Modeling and Analysis of the Session Initiation Protocol

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Session Initiation Protocol (SIP)

- SIP is developed by the Internet Engineering Task Force (IETF) and published as Request for Comments (RFC) 3261 in 2002

- SIP is used for initiating, modifying and terminating multimedia sessions over the Internet

- SIP has been recognised as a signaling protocol of the IP Multimedia Subsystem

- SIP is a protocol for VoIP applications

SIP principles

- Personal mobility of users
- Scalability of a network
- Expansibility of the protocol
- Integration into a stack of existing protocols of the Internet
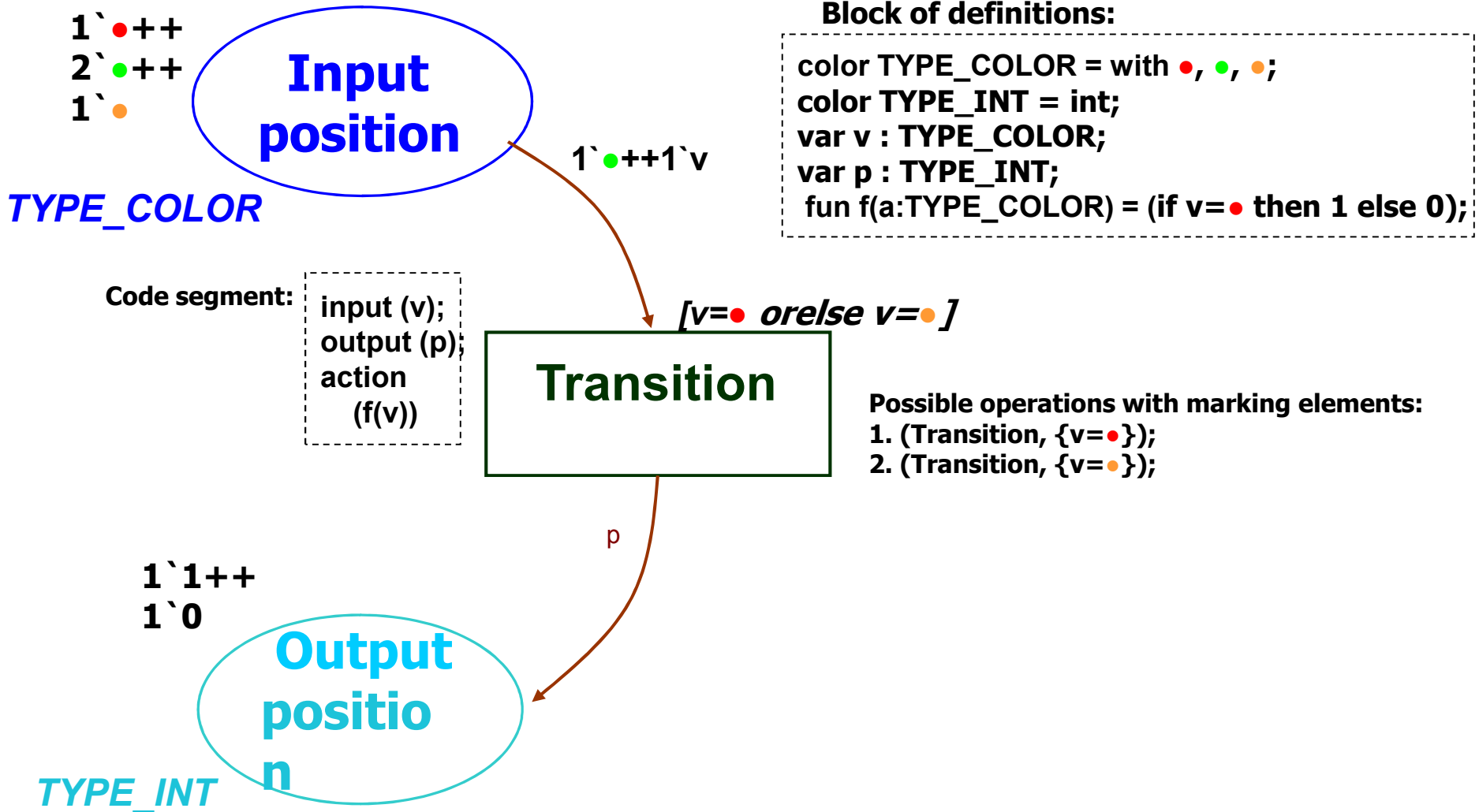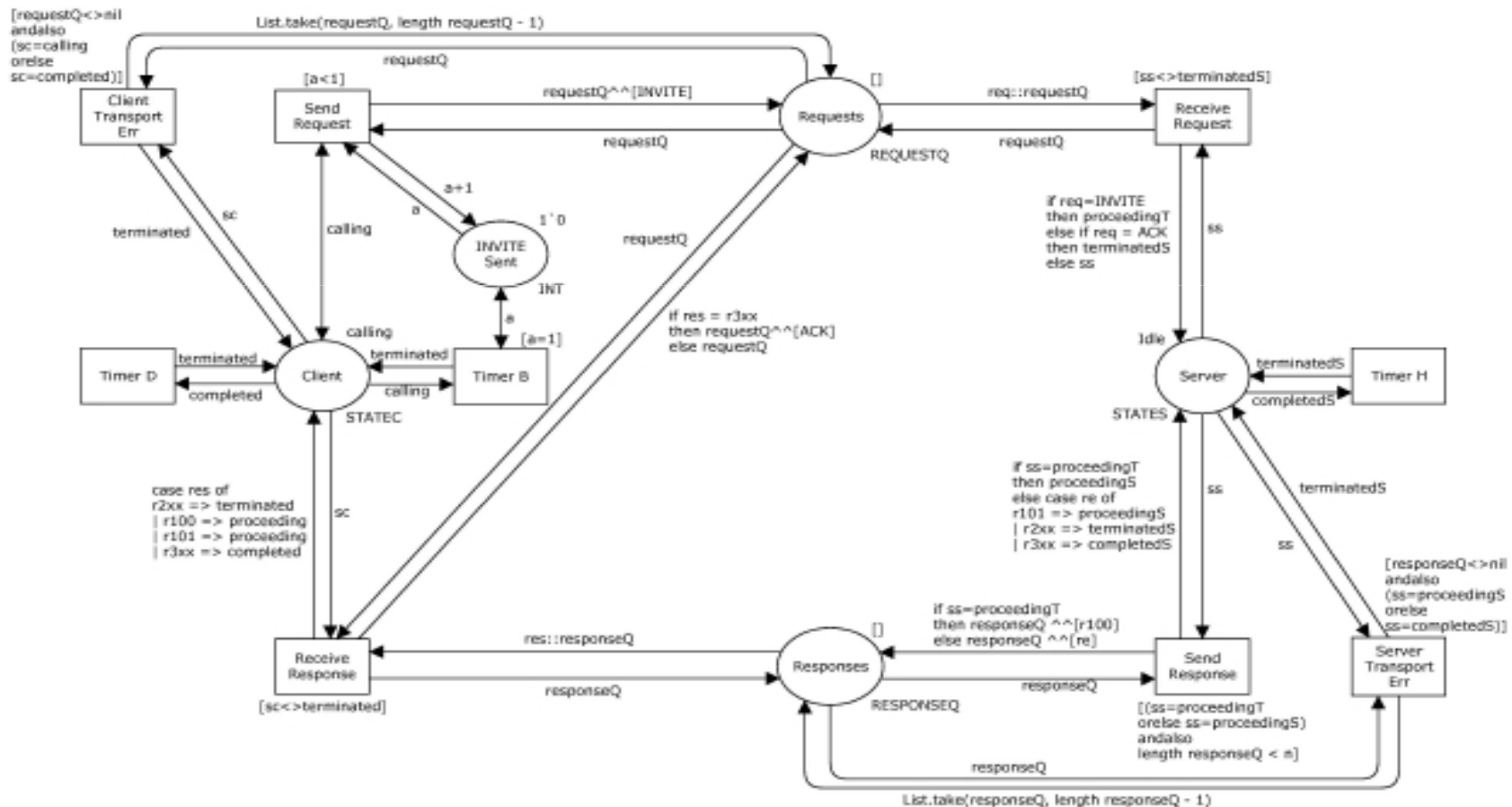- Interaction with other signaling protocols (H.323)

Requests

- **INVITE** * }
- **BYE** } **Have been modeled**
- **ACK**
- **CANCEL**
- **REGISTER**
- **OPTION**

* using work of Lay G. Ding and Lin Liu "Modelling and Analysis of the INVITE Transaction of the Session Initiation Protocol Using Coloured Petri Nets"
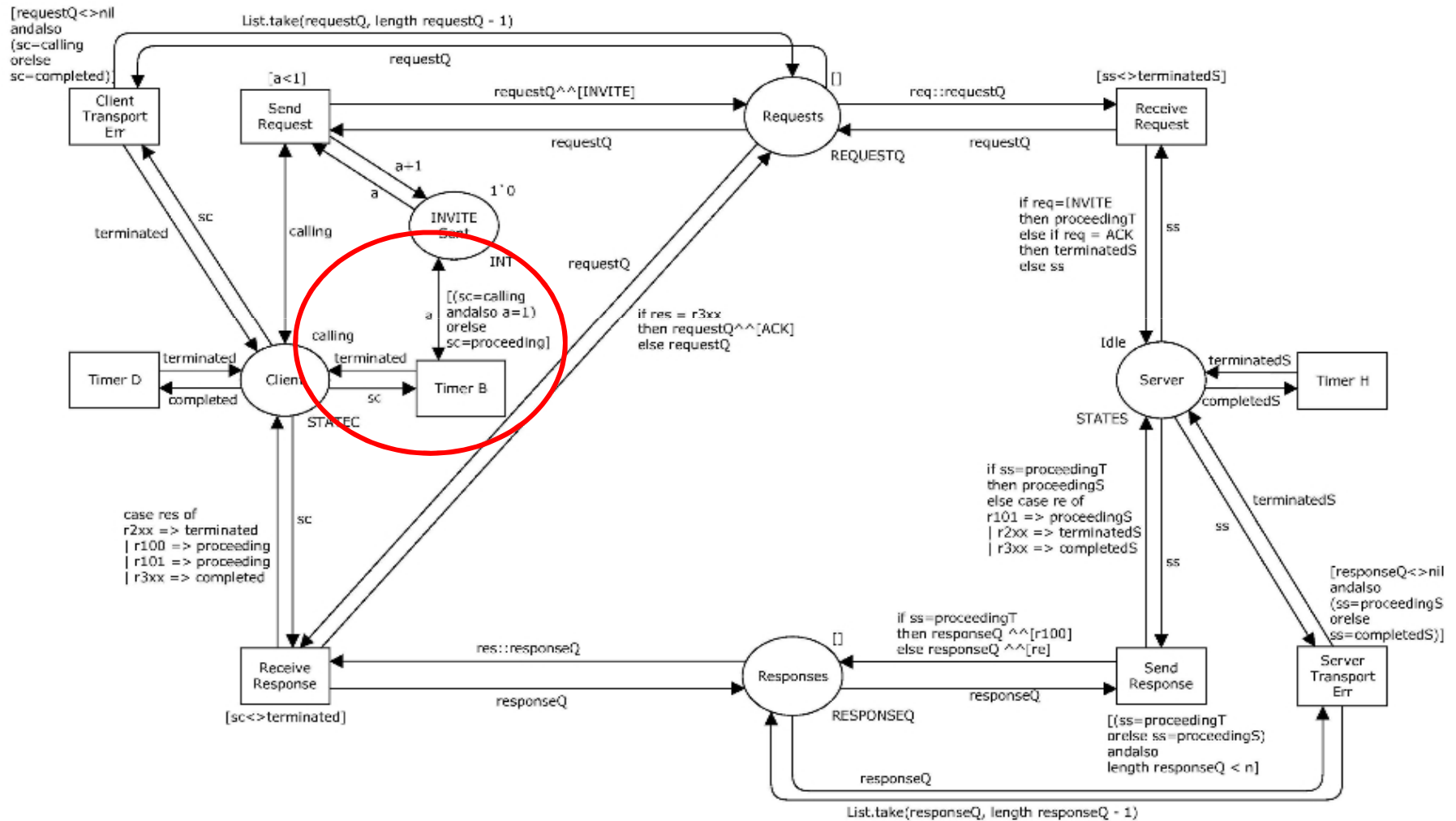
Coloured Petri Nets

1`●++
2`●++
1`●

Input position

TYPE_COLOR

1`●++1`v

Block of definitions:

color TYPE_COLOR = with ●, ●, ●;
color TYPE_INT = int;
var v : TYPE_COLOR;
var p : TYPE_INT;
fun f(a:TYPE_COLOR) = (if v=● then 1 else 0);

Code segment:

input (v);
output (p);
action
(f(v))

Transition

[v=● orelse v=●]

Possible operations with marking elements:
1. (Transition, {v=●});
2. (Transition, {v=●});

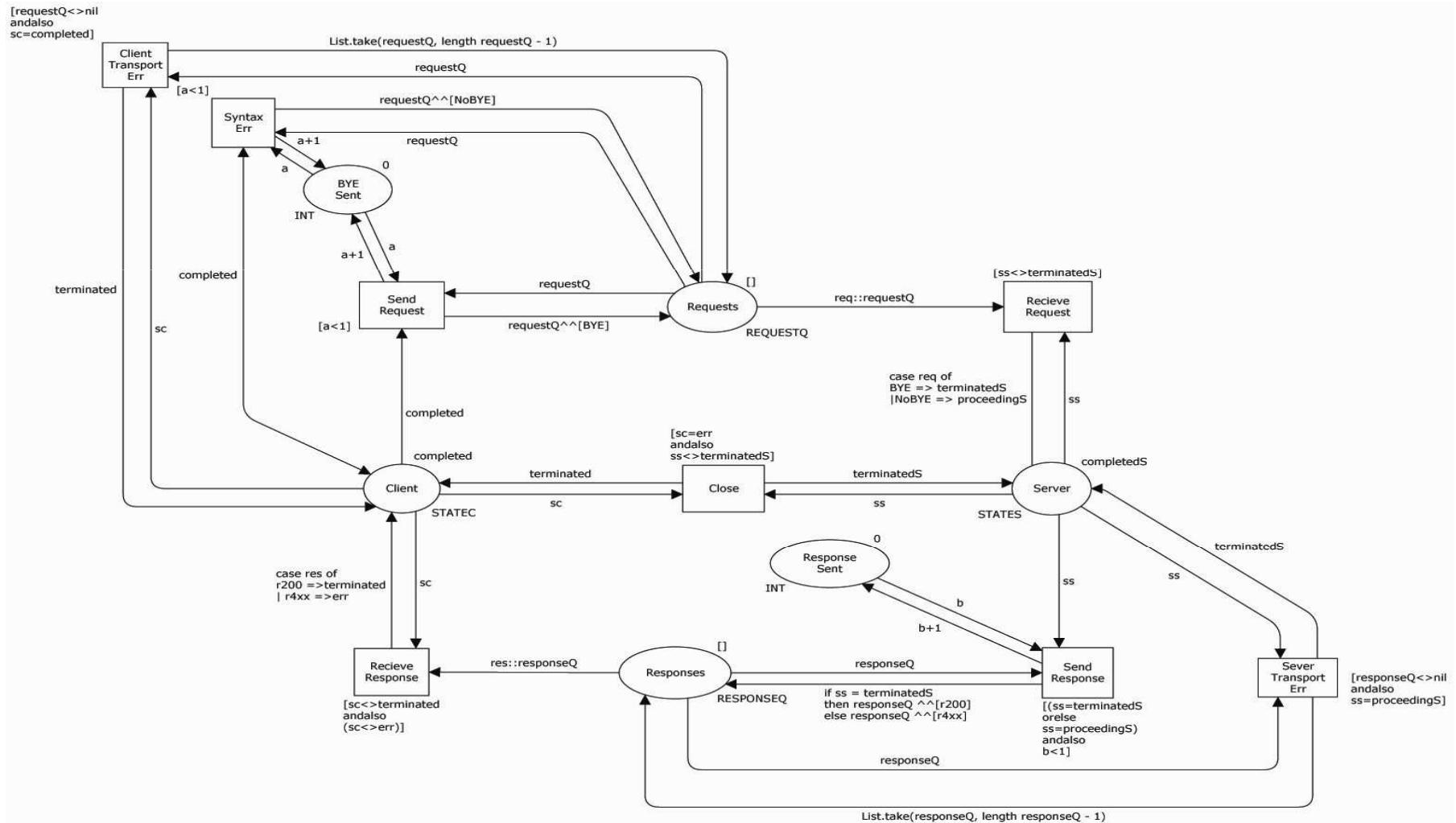p

1`1++
1`0

Output position

TYPE_INT

Modelling of the SIP INVITE Transaction

Analysis and modification

Modelling of the SIP BYE Transaction

Future work

- To model all transactions of SIP

- To verify protocol and make modifications

- To do a model of SIP for unreliable transport medium

Thank for your attention!