

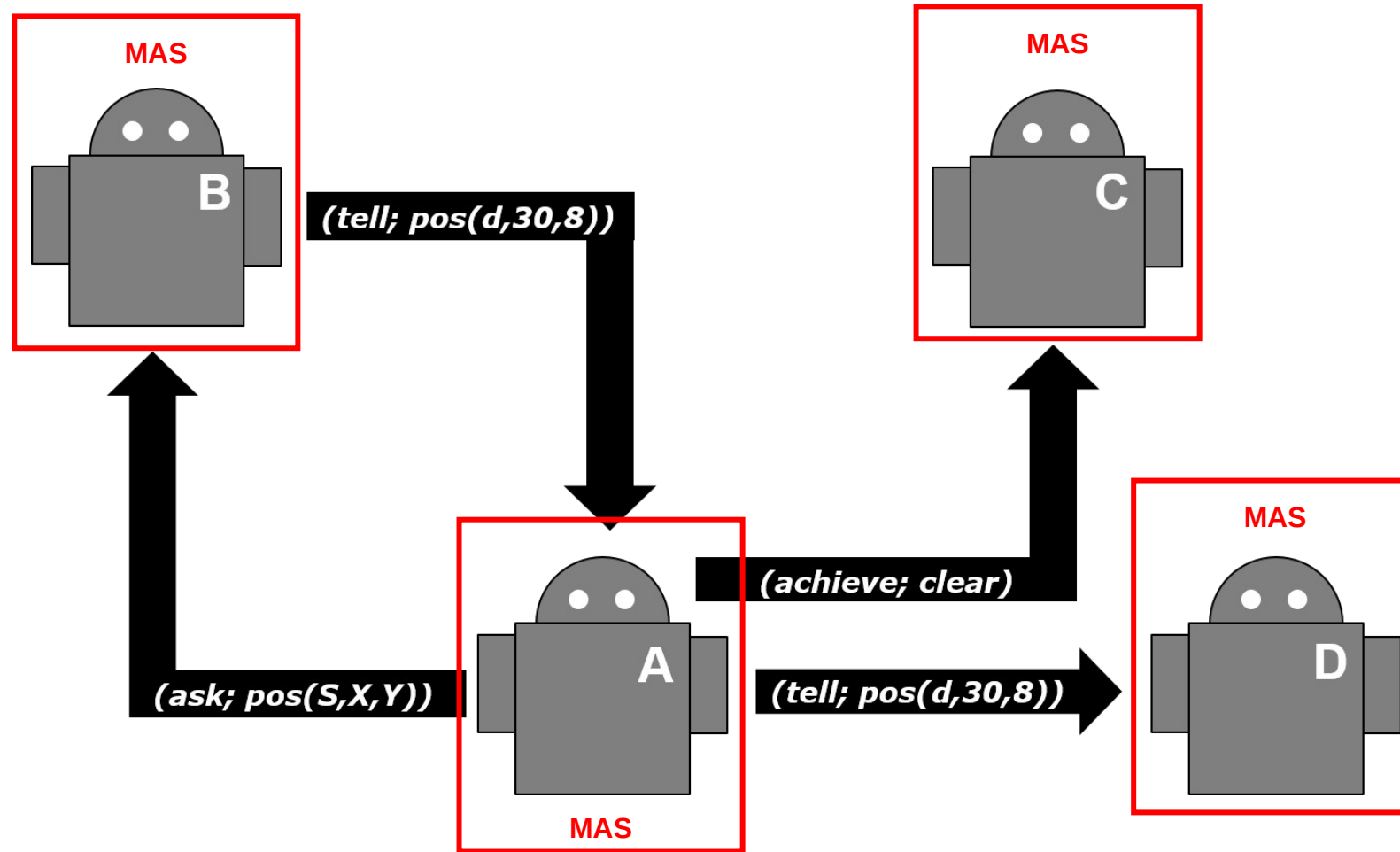
# COMMUNICATION BETWEEN EMBEDDED MAS

# Open Multi-Agent System

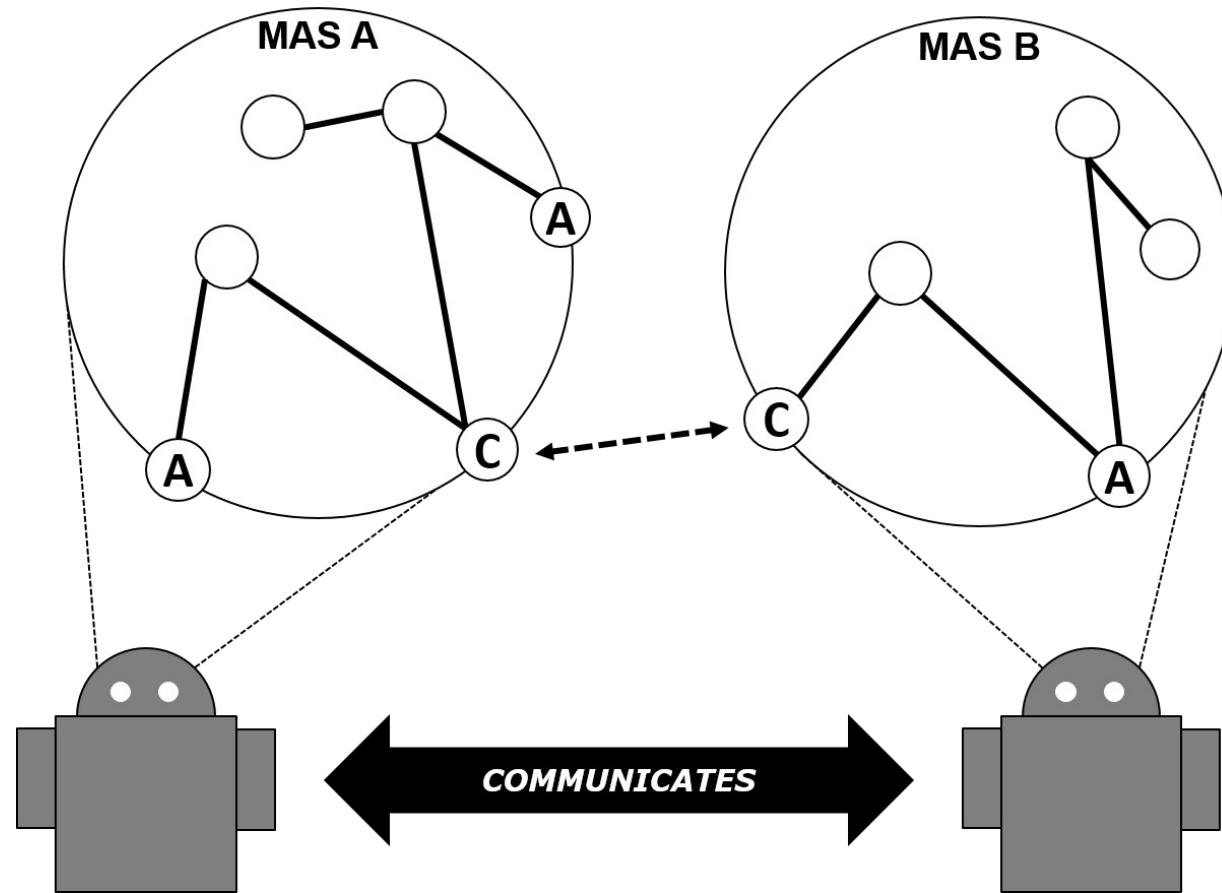
Um SMA pode ser Aberto, dessa forma é possível:

- troca de mensagens com agentes estrangeiros;
- entrada ou saída de agentes no SMA.

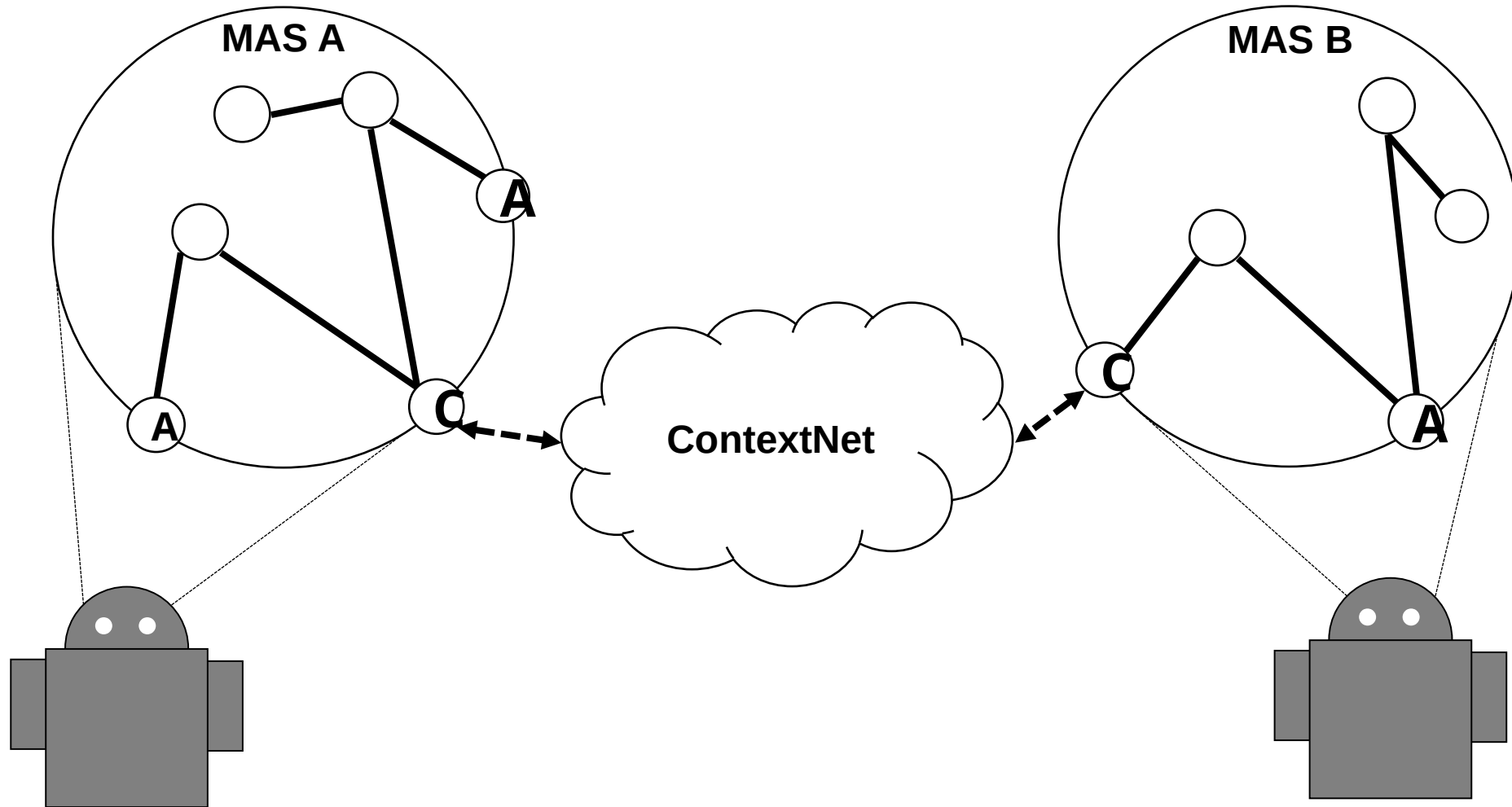
# Open MultiAgent System



# Agentes Comunicadores



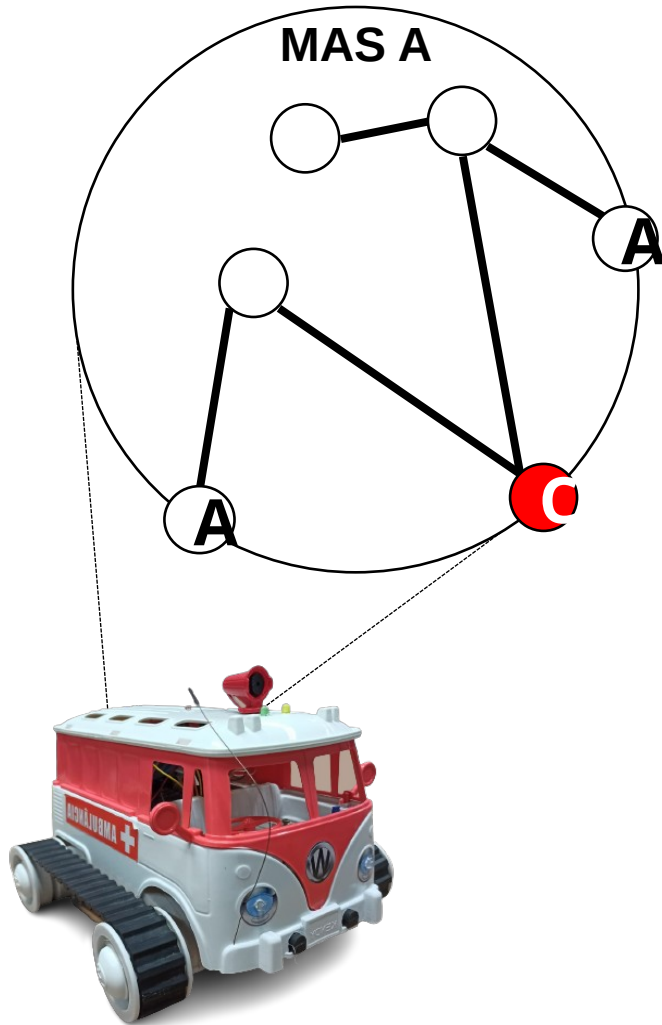
# Agentes Comunicadores: Middleware IoT



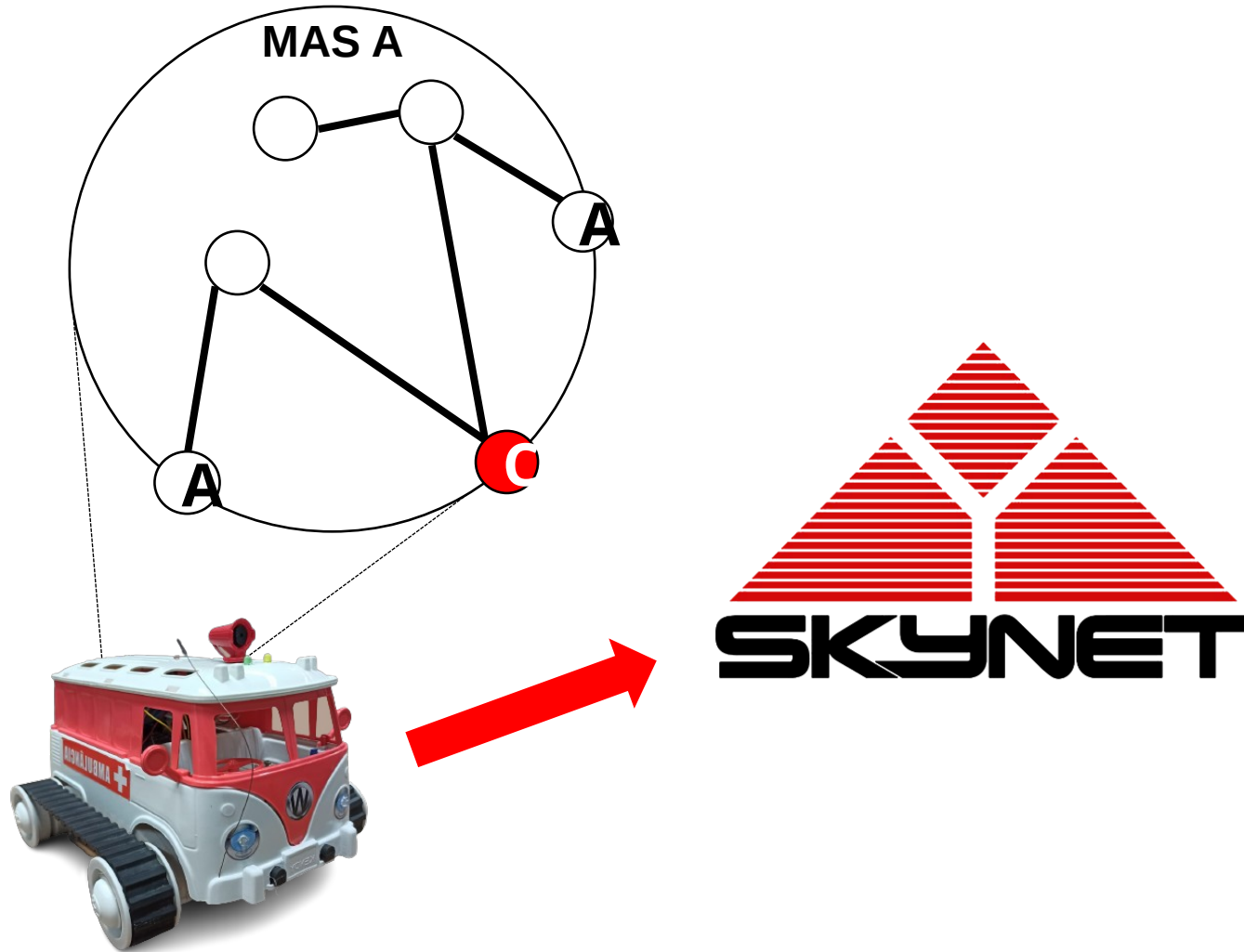
# Agentes Comunicadores: Middleware IoT

O ContextNet é um *middleware* que visa a **aplicações colaborativas** abrangentes de pequena e grande escala, como **monitoramento on-line** ou **coordenações de atividades** de **entidades móveis** e **compartilhamento de informações**.

# Agentes Comunicadores: Middleware IoT

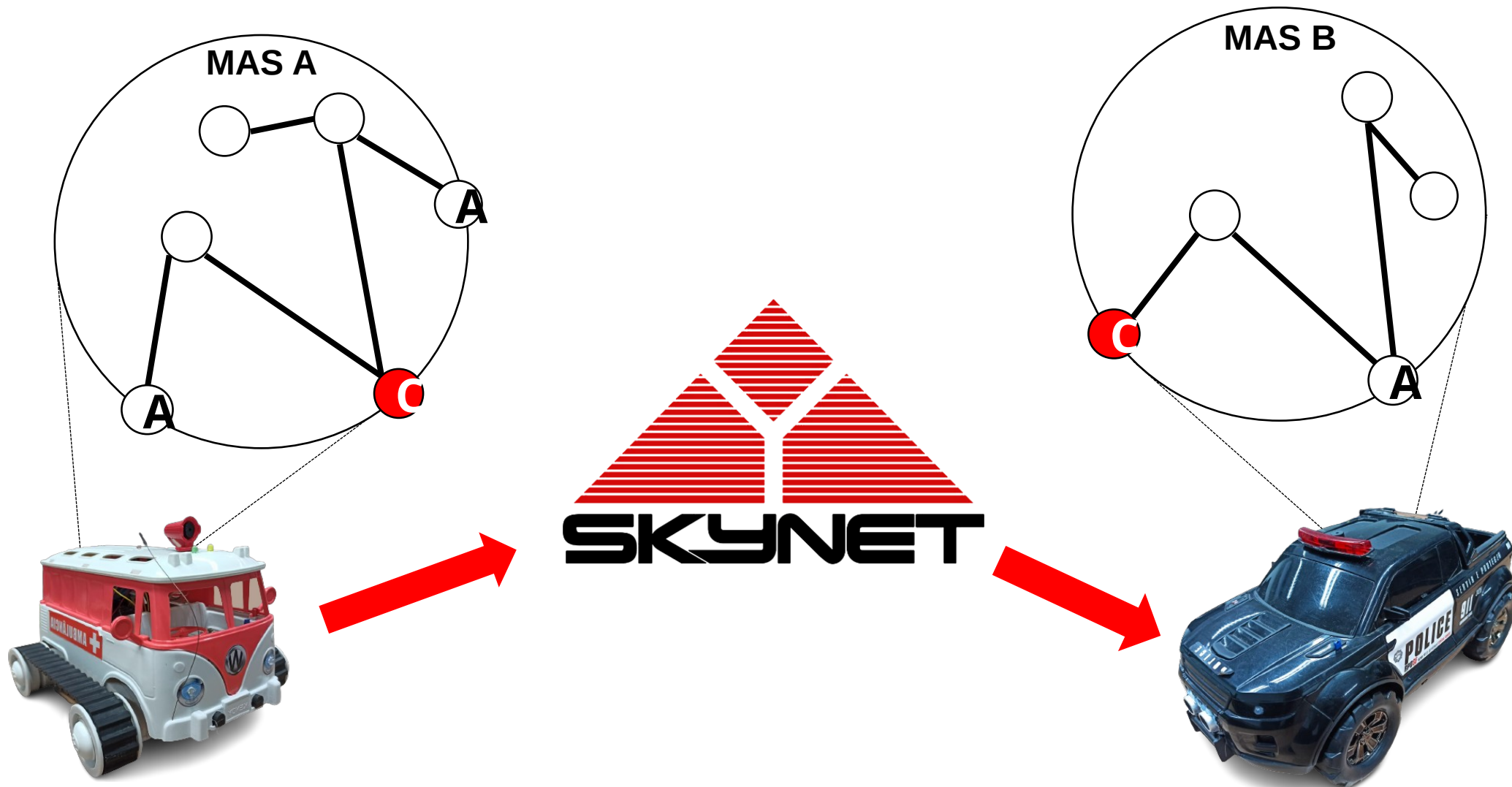


# Agentes Comunicadores: Middleware IoT

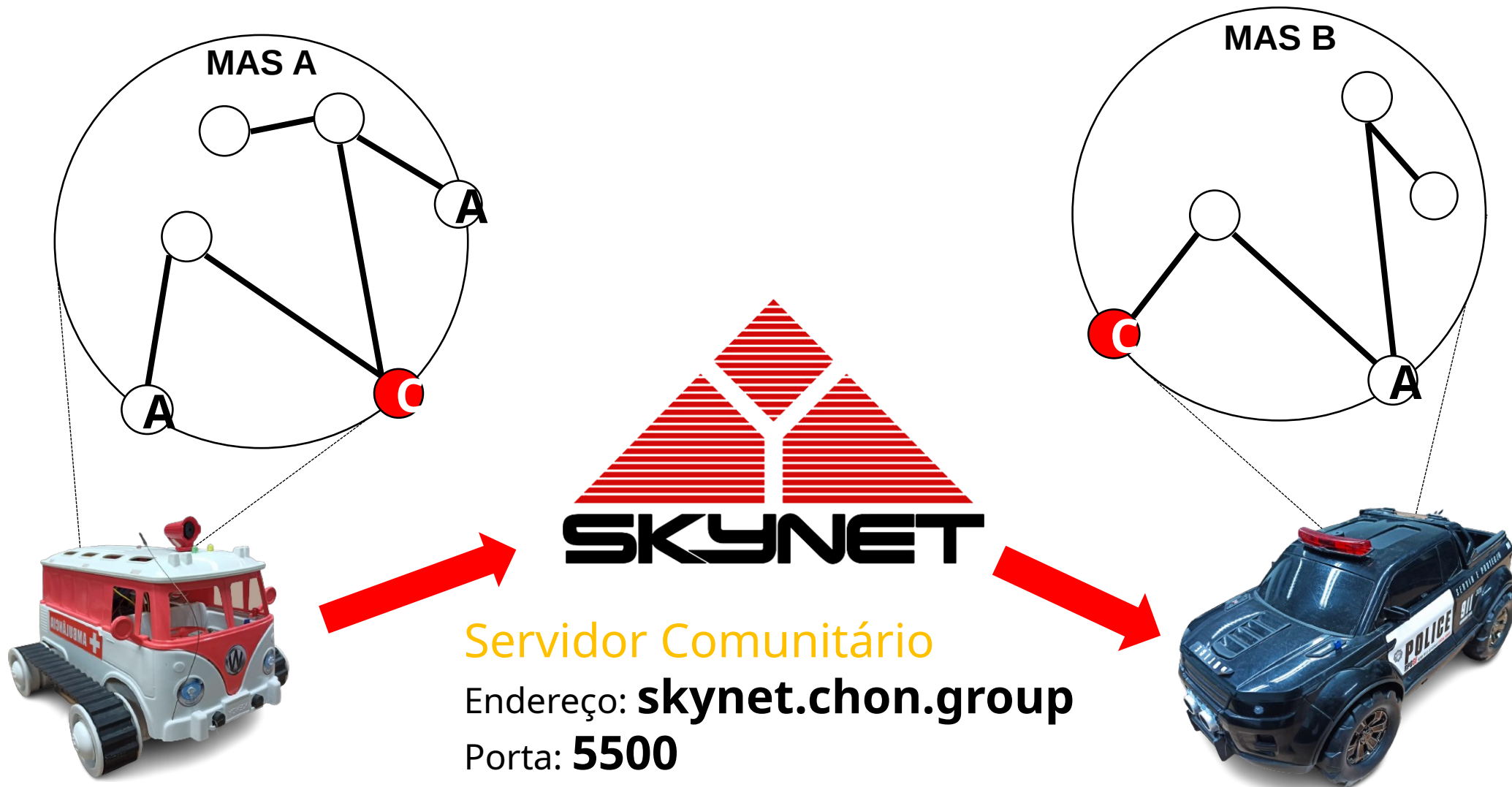




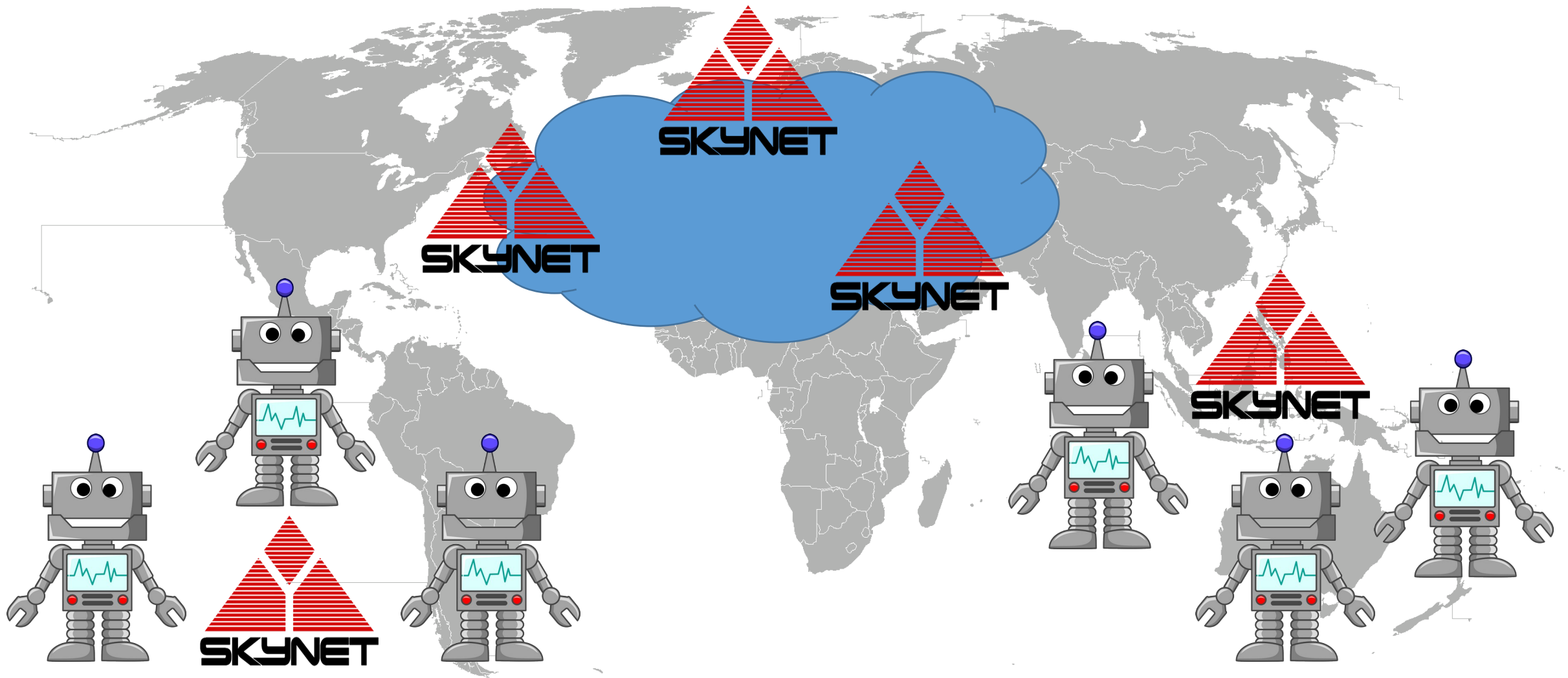
# Agentes Comunicadores: Middleware IoT



# Agentes Comunicadores: Middleware IoT



# SkynetServer: Geograficamente Distribuídos



# Agentes Comunicadores: Ações Internas

- **Communicator** Internal Actions:

**.sendOut**(agentUuid, force, message)

envia uma mensagem de um agente comunicador para outro comunicador de um SMA distinto.

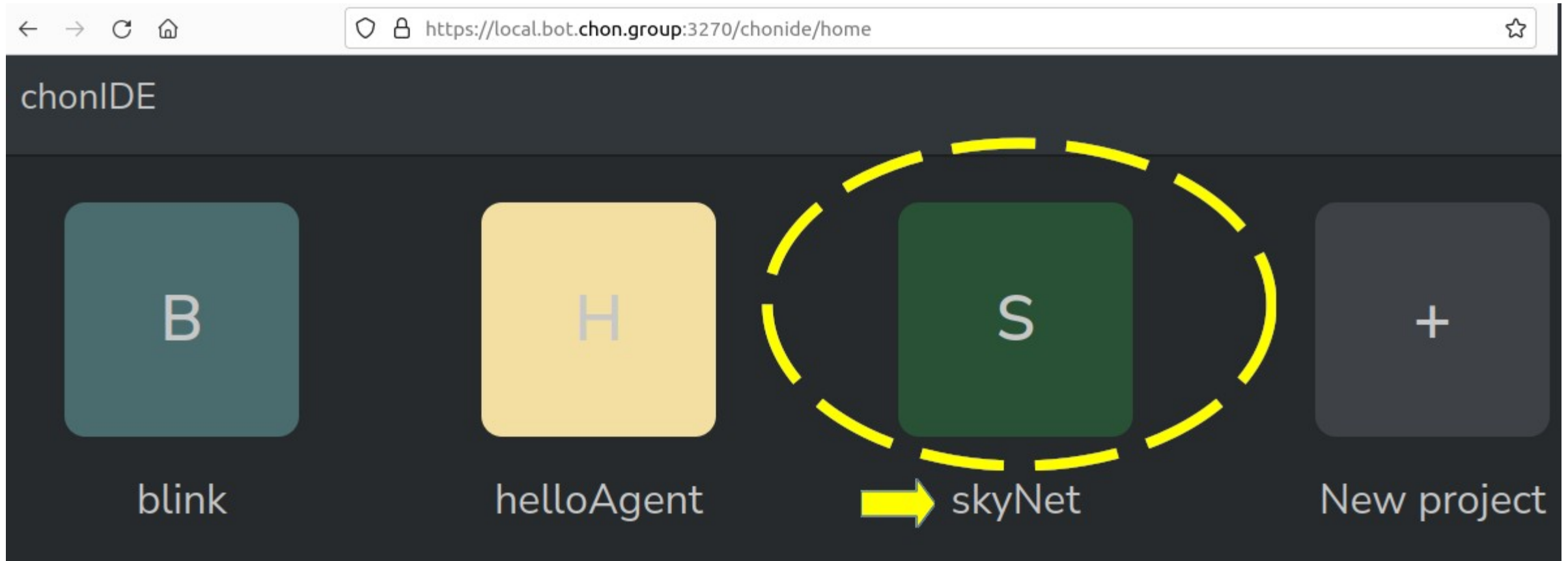
**.connectCN**(servidor, porta, UUID)

se conecta ao servidor IoT com um id específico para o agente.

**.disconnectCN**

desconecta do servidor IoT atualmente conectado.

# Hello SkyNet



# Hello SkyNet

The screenshot shows the chonIDE interface. At the top, there's a toolbar with a green play button (labeled '2' with a yellow arrow) and a red stop button. Below the toolbar, the 'skyNet' project is selected, showing a tree view on the left with 'Multi-Agent System' expanded, containing 'Agents' (with 'kirk' and 'uhura' sub-items) and 'Firmware'. The main editor displays code for the 'kirk' agent. Line 7, 'gateway("YOUR-SERVER-IPv4",5500).', is highlighted in blue and labeled '1' with a yellow arrow. The code includes comments about UUID generation and a public IoT gateway, and ends with a test communication function.

```
/* To generate a random UUID use https://www.uuidgenerator.net/ */
kirkUUID("80d9c5b3-5327-4836-b722-7481061affef").
uhuraUUID("af467a22-eafc-4e87-9f57-882740ab0710").

/* We provide a Public IoT Gateway, more info in https://doi.org/10.5753
/wei.2023.229753 */
gateway("YOUR-SERVER-IPv4",5500).

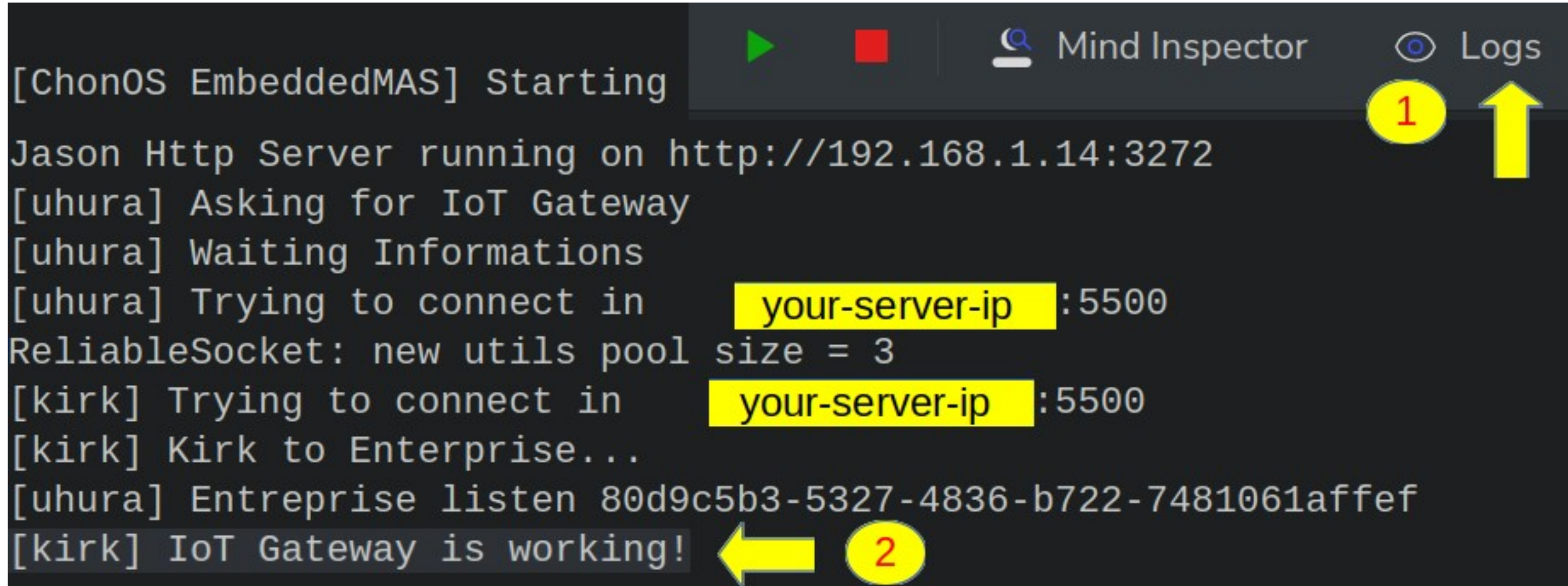
/* Plans */

+!testComm: uhuraUUID(Uhura) & not communication(ok)<-
.print("Kirk to Enterprise...");
```



# Hello SkyNet

```
[ChonOS EmbeddedMAS] Starting
Jason Http Server running on http://192.168.1.14:3272
[uhura] Asking for IoT Gateway
[uhura] Waiting Informations
[uhura] Trying to connect in your-server-ip :5500
ReliableSocket: new utils pool size = 3
[kirk] Trying to connect in your-server-ip :5500
[kirk] Kirk to Enterprise...
[uhura] Enterprise listen 80d9c5b3-5327-4836-b722-7481061affef
[kirk] IoT Gateway is working!
```



# Exemplo: Comunicação entre SMA Embarcados



# Exemplo: Comunicação entre SMA Embarcados



# Exemplo: Comunicação entre SMA Embarcados

agent **scott**



Embedded MAS  
**enterprise**

# Exemplo: Comunicação entre SMA Embarcados

agent **scott**



agent **uhura**



Embedded MAS  
**enterprise**

# Exemplo: Comunicação entre SMA Embarcados

agent **scott**

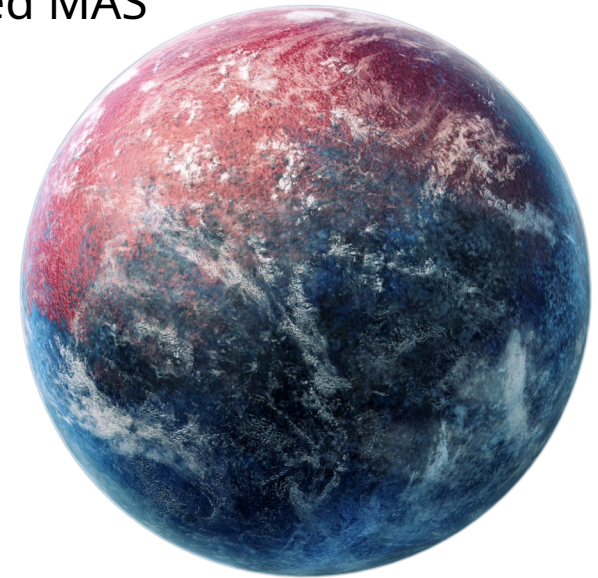


agent **uhura**



Embedded MAS  
**enterprise**

Embedded MAS  
**bajor**





# Exemplo: Comunicação entre SMA Embarcados

agent **scott**



agent **uhura**

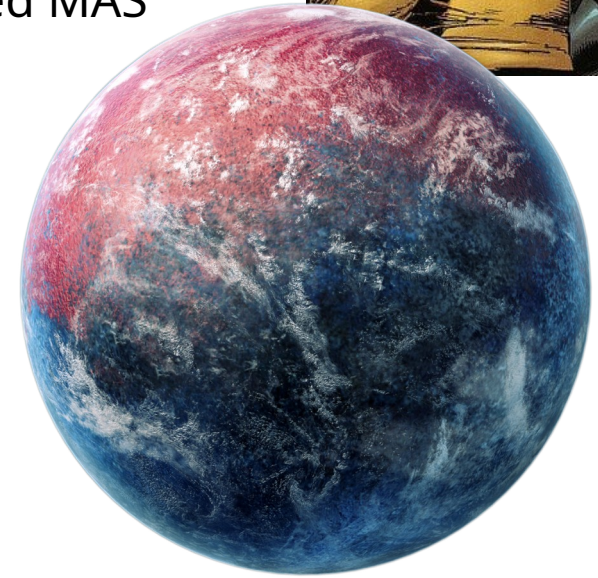


Embedded MAS  
**enterprise**

agent **kirk**



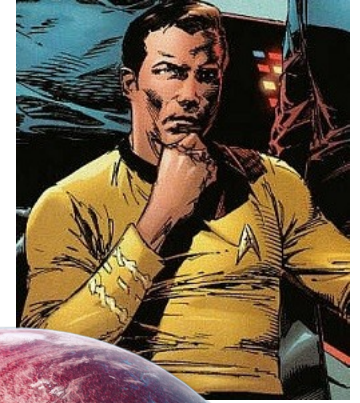
Embedded MAS  
**bajor**



# Exemplo: Comunicação entre SMA Embarcados



This is Lieutenant  
Nyota Uhura,  
Communications  
officer.



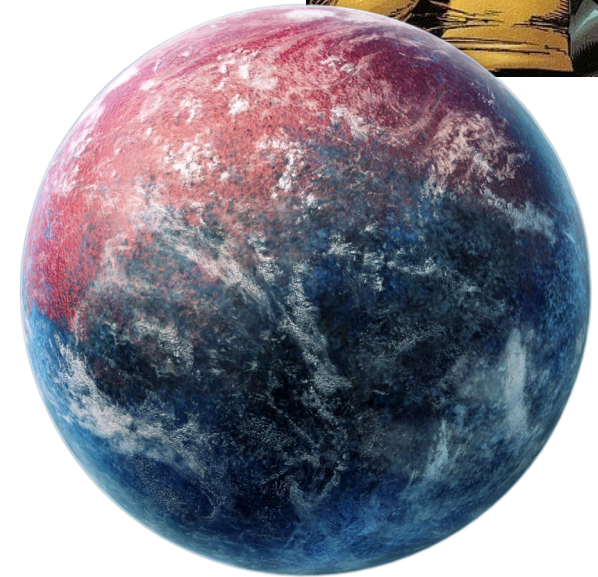
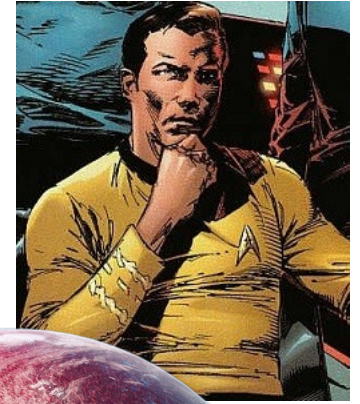


# Exemplo: Comunicação entre SMA Embarcados



This is Lieutenant  
Nyota Uhura,  
Communications  
officer.

Kirk to Enterprise...  
Damage report!



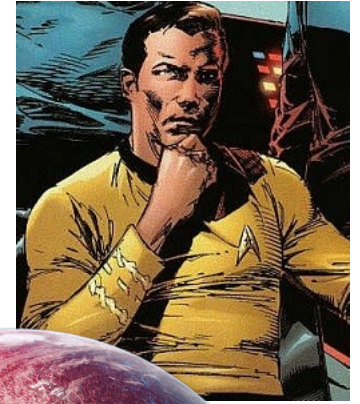
# Exemplo: Comunicação entre SMA Embarcados



This is Lieutenant  
Nyota Uhura,  
Communications  
officer.

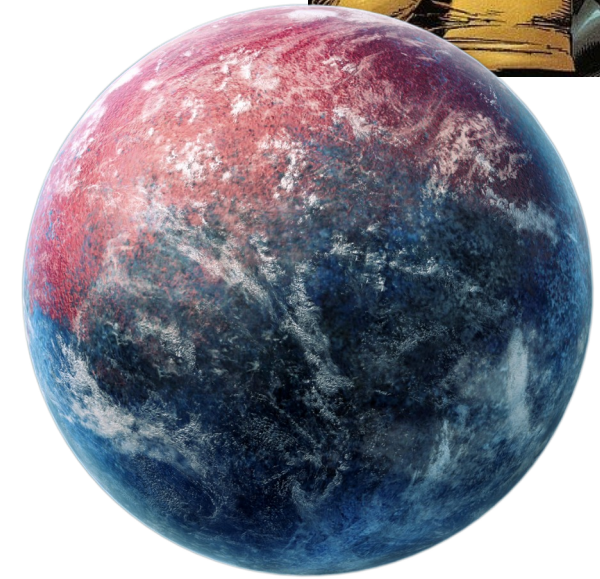
Kirk to Enterprise...  
Damage report!

Commander Kirk, Deck  
2 compromised!





# Exemplo: Comunicação entre SMA Embarcados



# Exemplo: Comunicação entre SMA Embarcados



<https://github.com/chon-group/distributedAndEmbeddedAI/tree/main/04-LimitedOpenMAS/examples/StarTrek>