

Failure Recovery of VLR-HLR
A3 (without checkpointing) and reject calls
A2 (without checkpointing) and service calls by paging
A1 (with checkpointing)

VLR Failure Recovery
For A3: no cost.

\[ N = \frac{aL}{\lambda} + N (Pd - 1) \rho + Pd = 1 \]

For A2:

is the checkpoint cost \( aL \), is the checkpoint interval \( \lambda \), is the number of double-paging areas in the VLR, \( N \) is the number of registration areas in the VLR, \( \rho \) is the penalty factor accounting for the cost current after the failure, \( d \) is the probability that a VLR record in the backup is where \( Pd \) is the probability that a VLR record in the backup is

The cost given below is normalized with respect to the cost of paging = 1.

Cost for Servicing a Call under VLR Recovery Schemes
For A3: zero but with probability \( P_L(y) \) all \( y \) calls are lost.

\[
\begin{align*}
\sum_{y} C \times [(0)^L - P_L] + 1 & \times (0)^L \\
\sum_{y} C \times [(0)^L - P_L] + 1 & \times (0)^L
\end{align*}
\]

For A2:

For A1:

Let \( P_L(y) \) be the probability of \( y \) call arrivals between the VLR failure and first call delivery after the VLR failure.

Cost of first call delivery after the VLR failure.