Structured P2P

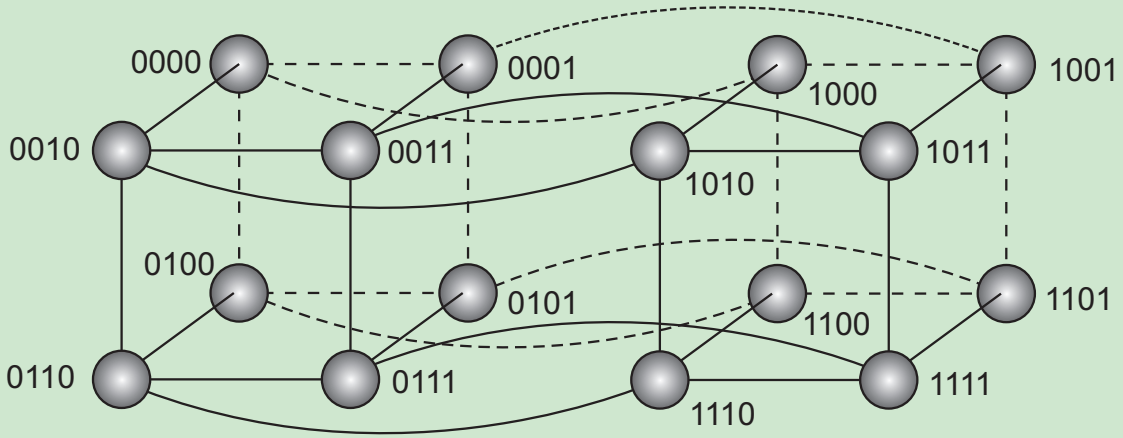
Essence

Make use of a semantic-free index: each data item is uniquely associated with a key, in turn used as an index. Common practice: use a hash function

$$key(data\ item) = hash(data\ item's\ value).$$

P2P system now responsible for storing (*key*,*value*) pairs.

Simple example: hypercube



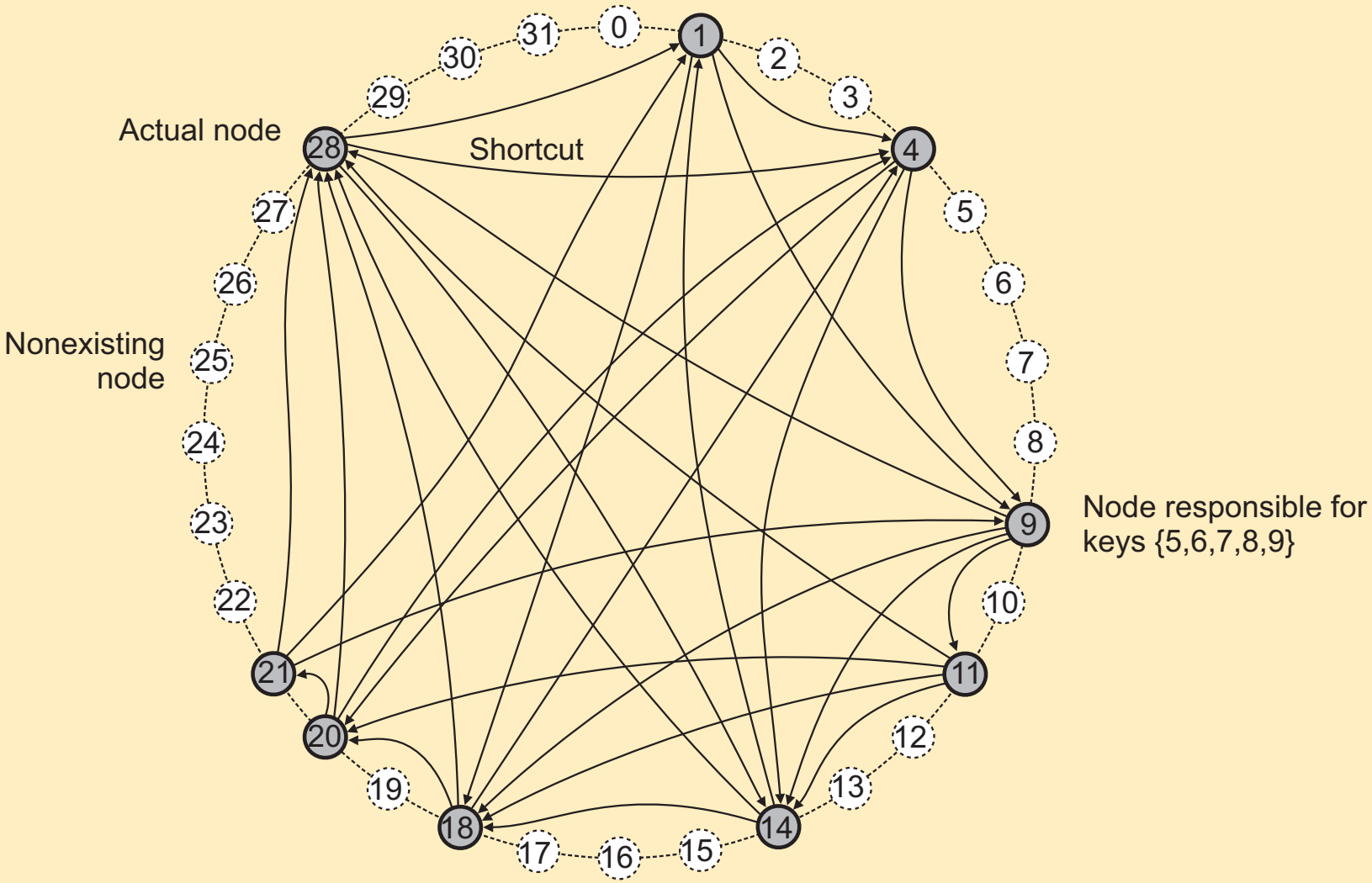
Looking up d with key $k \in \{0,1,2,\ldots,2^4-1\}$ means routing request to node with identifier k.

Example: Chord

Principle

- Nodes are logically organized in a ring. Each node has an m-bit identifier.
- Each data item is hashed to an m-bit key.
- Data item with key k is stored at node with smallest identifier $id \geq k$, called the successor of key k.
- The ring is extended with various shortcut links to other nodes.

Example: Chord



$lookup(3)@9 : 28 \rightarrow 1 \rightarrow 4$