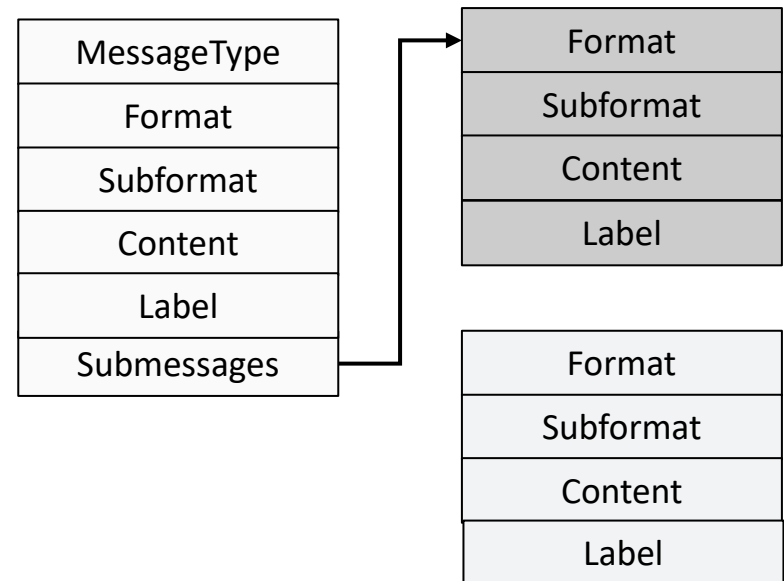
## The basic structure of an NLP exchange is a sub-message

- *Format: whether content is text, structured content, image etc.*
- *Subformat: Specialization of format, e.g. language for text, encoding for images etc.*
- *Content: The actual content*
- *A label field which is a string*

## NLIP request and response messages consist of a sequence of sub-messages.

- *And indicates type of messages (control/data/general)*
  - **A control message could inquire about policies of the service, configuration exchange etc.**

Since most messages have only one sub-message, the NLIP message contains the first format, subformat, content and optional message at very top.



<b>Format</b>	<b>Subformat</b>	<b>Notes</b>
text	Language of text (e.g. English, French etc.)	Provides a hint to the other side, can be used for model selection
token	An opaque string – determined by token creator	Content is an opaque string – used by end-point to share information such as correlators or authentication data
structured	JSON, URI, XML	Content is structured format. Allows backward compatibility for display of graphical GUI
binary	Encoding – image, video, sensor etc.	Subformat is content-type/encoding
location	Text or GPS	Coordinate if GPS, description if text
generic	Open	Provided for future extensions

## How is NLIP different

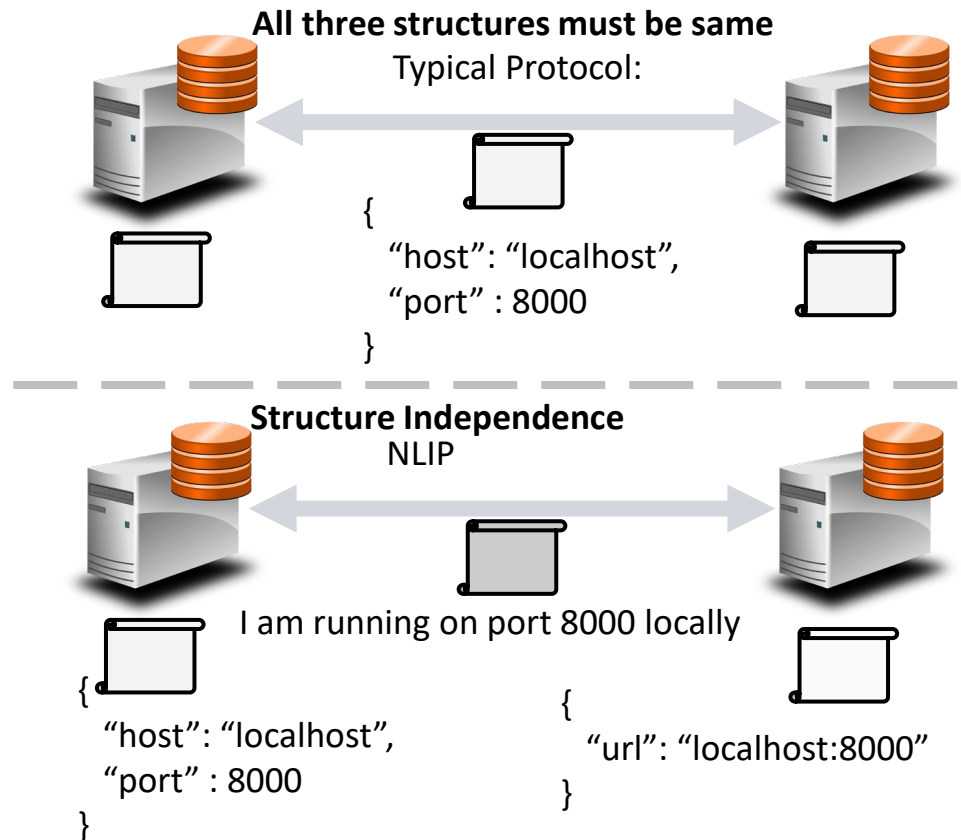
- *Designed by an open consortium of many universities and industries*
- *Independent of any specific model or agent development framework*
- *Special group focused on security considerations*
- *Applies generative AI to design of Computer Networks Protocols*

## Currently Proposed Protocols

- *Model Context Protocol – from Anthropic*
- *A2A – from Google*
- *AGNTCY – from Cisco*
- *Etc.*

## NLIP follows a different paradigm than most application-level protocols

- *Most application-level protocols define the structure that needs to be exchanged on the wire*
  - **Forces a rigid API**
  - **Causes version upgrade issues**
  - **Limits extensibility**
- *NLIP assumes that the information exchanged on the wire will be translated to a structure which is local to each communicating party*
  - **GenAI is good at parsing unstructured text to structured text**

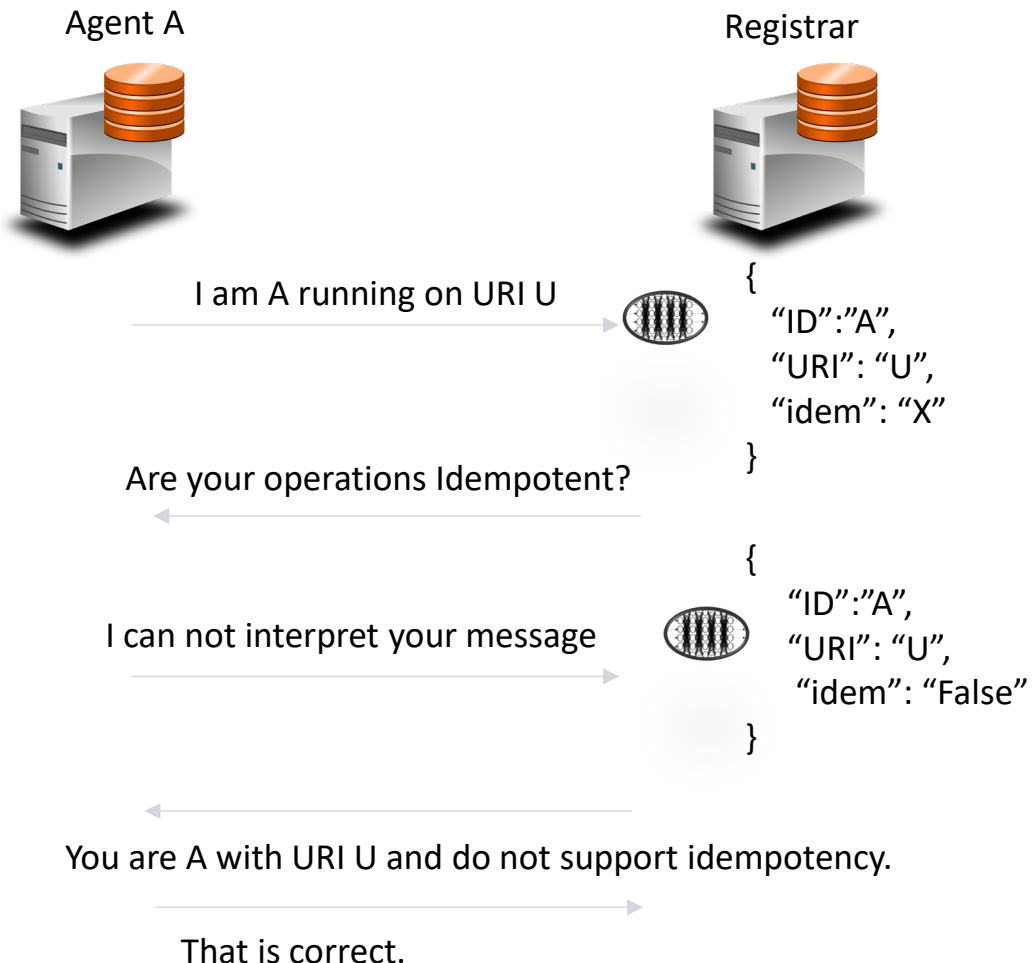


One can view it as httons and noths on steroids using generative AI.

NLIP can be used to interoperate among services that have different versions of internal representation?

## Example:

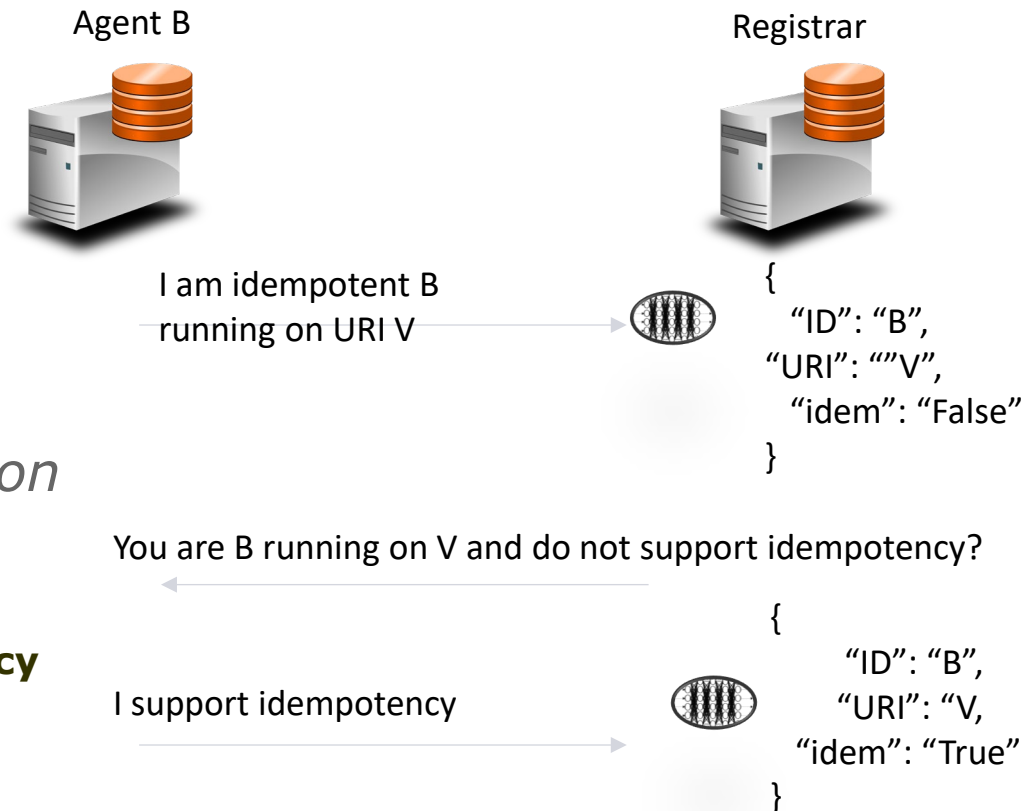
- *Service R is a registration service:*
  - **Each registered agent has fields id, URI and Idempotency**
- *Agent A does not support idempotency field*
  - **Initial registration does not contain information about it**



**NLIP can be used to interoperate among services that have different versions of internal representation?**

## Example:

- *Service R is a registration service:*
  - **Each registered agent has fields URI and Idempotency**
- *Agent B supports idempotency field*
  - **But LLM of R fails to interpret it correctly**



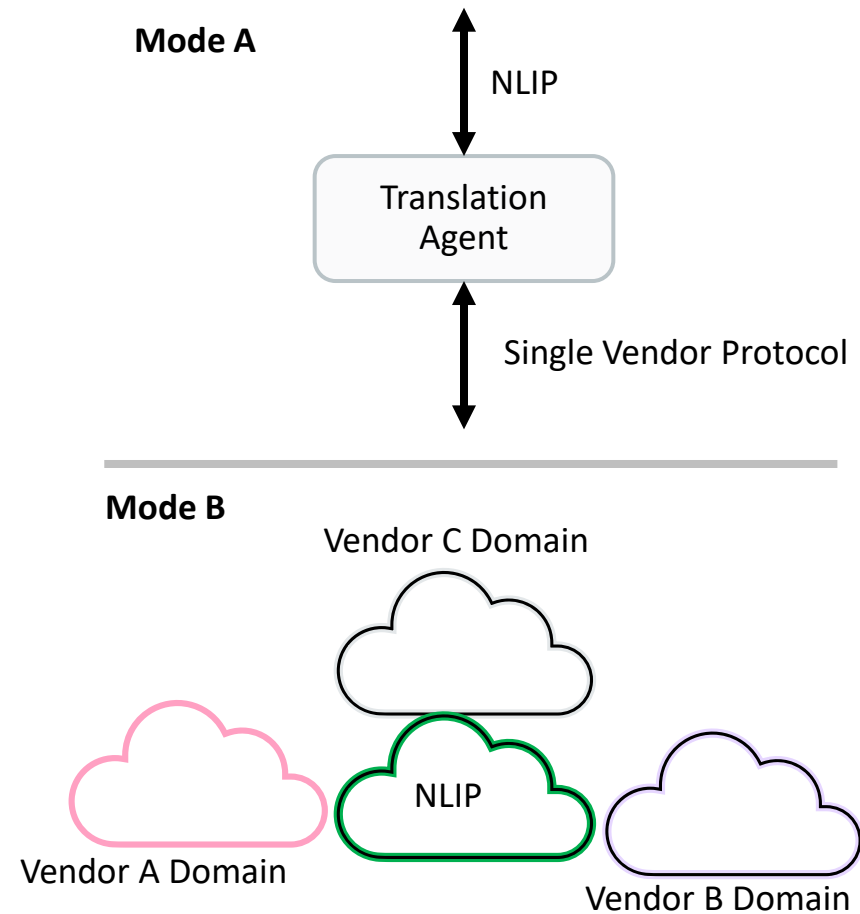
**There are multiple single vendor protocols proposed for communication between AI agents**

- *Google A2A, Cisco AGNTCY, Anthropic MCP, IBM ACP plus others to emerge*

**NLIP can interoperate with them in two ways**

- *A: NLIP provides Northbound API, Vendor Protocol provides Southbound API*
  - **Using a LLM to support translation will be relatively easy**
- *B: NLIP provides interoperability across different domains of single vendor protocols*
  - **Each domain may have multiple agents**

**Eventually, the industry should converge to an open standard protocol such as NLIP**





**Rue du Rhône 114  
CH-1204 Geneva  
T: +41 22 849 6000  
F: +41 22 849 6001**

**[www.ecma-international.org](http://www.ecma-international.org)**