

*Wanhive*

Wanhive vs CHORD

Comparative Analysis

# Basics

SL	CHORD	WANHIVE
1	Algorithm for DHT Implementation	Multimedia Messaging Framework based on Chord Algorithm
2	Uniform Key space ( $\mathbf{K}$ ) with at max $2^m$ Nodes where, $m$ = Key length	Partitioned Key Space: Overlay Key space: $\mathbf{K}_o$ of key length $m_o$ User Key Space: $\mathbf{K}_u$ of key length $m_u$ $m_u \gg m_o$ , $\mathbf{K}_o$ and $\mathbf{K}_u$ are disjoint
3	<b>Consistent Hashing</b> for Key generation	Keys are assigned locally at overlay nodes and/or by <b>Registry Service</b> .
	Structure: Logical Ring	Structure: Hierarchical (Super-Peer Based)
4	Functions: $v = \mathbf{get}(k)$ $\mathbf{put}(k, v)$ $\mathbf{delete}(k)$	Functions: $k \in \mathbf{K}_u$ <b>register</b> ( $k$ ) <b>send_message</b> ( $k, m$ ), $m$ =Message <b>unregister</b> ( $k$ )
5	Implementation: a. Iterative (reference MIT impl.) b. Recursive	Implementation: <b>Direct</b> (Recursive) Routing only; Iterative user join to the super-peer network (opt)

# Structure

SL	CHORD	WANHIVE
1	Components: 1. Node ( $n \in K$ ) 2. Keys ( $k \in K$ ) 3. Values ( $v$ )	Components: 1. Overlay Nodes ( $n \in K_o$ ) 2. Keys ( $k \in K_u$ ) representing logical connections 3. Messages ( $m \in M$ ), $M = \{0,1\}^y$
2	<b>Nodes</b> are the <b>Active Components</b>	<b>Logical Connections</b> represented by the keys ( $K_u$ ) are the <b>Active Components</b>
3	Structure: Logical Ring, Finger Table	Structure: (Hierarchical/Layered) 1. <b>Logical Ring</b> for Message Routing 2. <b>Centralized</b> for Overlay Maintenance
4	Discovery/Storage: <i>get_successor(k)</i>  Number of nodes that must be contacted to find a successor in an N-node network: <b><math>O(\log(N))</math></b>	Message Routing: <i>forward(h(k), m)</i> <i>h: <math>K_u \rightarrow K_o</math></i> (efficient, non-invertible function)  Number of hops in a N-node super-peer network: <b><math>O(\log(N))</math></b> (several optimizations possible)

# Features

SL	CHORD	WANHIVE
1	Primary Function: Primarily persistent storage and information sharing	Primary Function: Real-time high throughput, low latency multimedia messaging.
2	Communication: 1. Uses UDP 2. No order/delivery guarantee 3. Packet Oriented	Communication: 1. Uses TCP 2. Best effort ordered delivery 3. Message Oriented (SCTP-like)
3	Protocol: Flexible	Protocol: Well-defined
4	Node Authentication and message security hard to implement	Robust security and authentication through Symmetric and Asymmetric key cryptography
5	Scalable, Reliable and Robust, but vulnerable to sybil and blasting attacks. Slow.	Trades off scalability and robustness for better security and better QOS guarantee
6	Designed for scalability, robustness and reliability	Designed for easy maintenance, <i>mobility</i> and performance

# Research Areas

- Third-party assisted Authentication
- Cryptographic Key Management
- Network Key Management
- Flooding and Misuse Prevention
- Protocol Standardization and Communication Security
- Improvements in DHT Algorithm and Overlay Architecture to improve Routing Performance
- Maintenance, Mobility and Virtualization

*That's it, Thank you*

*Wanhive*

**Author:** *Amit Kumar at Wanhive Systems Private Limited, Patna Bihar (India) 800024. EMAIL:  
amit[\*AT\*]wanhive.com*

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