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| Company | Use case | Comment (description and benefits) |
| Samsung | 1. Handover optimization  2. Paging optimization  3. Handover optimization based on UE Load  4. RAN Node Software Upgrade | **Handover optimization**  In virtualized environment, the HO may be rejected due to inadequate available resources within the target gNB. The notion of resources may include virtual resources (e.g., compute, memory) and/or radio resources (e.g., PRB, RRC connected users). If the HO request is rejected, a UE will try to connect to a different gNB until the request is successfully accepted. Several target gNBs can be tried until the request is successfully accepted. This process can result in wastage of UE and network resources, while it may also introduce service disruption due to increased latency and radio link failures (RLFs). It also introduces inefficiency in the HO or other network procedures.  **Handover optimization based on UE Load**  The target node, eNB, may not have adequate resources to accept certain handover requests. In the context of network virtualization, these resources may include not only legacy radio resources, but also virtual resources such as processor and memory. Handover optimization can benefit from knowledge about the projected UE load on the target cell including additional radio and virtual resources  **Paging optimization**  As per the current procedures, if the UE goes out-of-coverage (OOC) the paging which was initiated by the network Access and Mobility Management Function (AMF) fails. The re-attempts continue to fail until UE comes in the coverage and reacts to the paging attempts. This repetitive paging attempts result in the wastage of network resources. As an example, the use case includes a user or a group of users getting into an area, with no cellular coverage on a regular basis for a considerably long duration, for e.g., the user gets into a shielded room for some testing purpose every day for a defined period. The Network initiated paging for such users will fail until they are back in the area with cellular coverage. This would result in in-efficient network resource usage  **RAN Node Software Upgrade**  As per the current mechanism of software upgrade at RAN node results in service disruption or huge operational cost. Consider a scenario, when a RAN Node is required to shut down manually to undergo critical maintenance for a very short duration of time. Software upgrade can be one such critical maintenance scenario. In such cases, all the resources (bearer, security functions, mobility management) that are managed by this RAN Node need to be purged and reconfigured at another RAN Node (standby RAN Node) or if another RAN Node is not available then resources will be reconfigured again when former RAN Node comes up after software upgrade. Both the situations lead to additional operational expenses and data loss. Operational expense in terms of all the resources to be released/attached again and data loss for all GBR sessions/bearer. |
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