

The Architecture of the self-organizing Long Term Evolution Networks

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Abstract – Within this article the models of the self-organizing long term evolution (LTE) networks (SON) were explored.

Keywords – SON, LTE.

I. INTRODUCTION

The LTE systems, as any mobile networks, need to be managed. The managing was borrowed from UMTS (Universal Mobile Telecommunication System), but hereby it's being observed a trend of managing simplifying by self-configuring and self-optimizing implementation. However, taking into account the complexity of LTE systems, there appear new challenges concerning expanding and operational maintenance. The SON developing seems to be quite promising saving providers operational charges. Exactly therefore, SON are always considered among 3GPP (Third Generation Partnership Project).

II. INSTRUCTION FOR AUTHORS

There are three classes of SON architecture: centralized, distributed and hybrid SON.

In centralized SON (Fig. 1) all the optimizing function are located in OAM systems (Operation and Management), that makes it considerably easier to expand them. Although, separate producers have their own OAM systems, a possibility to optimize the interaction of different equipment is very low. Simple and quick optimizing mechanisms are not maintained either.

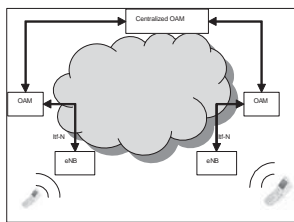


Fig.1 Centralized SON

In distributed SON (Fig. 2) all the optimizing functions are located in evolved Node B (eNB), what leads to a large amount of work during expanding. It is also difficult to

provide the maintenance of complicated optimizing schemes that demand a huge amount of eNB coordination. On the other hand, it is easy to accomplish challenges that involve only one or two eNB and demand the quick result.

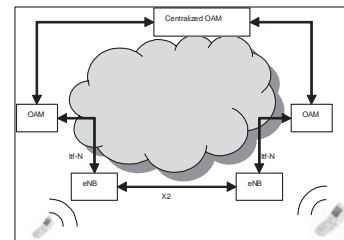


Fig.2 Distributed SON

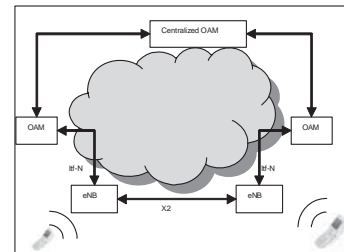


Fig.3 Hybrid SON

In hybrid SON the simple and quick optimizing schemes are executed in eNB, while complicated ones are executed in OAM. It possible, however, to optimize the work between equipment of different producers through the X2 interface. From the other side, it is required to make many efforts during such an expansion for adjusting of every station and interaction interfaces between them.

III. CONCLUSION

There were explored the classes of self-organizing LTE networks, provided their advantages and disadvantages. SON allow configuring and optimizing the network automatically, therefore, the necessity of interaction with human can be diminished, while the network capacity can be increased.

References

- [1] 3GPP TS 32.500, "Telecommunication management; Self-Organizing Networks (SON); Concepts and requirements (Rel. 8)".
- [2] 3GPP TS 32.501, "Telecommunication management; Self-Configuration of Network Elements; Concepts and Integration Reference Point (IRP) Requirements (Rel. 8)".
- [3] 3GPP TS 32.502, "Telecommunication management; Self-Configuration of Network Elements Integration Reference Point (IRP); Information Service (IS) (Rel. 8)".

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