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Santa Claus – with Mobile Reindeer and Elves

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Abstract. Mobile processes, along with mobile channels, enable process networks to be dynamic: they may change their size (number of processes, channels, barriers) and shape (connection topology) as they run – much like living organisms. One of the benefits is that all connections do not have to be established statically, in advance of when they are needed and open to abuse. In classical occam, care had to be taken by processes not to use channels when they were not in the right state to use them. With occam-π mobiles, we can arrange that processes simply do not have those channels until they get into the right state – and not having such channels means that their misuse cannot even be expressed! Of course, it is a natural consequence of mobile system design that the arrivals of channels (or barriers or processes) are the very events triggering their exploitation. In our explorations so far with occam-π, we have taken advantage of the mobility of data, channels and barriers and seen very good results. Very little work has been done with mobile processes: the ability to send and receive processes through channels, plug them into local networks, fire them up, stand them down and move them on again. This talk illustrates mobile process design through a solution to Tronø's classical *Santa Claus Problem*. The reindeer and elves are modeled as mobile processes that move through holiday resorts, stables, work benches, waiting rooms, Santa's Grotto and back again. All those destinations are also processes – though static ones. As the reindeer and elves arrive at each stage, they plug in and do business. We will show the occam-π mechanisms supporting mobile processes, confess to one weakness and consider remedies. The occam-π solution did, of course, run correctly the first time it passed the stringent safety checks of the compiler and is available as open source (**http://www.santaclausproblem.net**).

Keywords. mobile processes, mobile design, safety, occam-π, Santa Claus.