

Paper: Efficient Micro-Mobility using Intra-Domain Multicast-based Mechanisms (M&M)

Authors: Ahmed Helmy, Muhammad Jaseemuddin

Review No 1

Summary

The paper proposes a new architecture: an intra-domain multicast based mobility architecture to improve the handoff performance existing in IP mobility protocols. Two approaches to the same are proposed and compared.

- 1] Proxy based mobility
- 2] Algorithmic mapping which is shown to be more superior of the two.

Simulations have been used to compare the performance of this scheme with other major ones like hierarchical mobile IP and seamless handover and the results are presented in the form of graphs which are a clear indication of the superiority of this scheme. Also a novel technique : lossy bitwise aggregation is presented to aggregate multicast state at routers and hence improves the scalability performance. A proactive path setup approach to improve inter-AR handover within a domain has been suggested.

Strengths:

- 1] The paper promises a simple, efficient and scalable intra-domain architecture for mobility together with superior hand off performance and state aggregation that can be incrementally deployed.
- 2] Proposes a scheme for multicast state aggregation (lossy bit-wise aggregation) and through simulation graphs shows under most conditions it outperforms the prefix aggregation scheme.
- 3] Intra-domain M&M can coexist and inter-operate with other technologies.

Weaknesses:

- 1] The architecture suggested by the paper requires multicast address allocation.
- 2] Both the proxy based as well as algorithmic mapping approaches complicates routing.
- 3] The approach for algorithmic mapping assumes scope control which is available in Ipv6. The paper doesn't discuss issues with Ipv4. Also this scheme seems to require a lot of complexity at the AR as well as the BRs.
- 4] Inter-domain routing is still an issue in terms of scalability/feasibility.

Points/Suggestions of Improvement:

- 1] The explanation for the algorithmic mapping approach and issues about the m-subnet was not clear to me. Maybe an illustration of the same might prove helpful.
- 2] A Detailed evaluation and comparison through simulation including consideration of wireless links may provide some more accurate absolute bounds on the handoff delays and other performance measures.
- 3] For DAD since the LDAP server seems to be a single point of failure it might be a reasonable idea in order to have a backup for crash recovery. In order to limit the entries a soft state protocol might be useful which would require periodic keep alive messages from the active mobile devices and limit the entries and hence the search time.

Exam-like question on this paper and its answer:

Question]

Distinguish the 2 approaches proposed by the paper for an intra-domain multicast-based mobility architecture and indicate which is better and why?

Answer]

The 2 approaches are proxy-based mobility and algorithmic mapping based mobility. Proxy-based mobility has scalability issues as the unicast-to-multicast mapping for all visiting mobile nodes needs to be maintained at proxy. Proxy creates a third party dependence which is undesirable. Moreover to deal with robustness issues mobile node liveness tracking needs to be maintained, which requires initial configuration. The effect of failure of a proxy is not clear. Also the proxies may run out of multicast address space. Algorithmic mapping overcomes these problems by avoiding a proxy and using algorithmic mapping which avoids the explicit unicast-to-multicast mapping and eliminates the need for a proxy altogether providing a more robust and scalable solution.