

The Art of Using Cross-Layer Design in Cognitive Radio Networks

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Abstract—Cognitive Radio Networks (CRNs) have been obtained a significant focusing due to this technology is able to dis-solve the issues of spectrum overcrowding and underutilization. In a CRNs, the secondary user (SU) is equipped to discover and use abandoned licensed channel, however, they must be desertion the channel if any interference is brought to the primary user (PU) whom hold the channels. For that, the dynamic spectrum access (DSA) in CRNs is considered as an important application that allows for SU to use the licensed band in a dynamic way. Nevertheless, there are several challenges on CRNs such as interference, channel selection, routing, and etc. Cross-layer design can provide effective solutions in order to counteract these challenges. To this aim, in this paper, we have discussed the cross-layer design and mechanism for sharing the network information among the different layers. In addition, we have studied the existing related work about applying a cross-layer design in CRNs and how the upper layers and lower layer parameter optimization with the helping of a cross-layer. Finally, we have explained the implementation challenges of cross-layer design on CRNs.