

# Verificação de implementação de protocolo de rede

**Instituto Federal do Paraná**

Welliton Fernandes Leal

# REDES

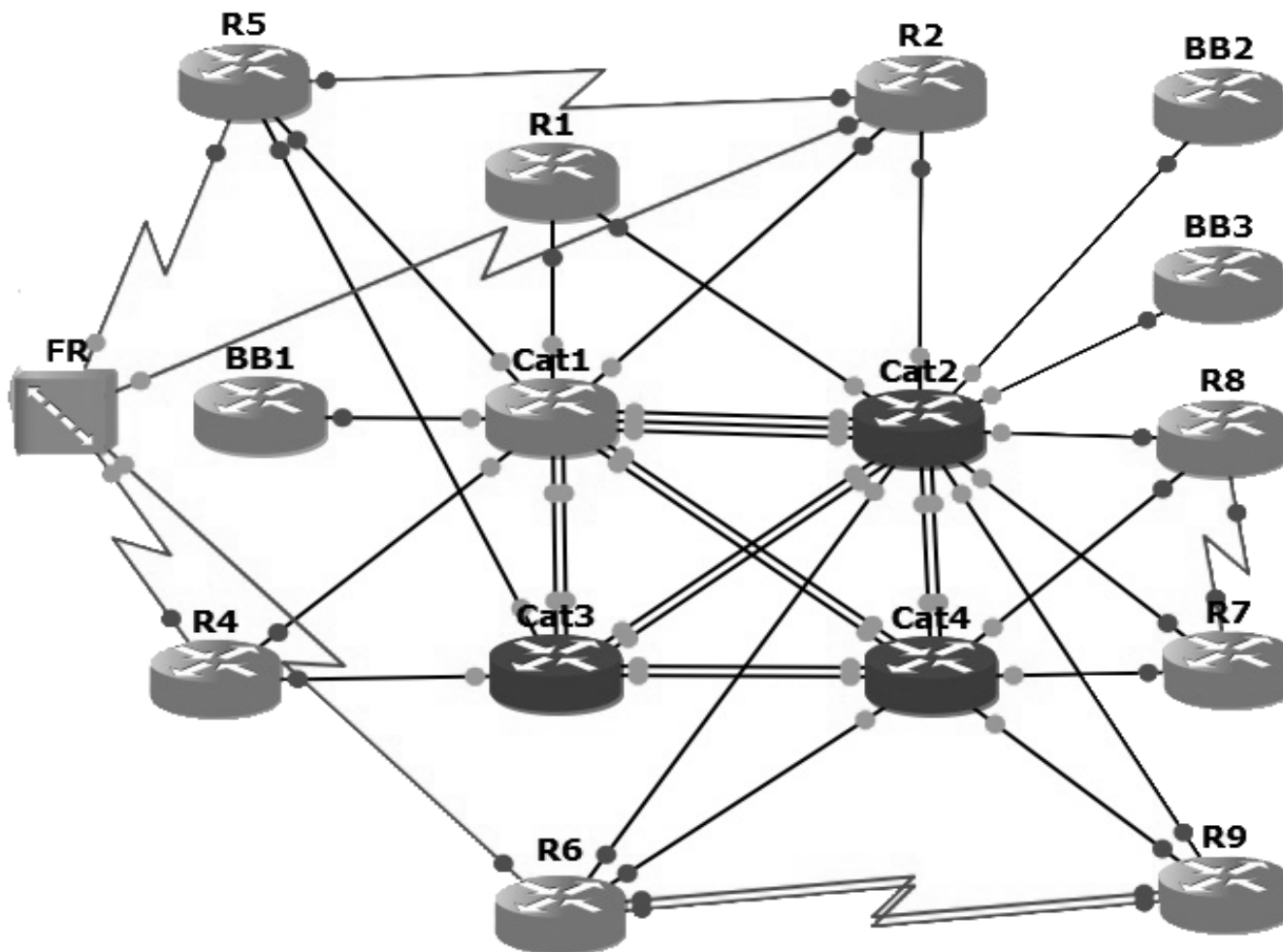


**PROTOS**

# **VERIFICAÇÃO DE PROTOCOLOS**

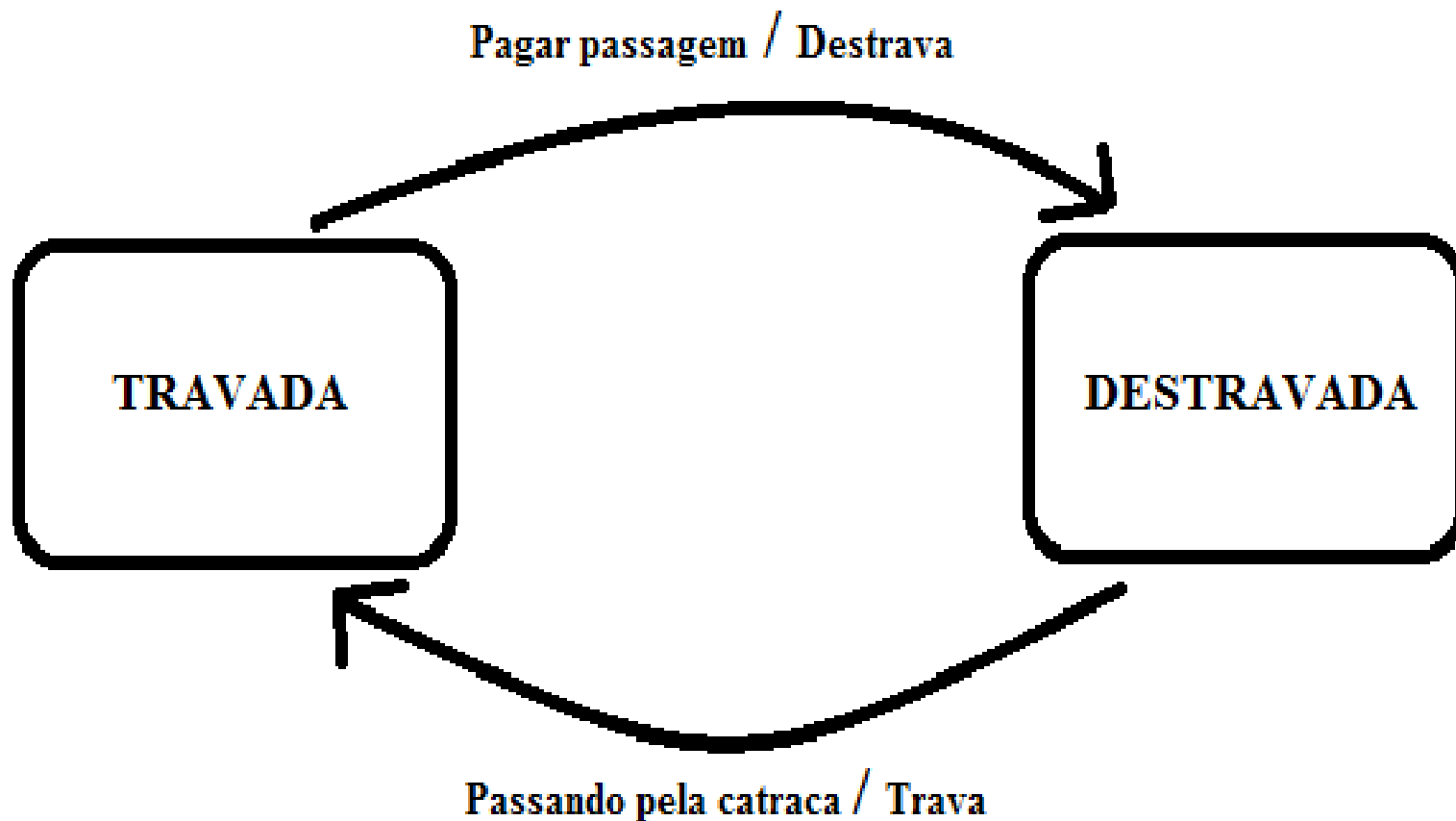
# MÉTODOS

- Simulações



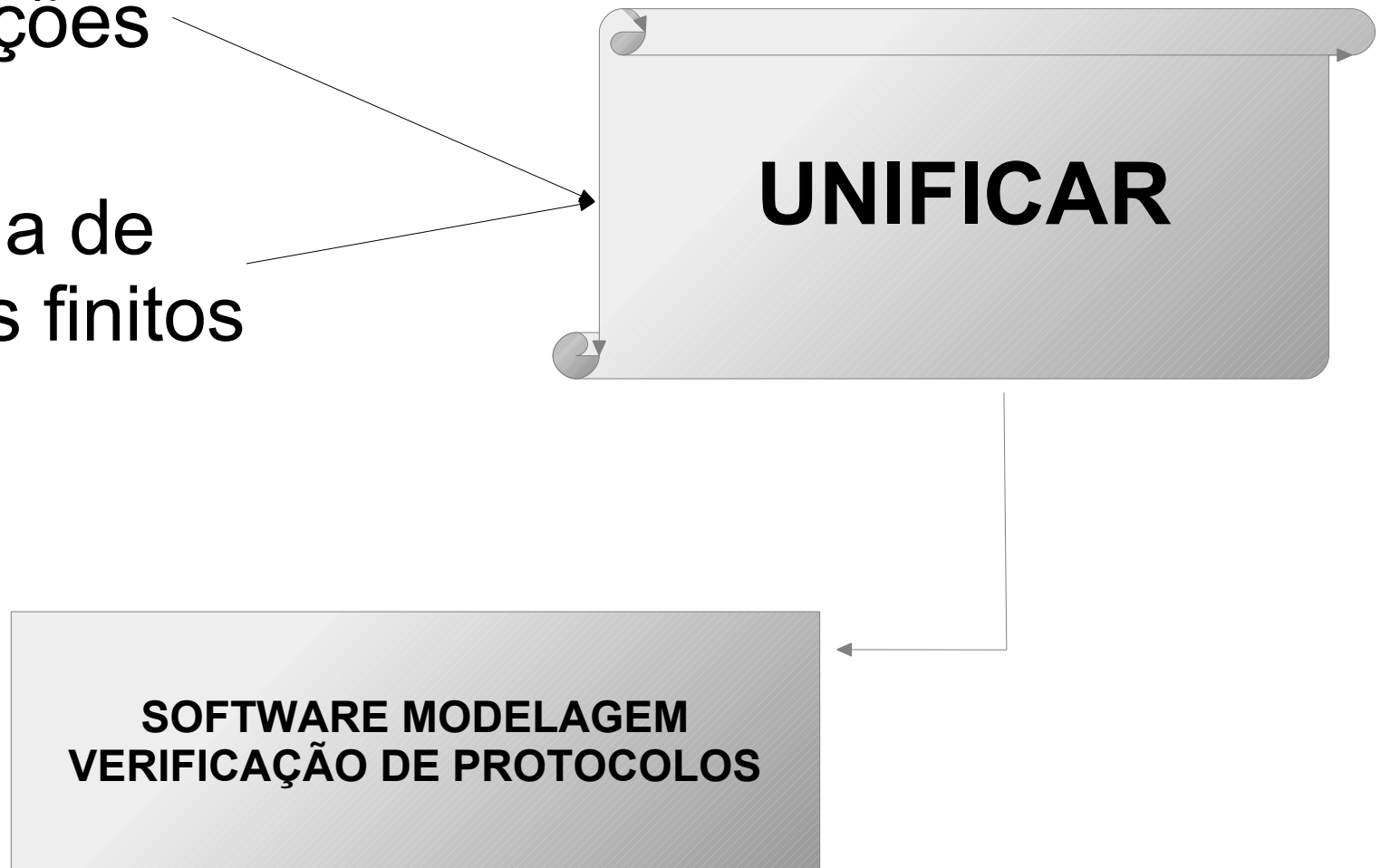
# MÉTODOS

- Máquina de estados finitos



# OBJETIVO

- Simulações
- Máquina de estados finitos



# **SIMULAÇÕES DE REDE**



# ANÁLISE

- **GNS3** – Graphical Network Simulator 3



- **OPNET** – Optimized Network Engineering Tools



- **NS2** – Network Simulator 2



**SOFTWARE DEFINIDO**

# SIMULAÇÕES

## Network Simulator 2



- Criação de *scripts*;
- Execução dos *scripts*;
- Análise do arquivo de saída *trace*;

# ANÁLISE DO ARQUIVO

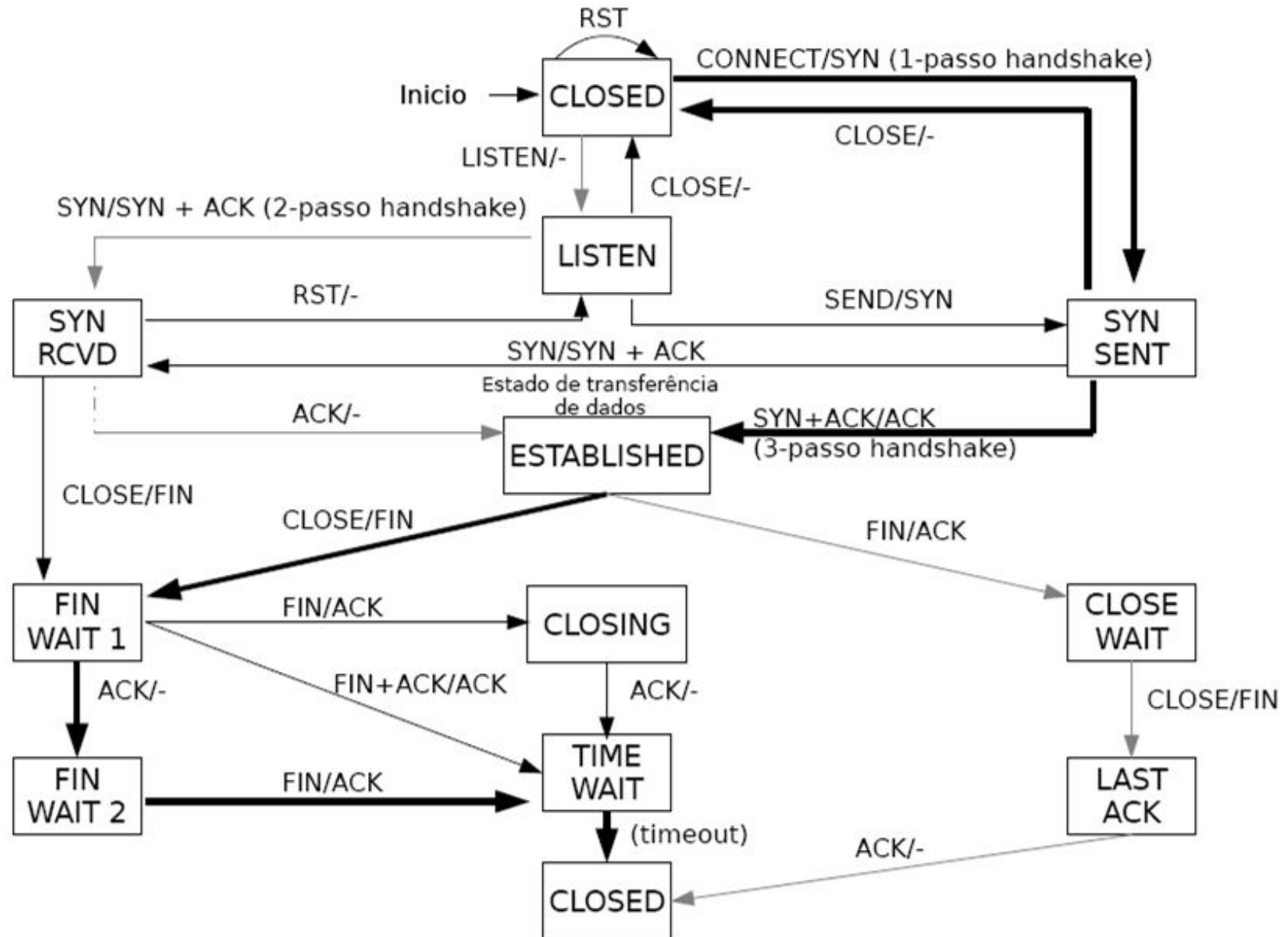
- Análise do arquivo de saída ***trace***;

```
AODV_final.trace
45 M 0.00000 13 (2500.00, 350.00, 0.00), (2500.00, 350.00), 0.00
46 M 0.00000 28 (2500.00, 490.00, 0.00), (2500.00, 490.00), 0.00
47 M 0.00000 43 (2500.00, 630.00, 0.00), (2500.00, 630.00), 0.00
48 M 0.00000 14 (2670.00, 320.00, 0.00), (2670.00, 320.00), 0.00
49 M 0.00000 29 (2670.00, 460.00, 0.00), (2670.00, 460.00), 0.00
50 M 0.00000 44 (2670.00, 600.00, 0.00), (2670.00, 600.00), 0.00
51 s 0.020000000 _0_ AGT --- 0 tcp 40 [0 0 0 0] [0:0 15:1 32 0] [0 0] 0 0
52 r 0.020000000 _0_ RTR --- 0 tcp 40 [0 0 0 0] [0:0 15:1 32 0] [0 0] 0 0
53 s 0.020000000 _1_ AGT --- 1 tcp 40 [0 0 0 0] [1:0 25:1 32 0] [0 0] 0 0
54 r 0.020000000 _1_ RTR --- 1 tcp 40 [0 0 0 0] [1:0 25:1 32 0] [0 0] 0 0
55 s 0.020000000 _16_ AGT --- 2 tcp 40 [0 0 0 0] [16:0 41:1 32 0] [0 0] 0 0
56 r 0.020000000 _16_ RTR --- 2 tcp 40 [0 0 0 0] [16:0 41:1 32 0] [0 0] 0 0
57 s 0.020000000 _31_ AGT --- 3 tcp 40 [0 0 0 0] [31:0 42:1 32 0] [0 0] 0 0
58 r 0.020000000 _31_ RTR --- 3 tcp 40 [0 0 0 0] [31:0 42:1 32 0] [0 0] 0 0
59 s 0.020000000 _46_ AGT --- 4 tcp 40 [0 0 0 0] [46:0 7:1 32 0] [0 0] 0 0
60 r 0.020000000 _46_ RTR --- 4 tcp 40 [0 0 0 0] [46:0 7:1 32 0] [0 0] 0 0
61 s 0.020000000 _0_ RTR --- 0 AODV 48 [0 0 0 0] [0:255 -1:255 30 0] [0x2 1 1 [15 0] [0 4]] (REQUEST)
62 s 0.020000000 _1_ RTR --- 0 AODV 48 [0 0 0 0] [1:255 -1:255 30 0] [0x2 1 1 [25 0] [1 4]] (REQUEST)
63 s 0.020000000 _16_ RTR --- 0 AODV 48 [0 0 0 0] [16:255 -1:255 30 0] [0x2 1 1 [41 0] [16 4]] (REQUEST)
64 s 0.020000000 _31_ RTR --- 0 AODV 48 [0 0 0 0] [31:255 -1:255 30 0] [0x2 1 1 [42 0] [31 4]] (REQUEST)
65 s 0.020000000 _46_ RTR --- 0 AODV 48 [0 0 0 0] [46:255 -1:255 30 0] [0x2 1 1 [7 0] [46 4]] (REQUEST)
66 s 0.020075000 _1_ MAC --- 0 AODV 106 [0 ffffffff 1 800] [1:255 -1:255 30 0] [0x2 1 1 [25 0] [1 4]] (REQUEST)
67 r 0.020923467 _16_ MAC --- 0 AODV 48 [0 ffffffff 1 800] [1:255 -1:255 30 0] [0x2 1 1 [25 0] [1 4]] (REQUEST)
68 r 0.020923647 _0_ MAC --- 0 AODV 48 [0 ffffffff 1 800] [1:255 -1:255 30 0] [0x2 1 1 [25 0] [1 4]] (REQUEST)
69 r 0.020923687 _2_ MAC --- 0 AODV 48 [0 ffffffff 1 800] [1:255 -1:255 30 0] [0x2 1 1 [25 0] [1 4]] (REQUEST)
70 r 0.020923731 _17_ MAC --- 0 AODV 48 [0 ffffffff 1 800] [1:255 -1:255 30 0] [0x2 1 1 [25 0] [1 4]] (REQUEST)
71 r 0.020923732 _15_ MAC --- 0 AODV 48 [0 ffffffff 1 800] [1:255 -1:255 30 0] [0x2 1 1 [25 0] [1 4]] (REQUEST)
72 r 0.020948467 _16_ RTR --- 0 AODV 48 [0 ffffffff 1 800] [1:255 -1:255 30 0] [0x2 1 1 [25 0] [1 4]] (REQUEST)
73 r 0.020948647 _0_ RTR --- 0 AODV 48 [0 ffffffff 1 800] [1:255 -1:255 30 0] [0x2 1 1 [25 0] [1 4]] (REQUEST)
74 r 0.020948687 _2_ RTR --- 0 AODV 48 [0 ffffffff 1 800] [1:255 -1:255 30 0] [0x2 1 1 [25 0] [1 4]] (REQUEST)
75 r 0.020948731 _17_ RTR --- 0 AODV 48 [0 ffffffff 1 800] [1:255 -1:255 30 0] [0x2 1 1 [25 0] [1 4]] (REQUEST)
76 r 0.020948732 _15_ RTR --- 0 AODV 48 [0 ffffffff 1 800] [1:255 -1:255 30 0] [0x2 1 1 [25 0] [1 4]] (REQUEST)
77 s 0.021193467 _16_ MAC --- 0 AODV 106 [0 ffffffff 10 800] [16:255 -1:255 30 0] [0x2 1 1 [41 0] [16 4]] (REQUEST)
78 s 0.021224041 _16_ RTR --- 0 AODV 48 [0 ffffffff 1 800] [16:255 -1:255 29 0] [0x2 2 1 [25 0] [1 4]] (REQUEST)
79 r 0.022041933 _1_ MAC --- 0 AODV 48 [0 ffffffff 10 800] [16:255 -1:255 30 0] [0x2 1 1 [41 0] [16 4]] (REQUEST)
80 r 0.022041933 _31_ MAC --- 0 AODV 48 [0 ffffffff 10 800] [16:255 -1:255 30 0] [0x2 1 1 [41 0] [16 4]] (REQUEST)
81 r 0.022042108 _15_ MAC --- 0 AODV 48 [0 ffffffff 10 800] [16:255 -1:255 30 0] [0x2 1 1 [41 0] [16 4]] (REQUEST)
82 r 0.022042154 _17_ MAC --- 0 AODV 48 [0 ffffffff 10 800] [16:255 -1:255 30 0] [0x2 1 1 [41 0] [16 4]] (REQUEST)
83 r 0.022042198 _32_ MAC --- 0 AODV 48 [0 ffffffff 10 800] [16:255 -1:255 30 0] [0x2 1 1 [41 0] [16 4]] (REQUEST)
84 r 0.022042216 _30_ MAC --- 0 AODV 48 [0 ffffffff 10 800] [16:255 -1:255 30 0] [0x2 1 1 [41 0] [16 4]] (REQUEST)
85 r 0.022066933 _1_ RTR --- 0 AODV 48 [0 ffffffff 10 800] [16:255 -1:255 30 0] [0x2 1 1 [41 0] [16 4]] (REQUEST)
86 r 0.022066933 _31_ RTR --- 0 AODV 48 [0 ffffffff 10 800] [16:255 -1:255 30 0] [0x2 1 1 [41 0] [16 4]] (REQUEST)
87 r 0.022067108 _15_ RTR --- 0 AODV 48 [0 ffffffff 10 800] [16:255 -1:255 30 0] [0x2 1 1 [41 0] [16 4]] (REQUEST)
88 r 0.022067154 _17_ RTR --- 0 AODV 48 [0 ffffffff 10 800] [16:255 -1:255 30 0] [0x2 1 1 [41 0] [16 4]] (REQUEST)
89 r 0.022067198 _32_ RTR --- 0 AODV 48 [0 ffffffff 10 800] [16:255 -1:255 30 0] [0x2 1 1 [41 0] [16 4]] (REQUEST)
90 r 0.022067216 _30_ RTR --- 0 AODV 48 [0 ffffffff 10 800] [16:255 -1:255 30 0] [0x2 1 1 [41 0] [16 4]] (REQUEST)
91 s 0.022371467 _16_ MAC --- 0 AODV 106 [0 ffffffff 10 800] [16:255 -1:255 29 0] [0x2 2 1 [25 0] [1 4]] (REQUEST)
92 s 0.022810830 _2_ RTR --- 0 AODV 48 [0 ffffffff 1 800] [2:255 -1:255 29 0] [0x2 2 1 [25 0] [1 4]] (REQUEST)
93 s 0.022980767 _32_ RTR --- 0 AODV 48 [0 ffffffff 10 800] [32:255 -1:255 29 0] [0x2 2 1 [41 0] [16 4]] (REQUEST)
94 r 0.023219933 _1_ MAC --- 0 AODV 48 [0 ffffffff 10 800] [16:255 -1:255 29 0] [0x2 2 1 [25 0] [1 4]] (REQUEST)
95 r 0.023219933 _31_ MAC --- 0 AODV 48 [0 ffffffff 10 800] [16:255 -1:255 30 0] [0x2 2 1 [25 0] [1 4]] (REQUEST)
```

# DADOS DA SIMULAÇÃO

Evento	Tempo	Nó Orig.	Nó Dest.	Tipo Pacote	Tam. Pacote	Flags	Id Fluxo	End. Fonte	End. Destino	Num Seq.	Id Pacote
r	1.3556	3	2	ack	40	-----	1	3.0	0.0	15	201
+	1.3556	2	0	ack	40	-----	1	3.0	0.0	15	201
-	1.3556	2	0	ack	40	-----	1	3.0	0.0	15	201
r	1.35576	0	2	tcp	1000	-----	1	0.0	0.0	29	199
+	1.35576	2	3	tcp	1000	-----	1	0.0	3.0	29	199
d	1.35676	2	3	tcp	1000	-----	1	0.0	3.0	29	199
+	1.356	1	2	cbr	1000	-----	2	1.0	3.0	157	207
-	1.356	1	2	cbr	1000	-----	2	1.0	3.1	157	207

# MÁQUINA DE ESTADOS FINITOS

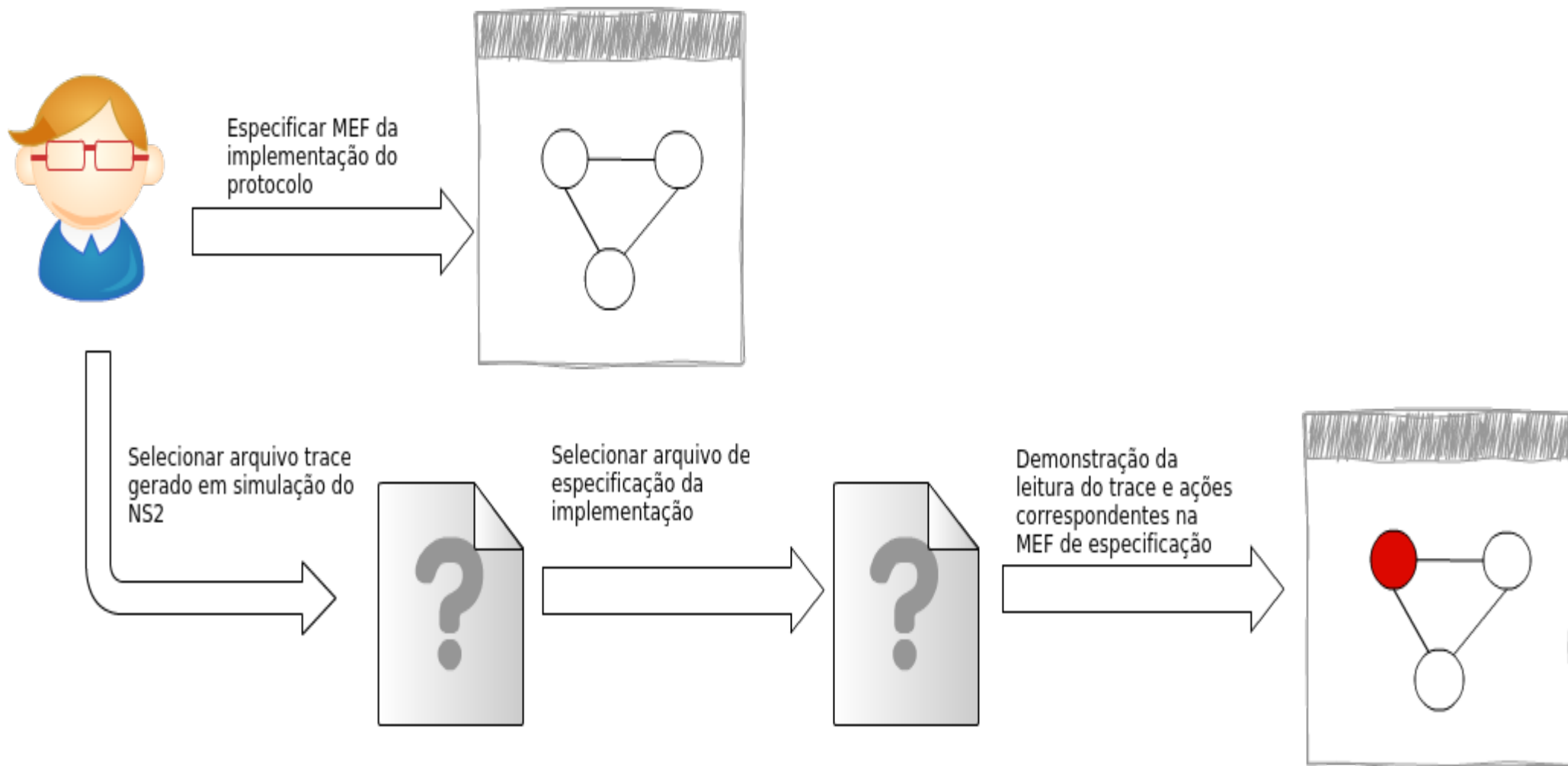


# O QUE SERÁ REALIZADO

- Será desenvolvido uma ferramenta para modelagem dos requisitos do protocolo;
- Através da modelagem será realizada a comparação da **modelagem vs *trace*** da simulação;
- Integração entre as ferramentas.

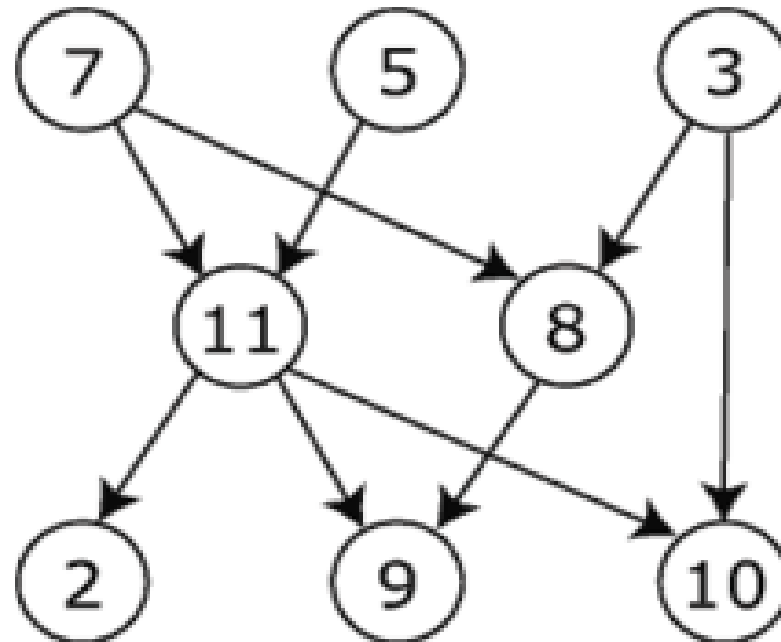


# COMO?





# GRAFOS



# PREFUSE

- **API** – Biblioteca para modelagem, visualização e interação de grafos, tabelas e árvores em java.

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