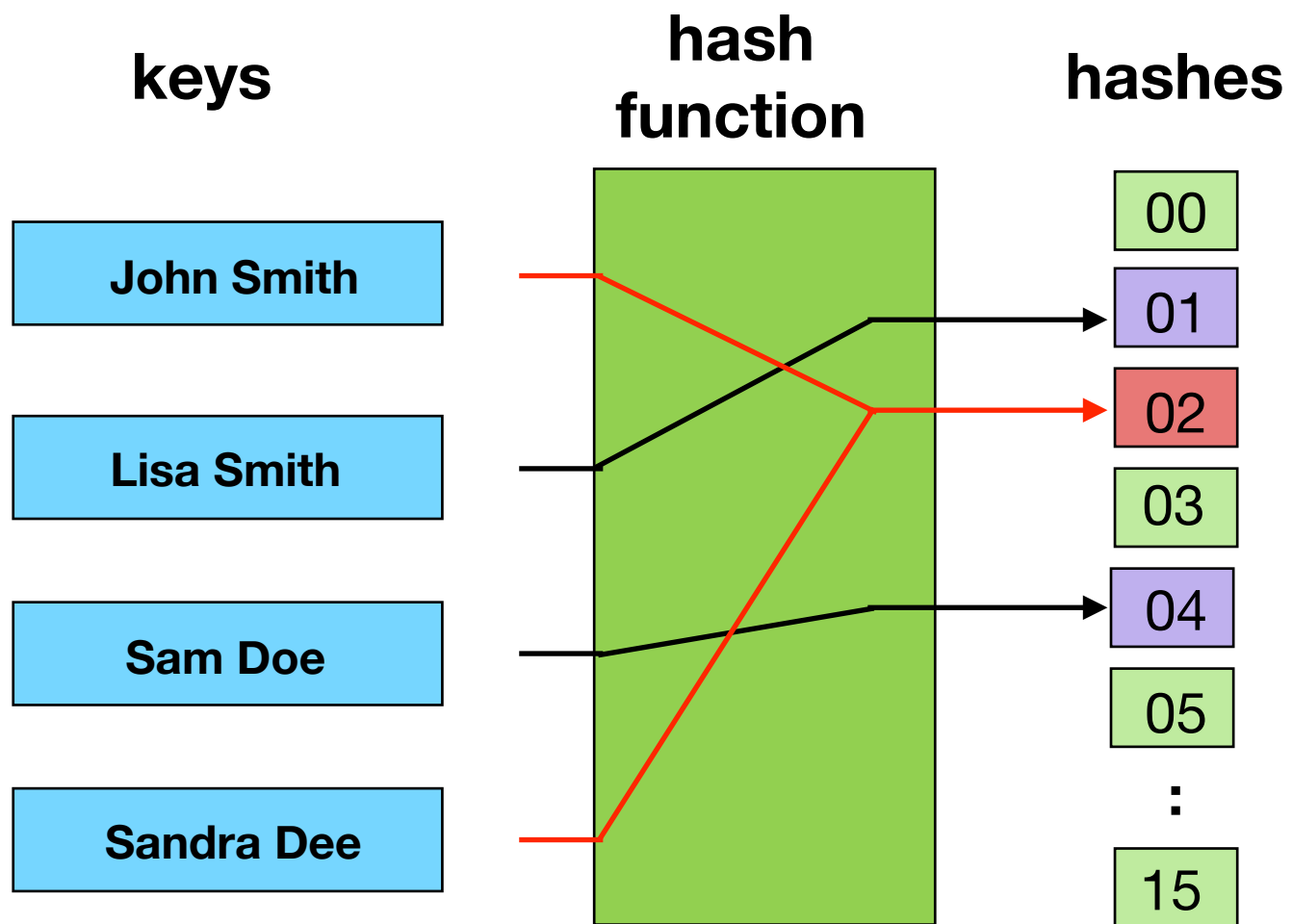


# Bloom Filter (布隆过滤器)



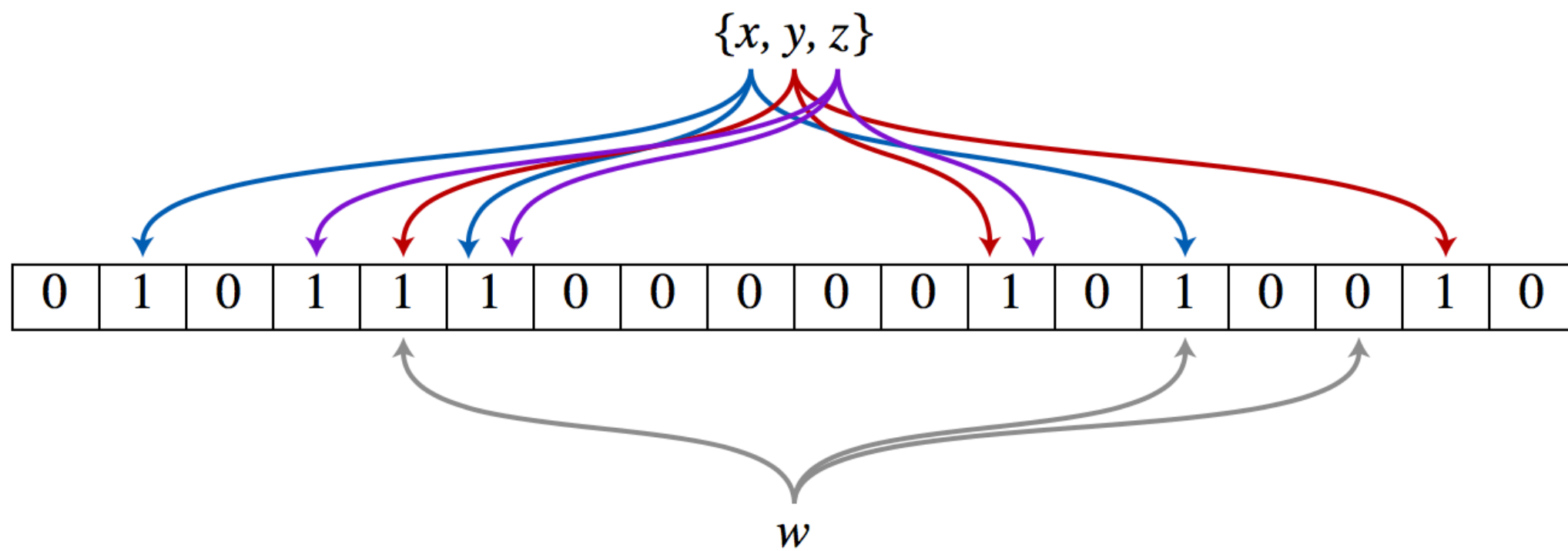
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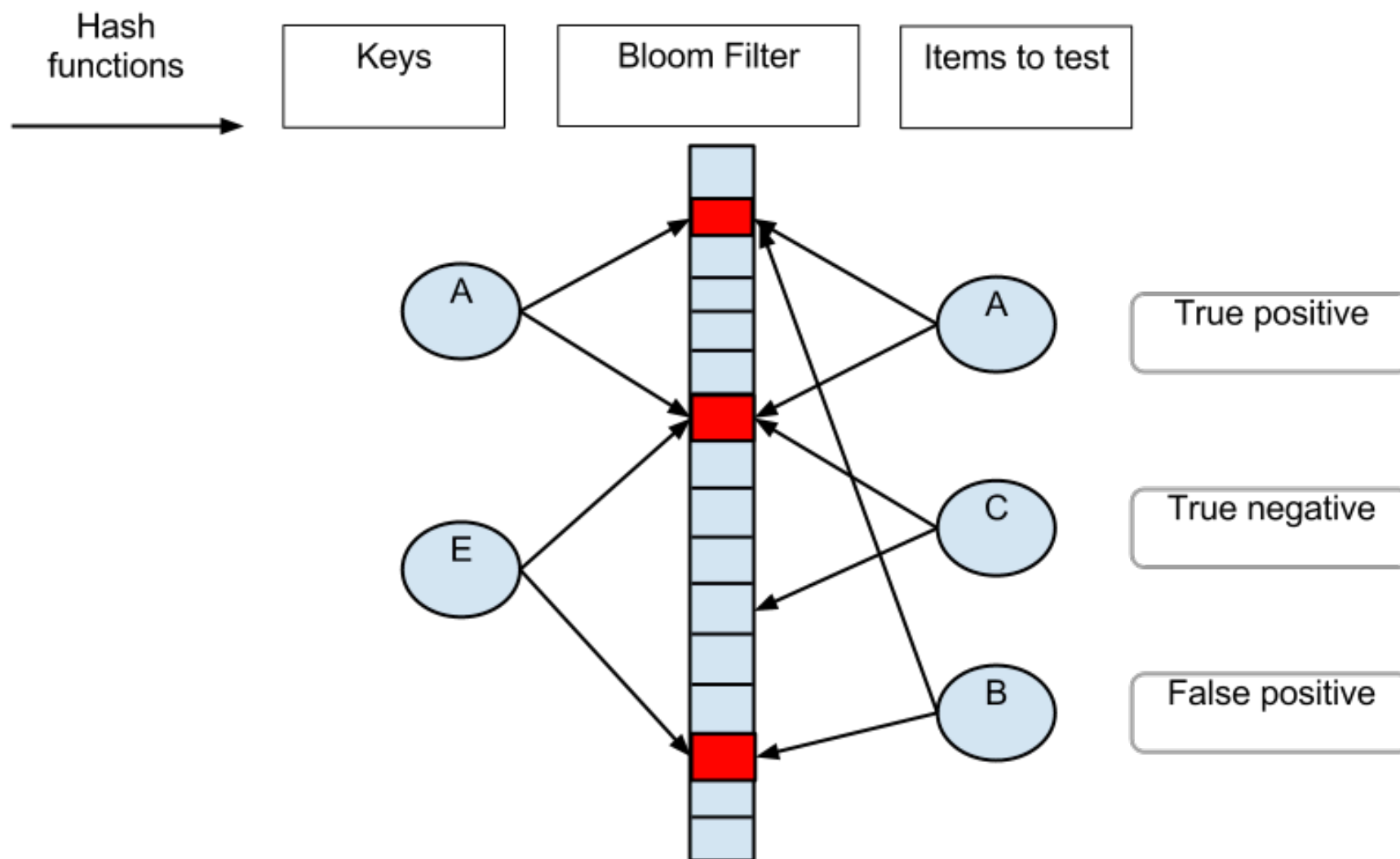
# 哈希函数



# 布隆过滤器 Bloom Filter

一个很长的二进制向量和一系列随机映射函数。布隆过滤器可以用于检索一个元素是否在一个集合中。它的优点是空间效率和查询时间都远远超过一般的算法，缺点是有一定的误识别率和删除困难。





# 案例

1. 比特币网络

2. 分布式系统 (Map-Reduce)

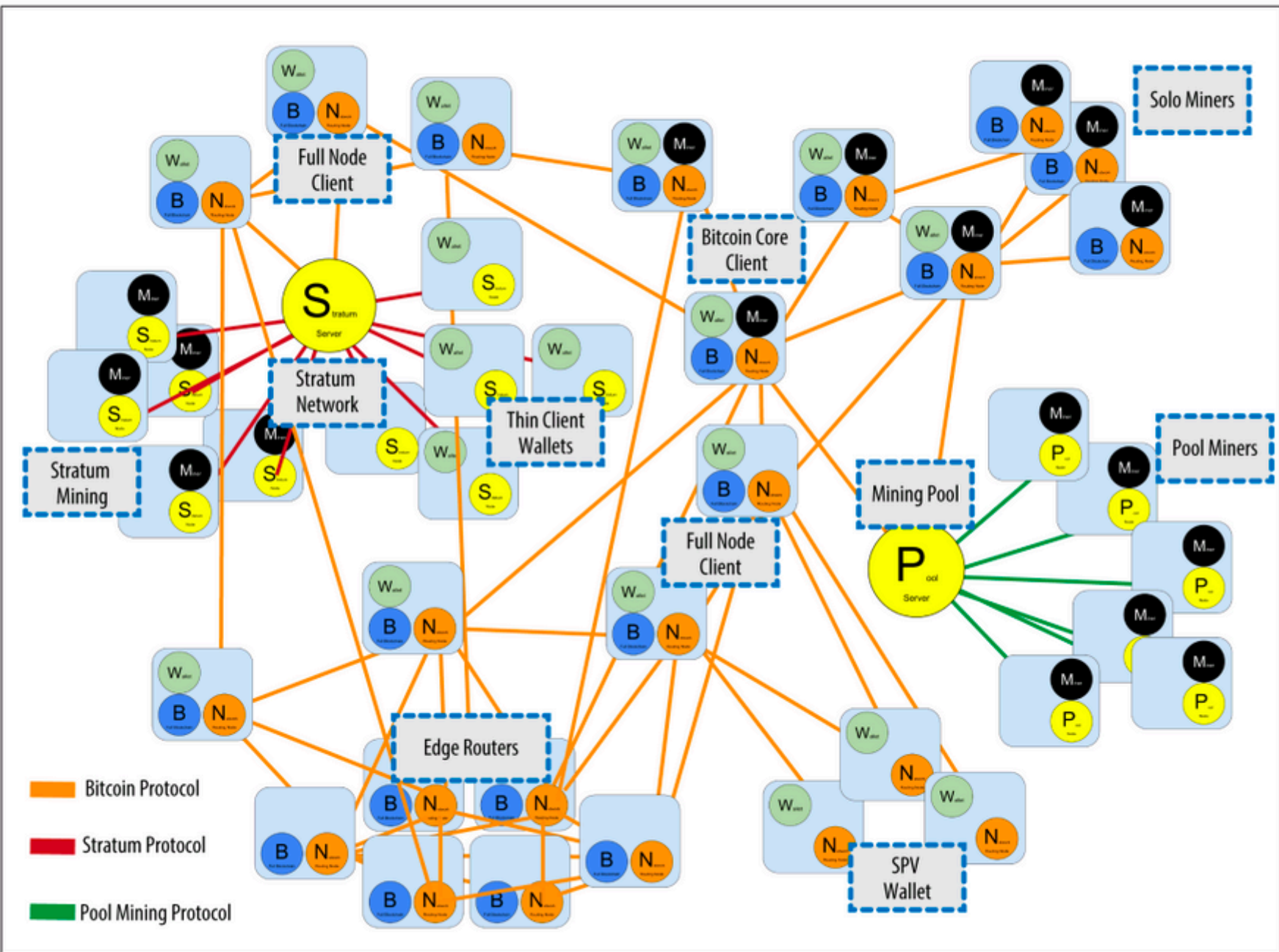
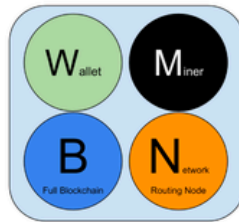


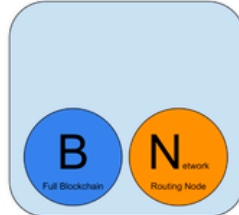
Figure 6-3. The extended bitcoin network showing various node types, gateways, and protocols





### Reference Client (Bitcoin Core)

Contains a Wallet, Miner, full Blockchain database, and Network routing node on the bitcoin P2P network.



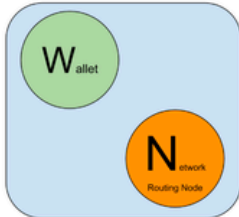
### Full Block Chain Node

Contains a full Blockchain database, and Network routing node on the bitcoin P2P network.



### Solo Miner

Contains a mining function with a full copy of the blockchain and a bitcoin P2P network routing node.



### Lightweight (SPV) wallet

Contains a Wallet and a Network node on the bitcoin P2P protocol, without a blockchain.



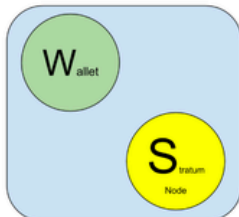
### Pool Protocol Servers

Gateway routers connecting the bitcoin P2P network to nodes running other protocols such as pool mining nodes or Stratum nodes.



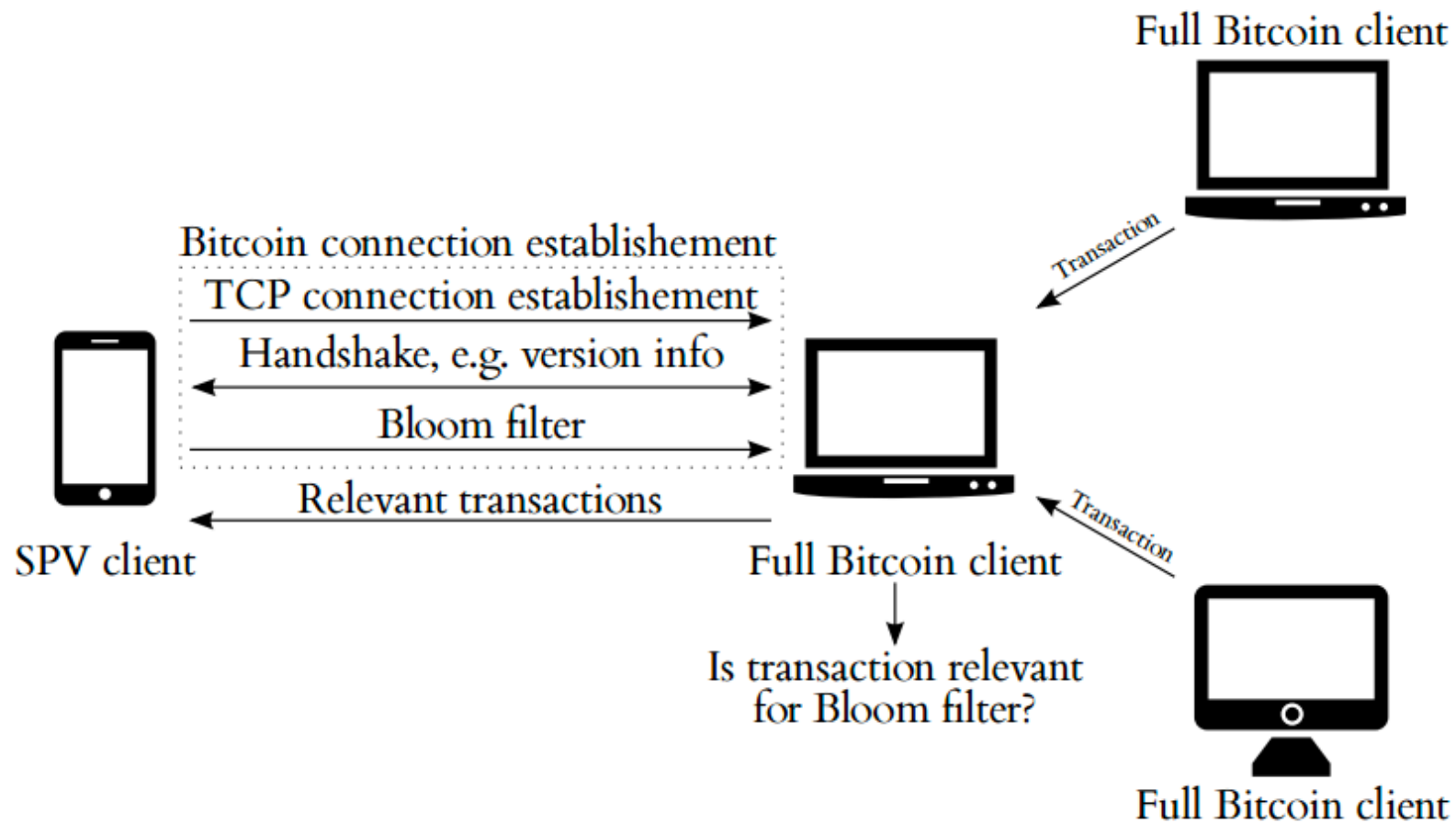
### Mining Nodes

Contain a mining function, without a blockchain, with the Stratum protocol node (S) or other pool (P) mining protocol node.



### Lightweight (SPV) Stratum wallet

Contains a Wallet and a Network node on the Stratum protocol, without a blockchain.





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