

APACHE SPARK GEOSPATIAL OPERATIONS LIBRARY

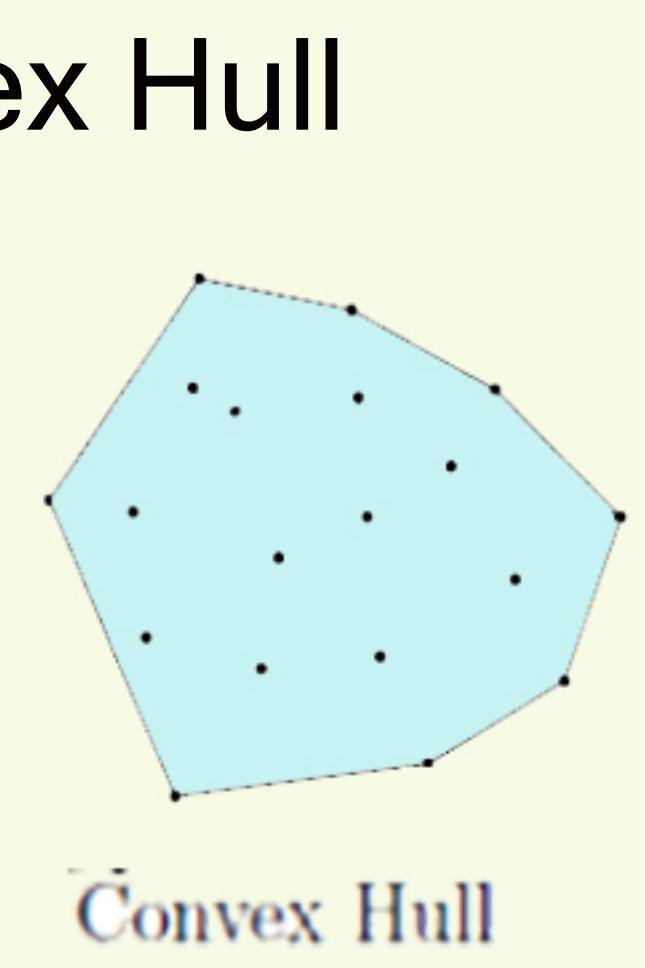
Group 12

PROBLEM DESCRIPTION

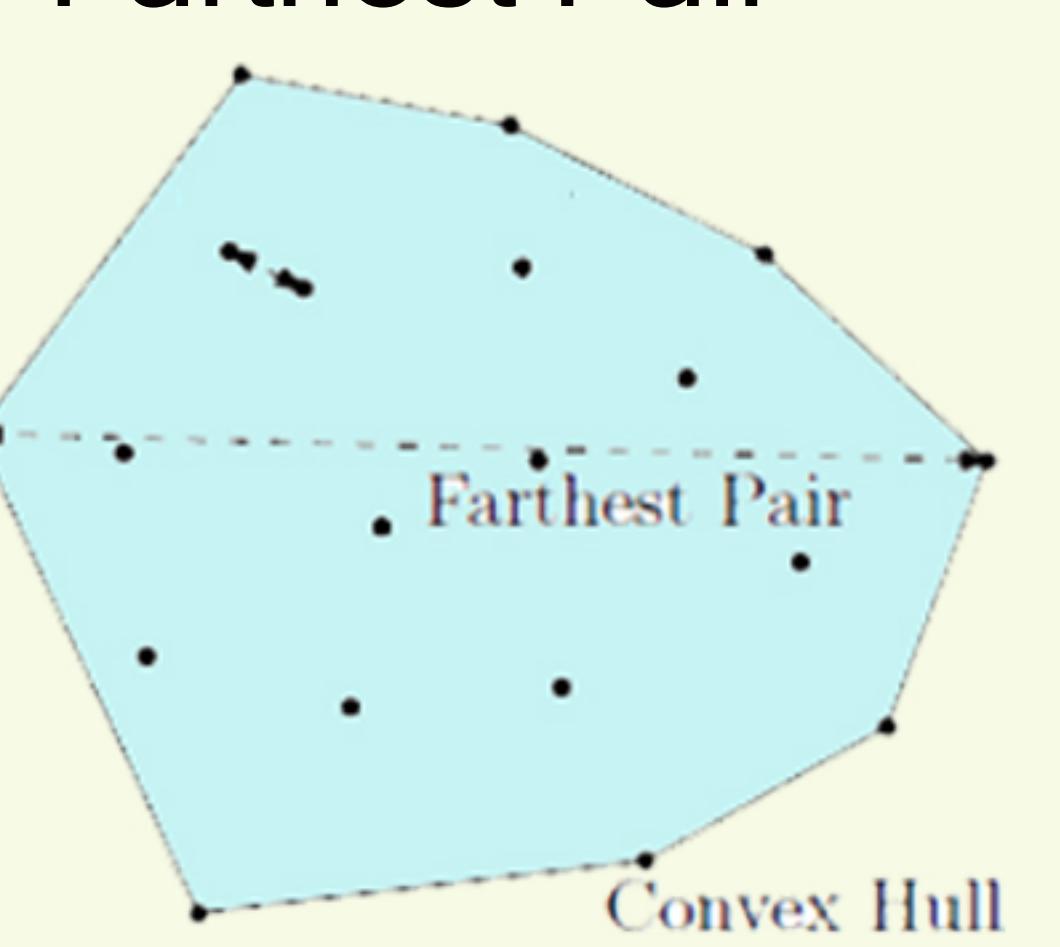
Geometry Union



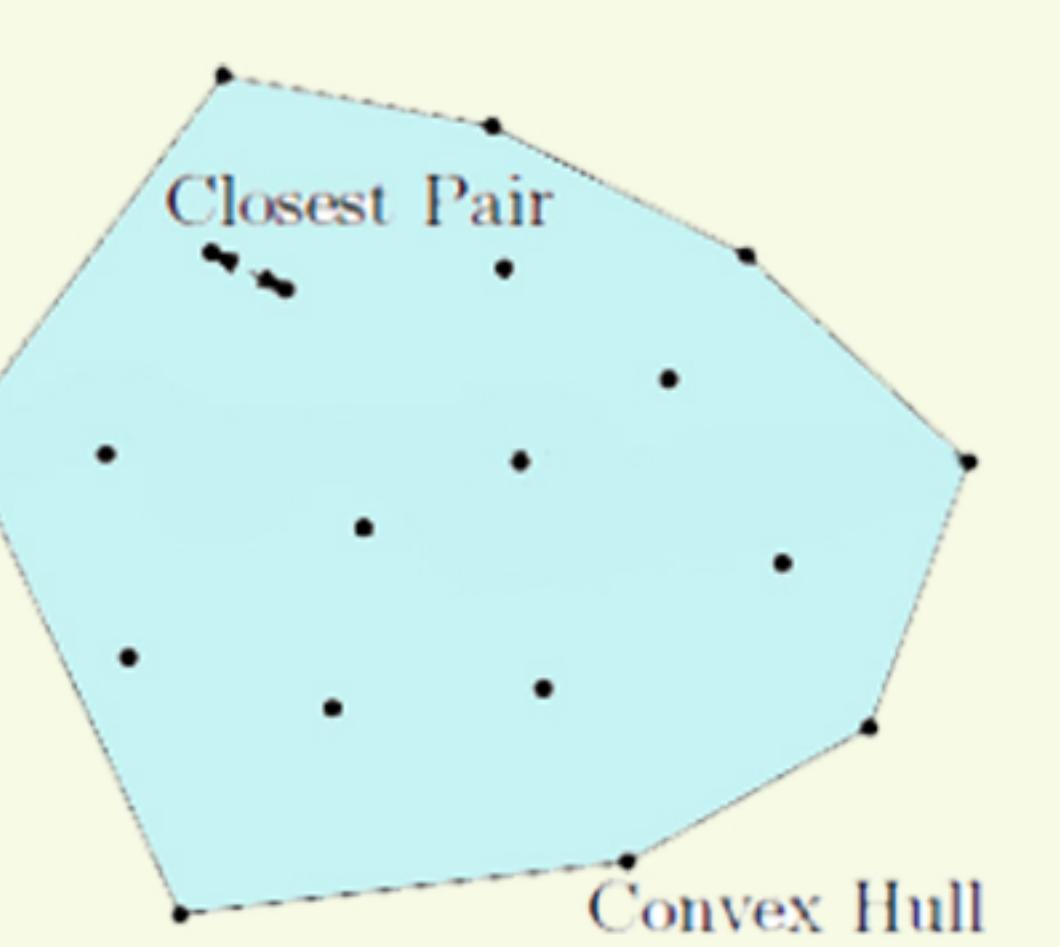
Convex Hull



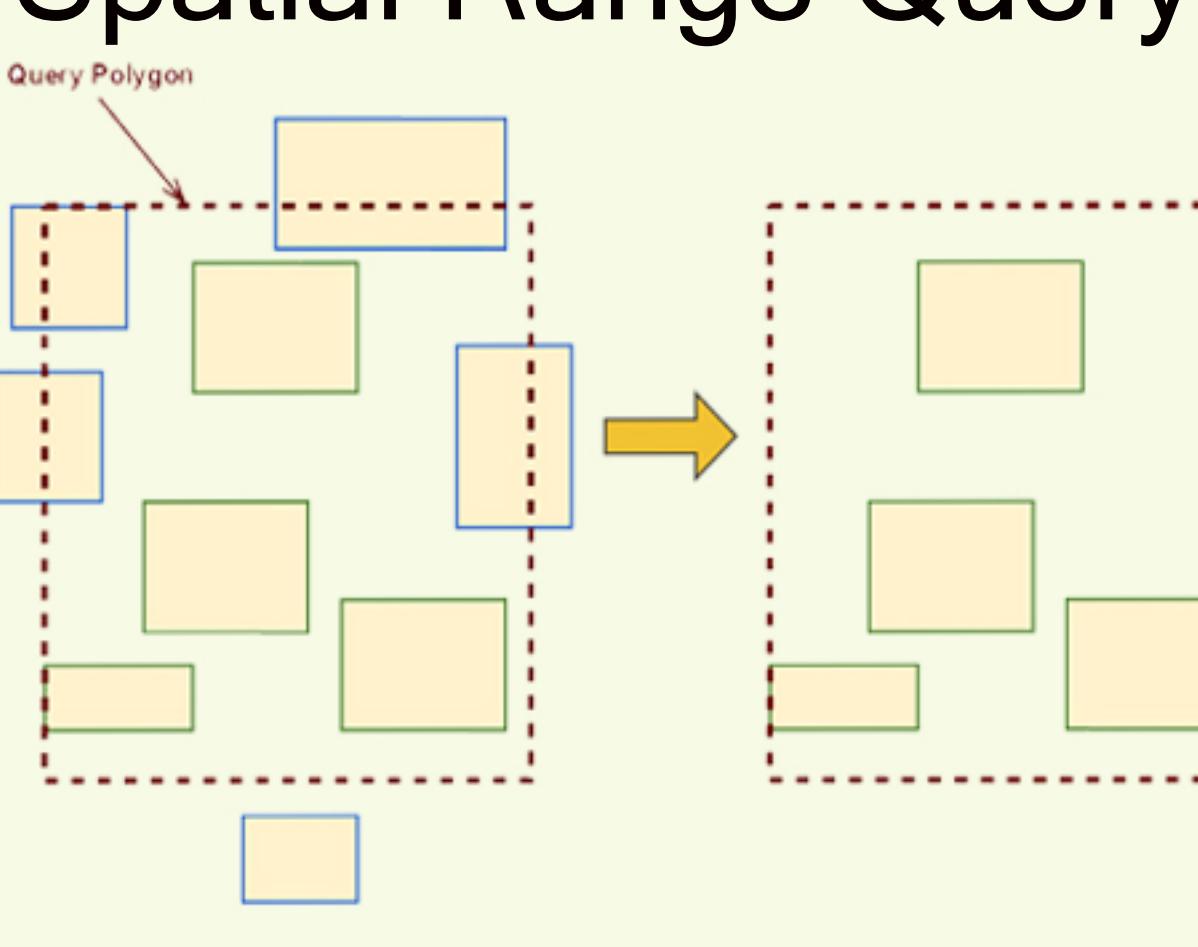
Farthest Pair



Closest Pair



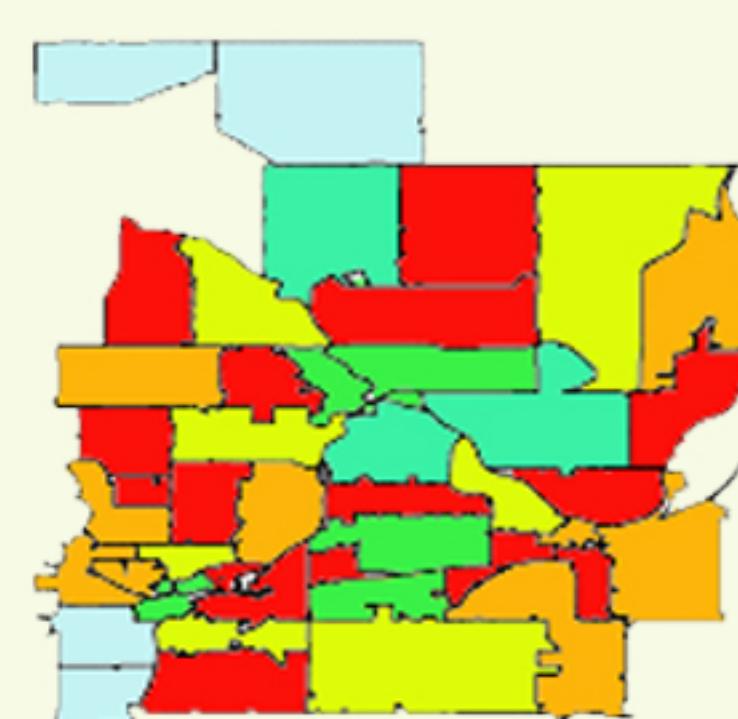
Spatial Range Query



Spatial Join Query

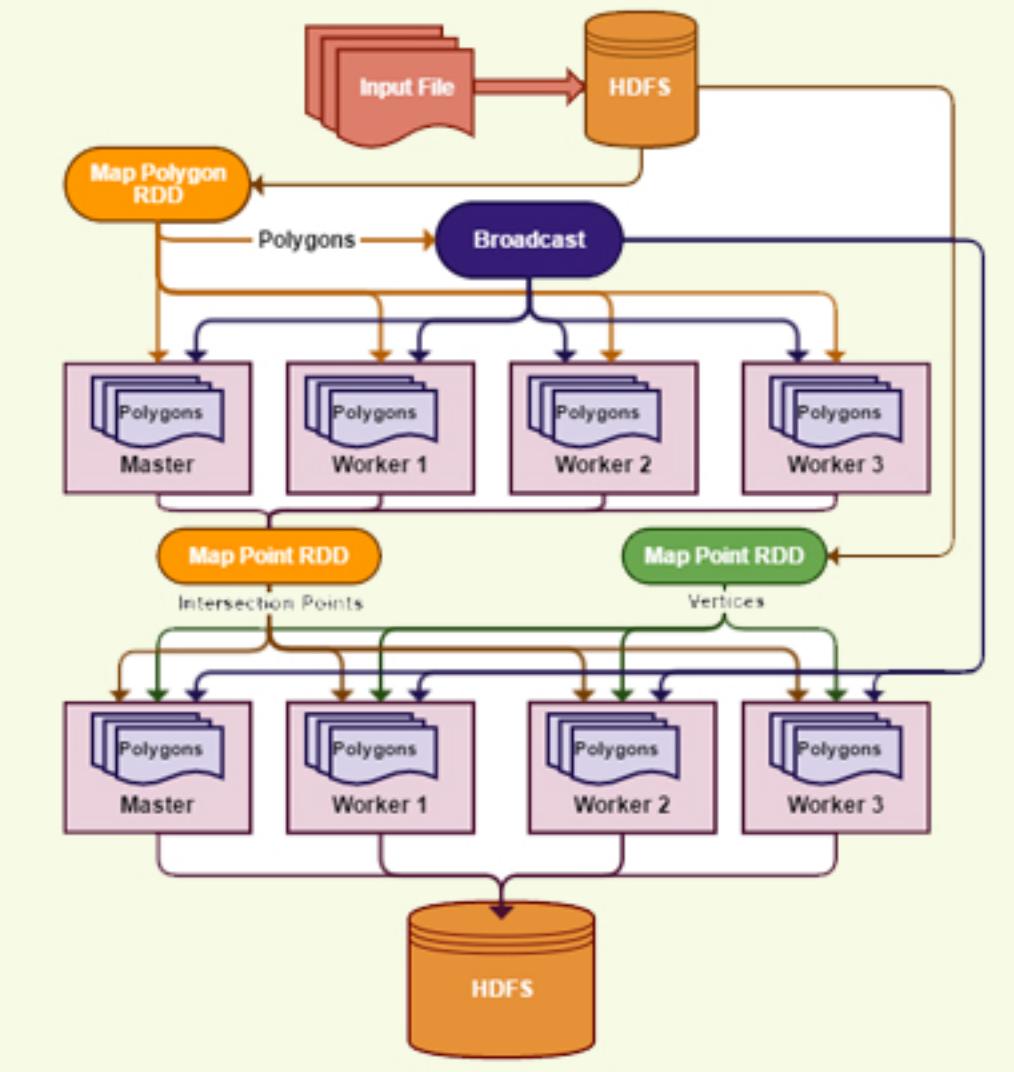


Heat Map

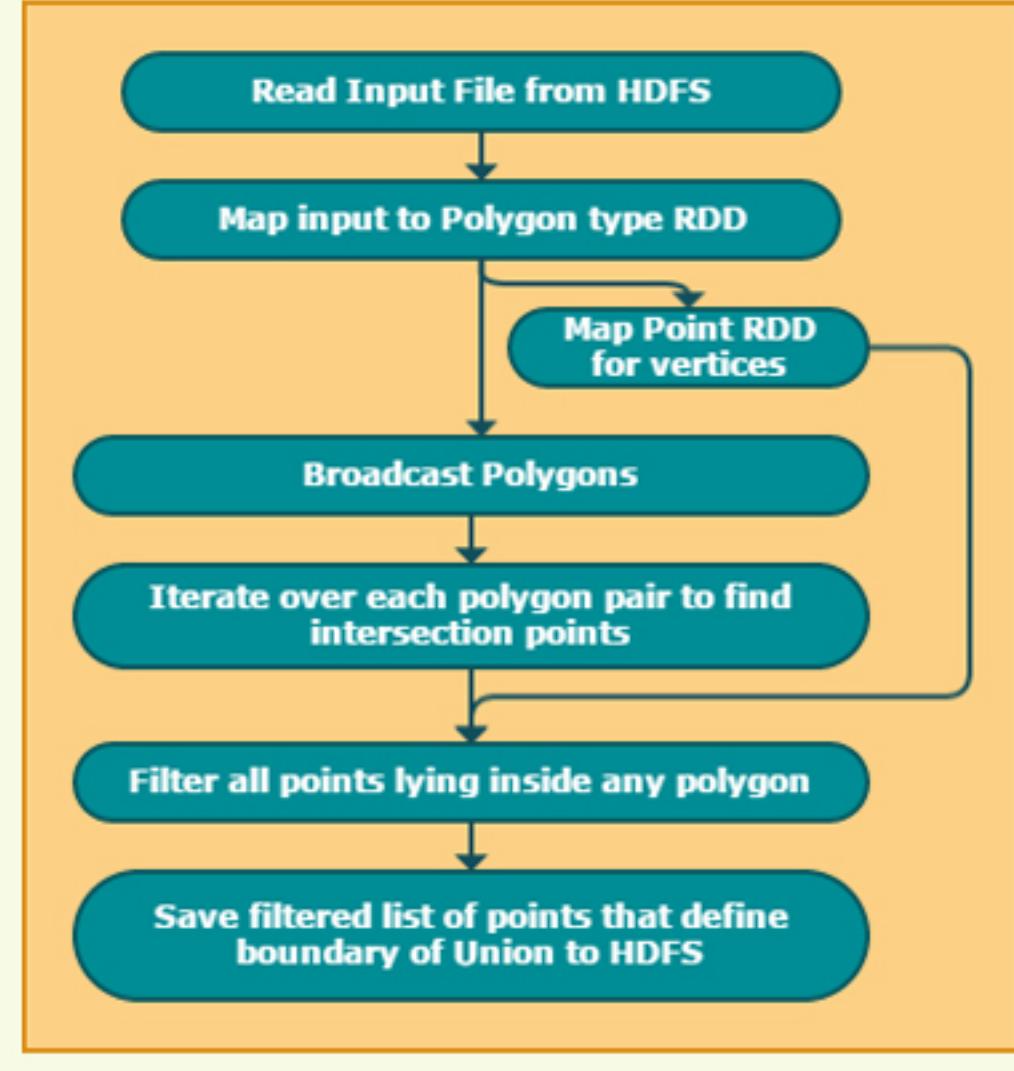


IMPLEMENTATION PLAN

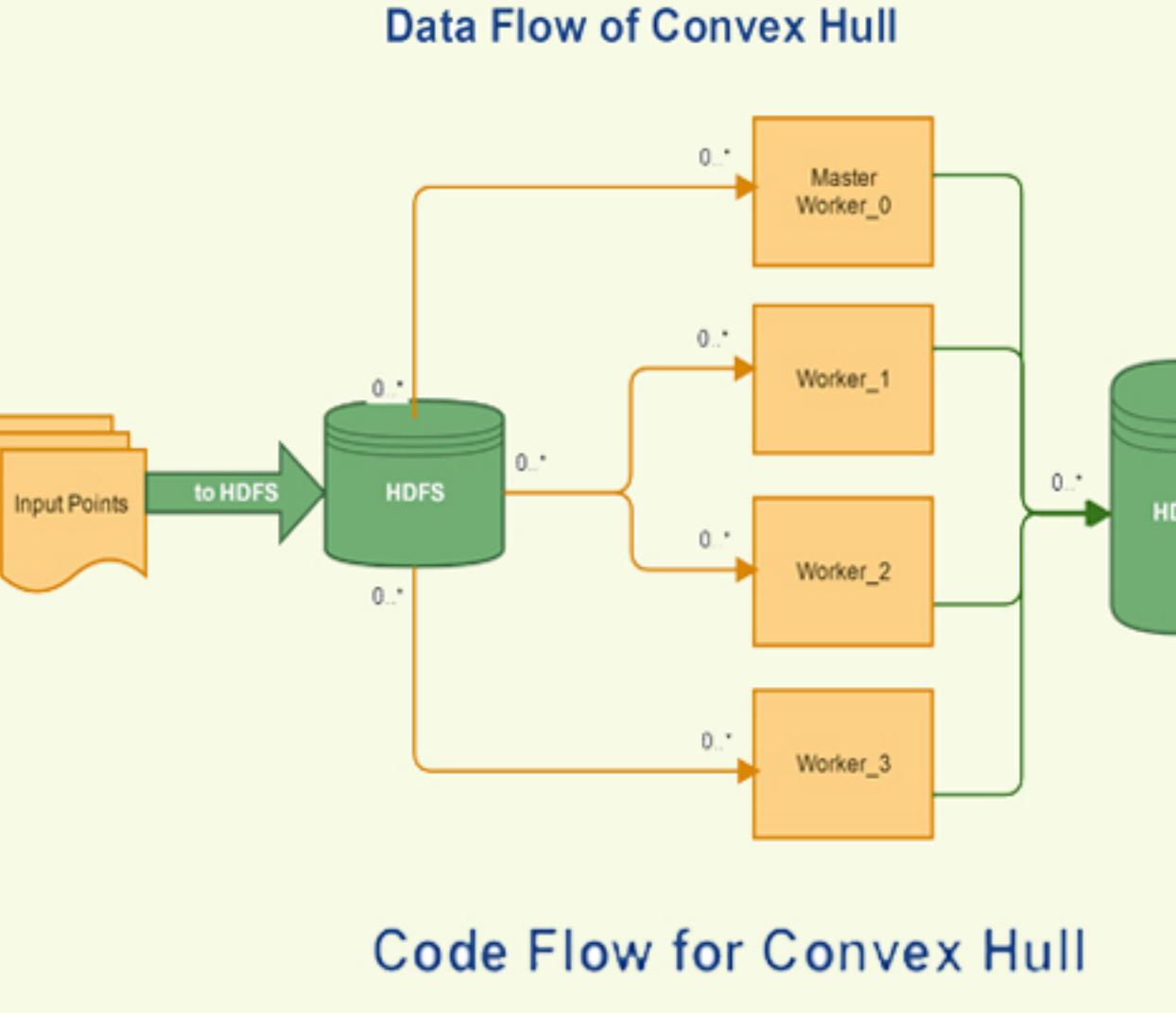
Data Flow of Geometry Union



Code Flow of Union



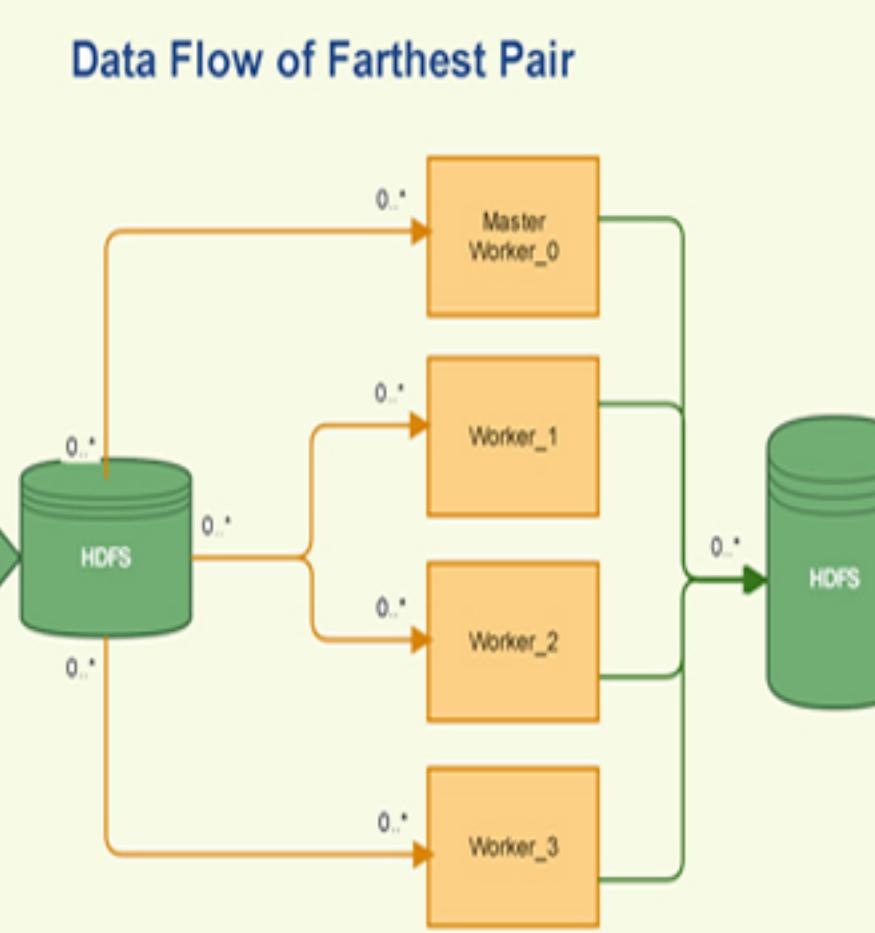
Data Flow of Convex Hull



Code Flow for Convex Hull



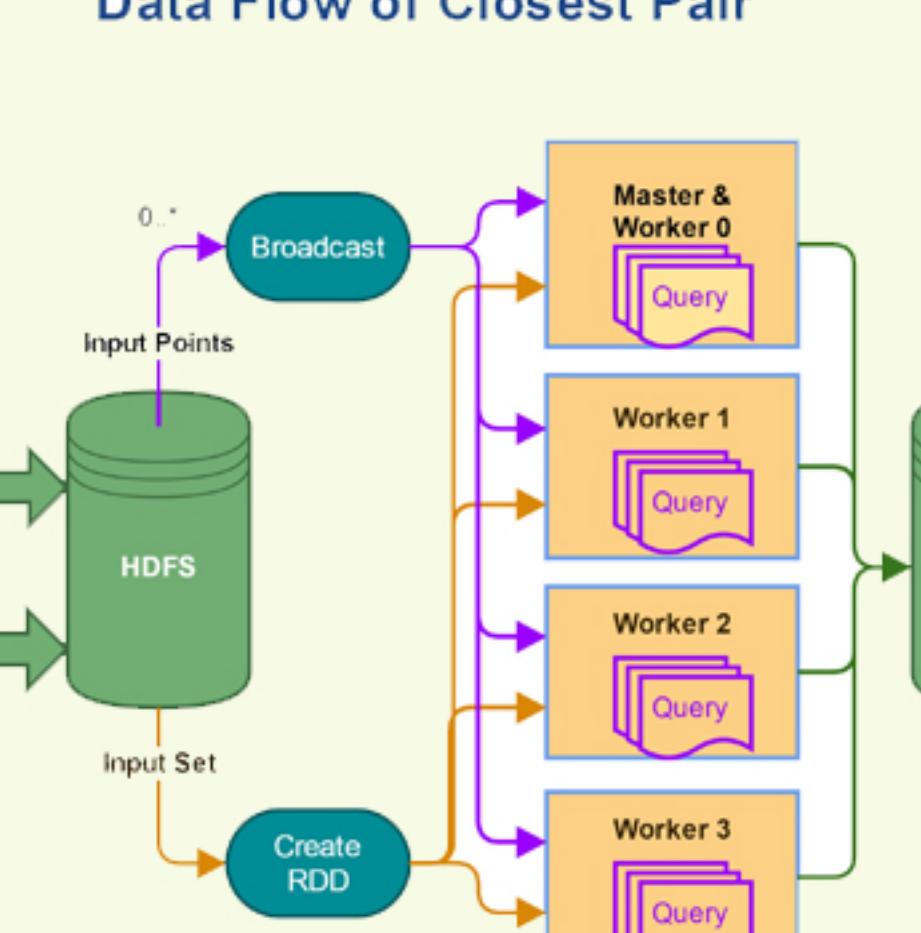
Data Flow of Farthest Pair



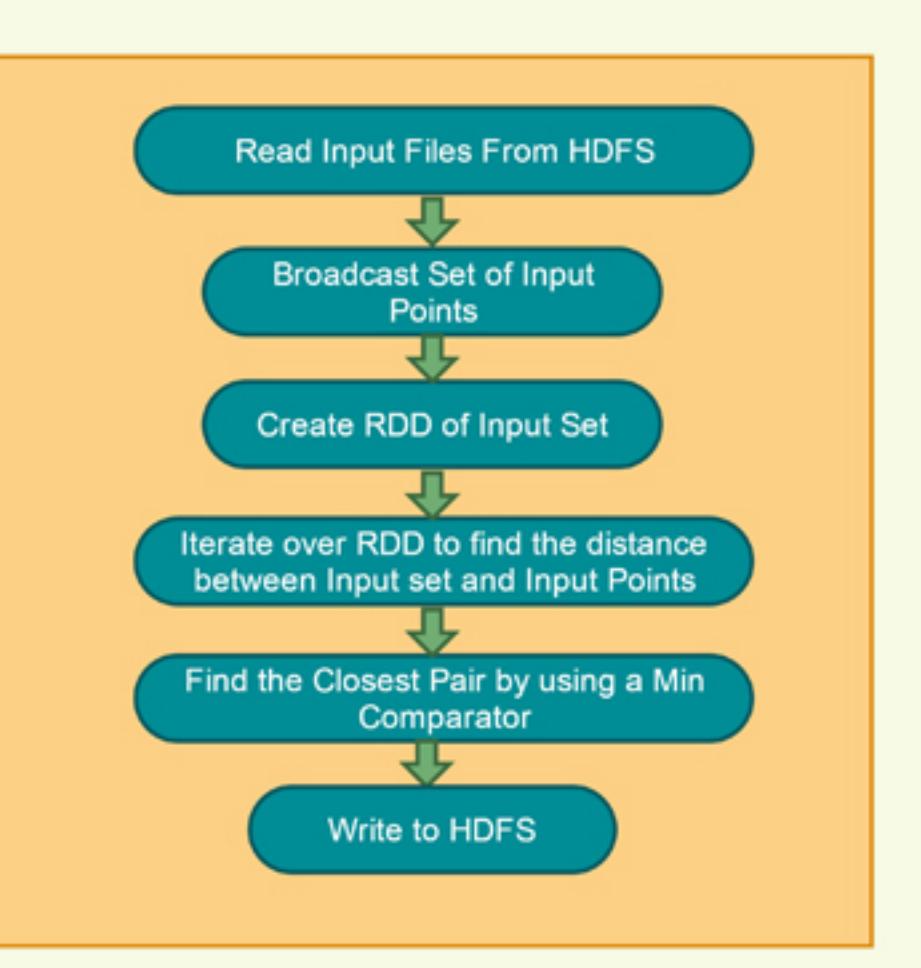
Code Flow for Farthest Pair



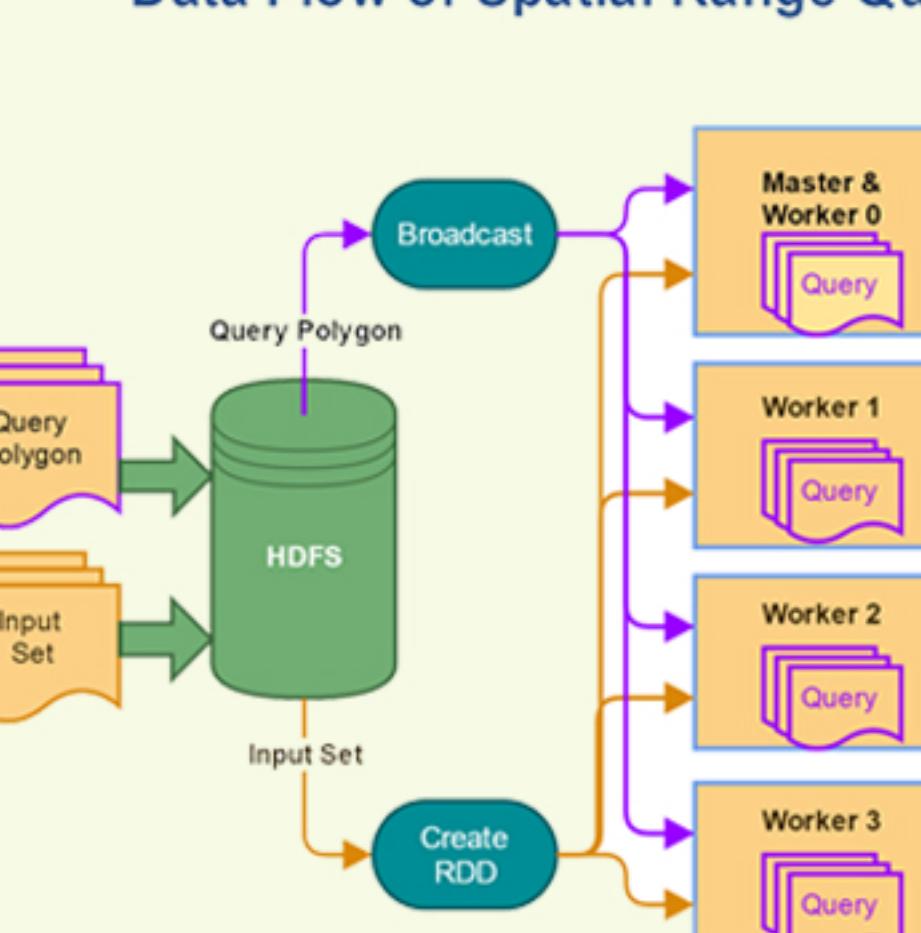
Data Flow of Closest Pair



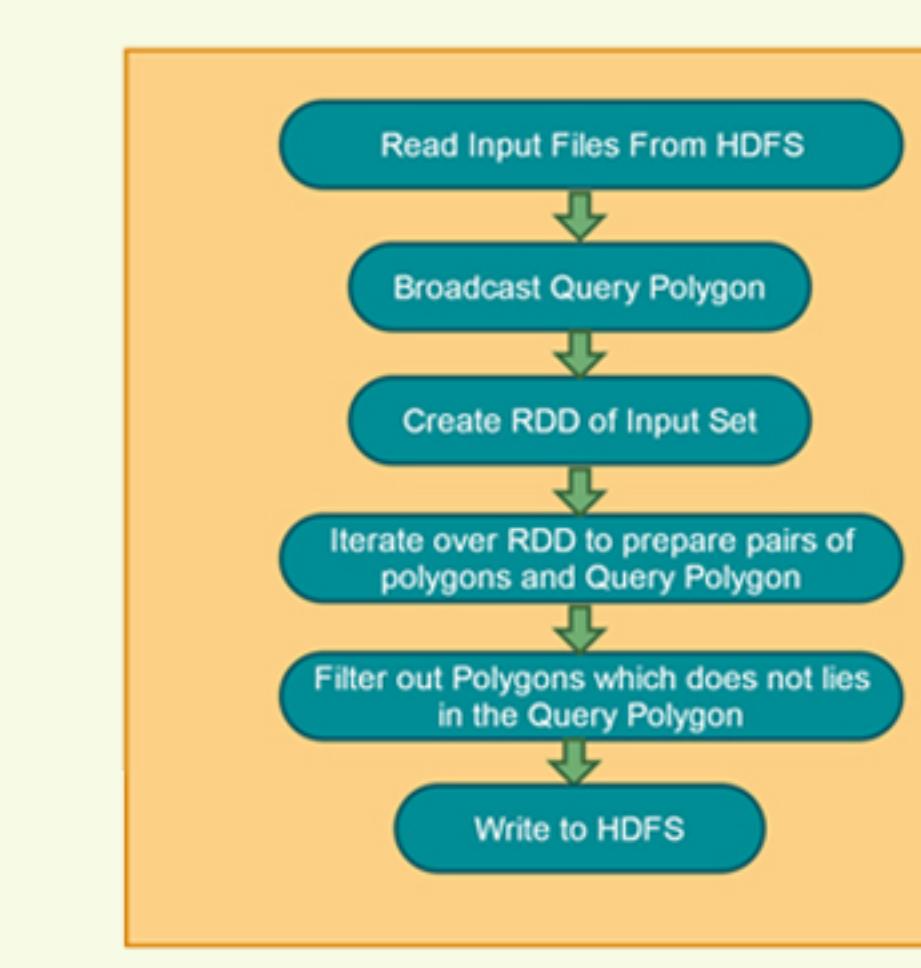
Code Flow for Closest Pair



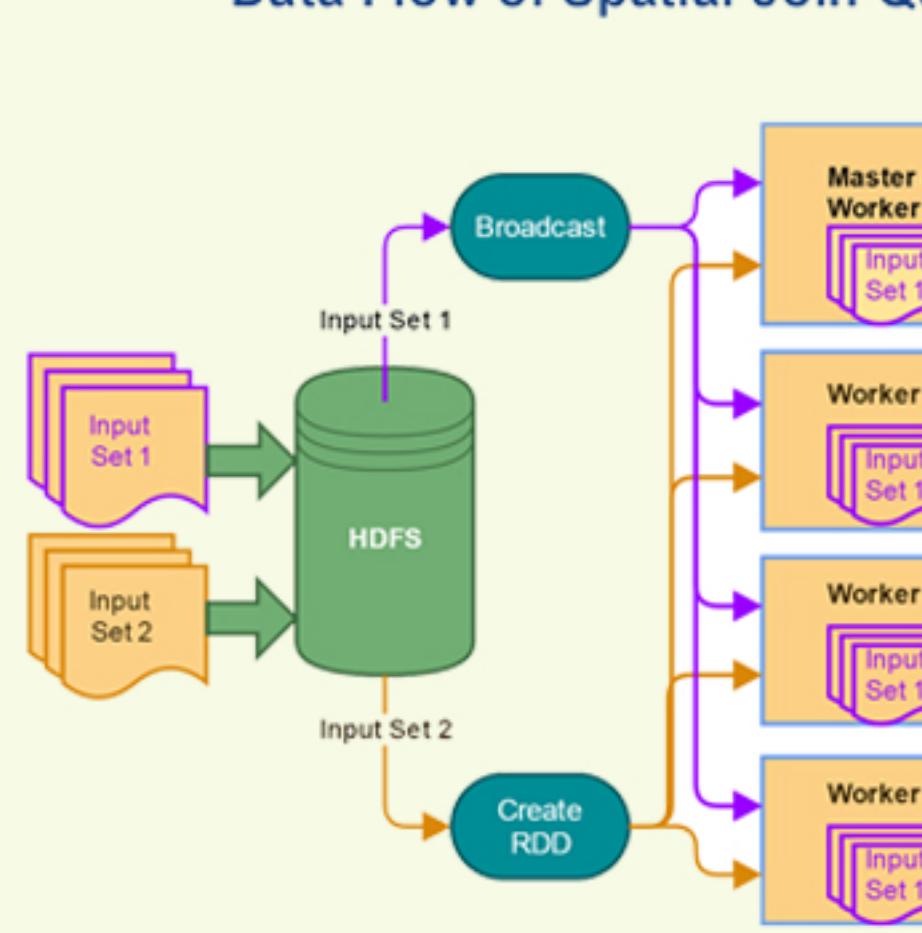
Data Flow of Spatial Range Query



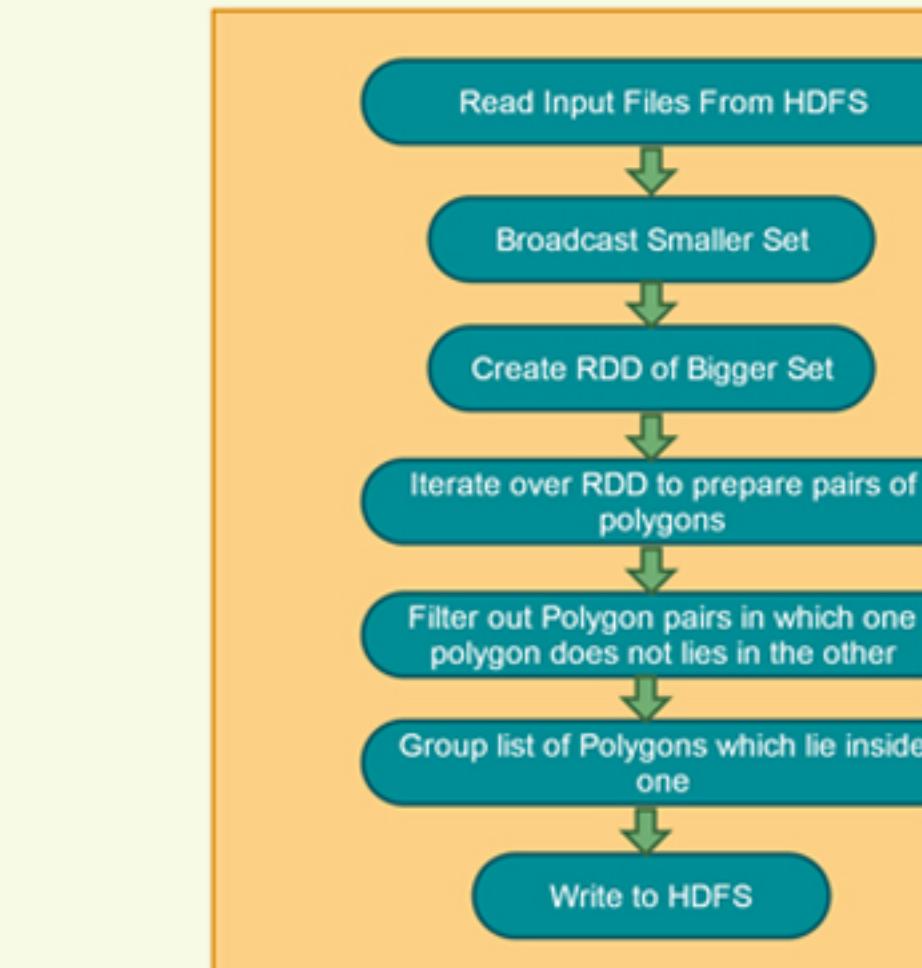
Code Flow of Spatial Range Query



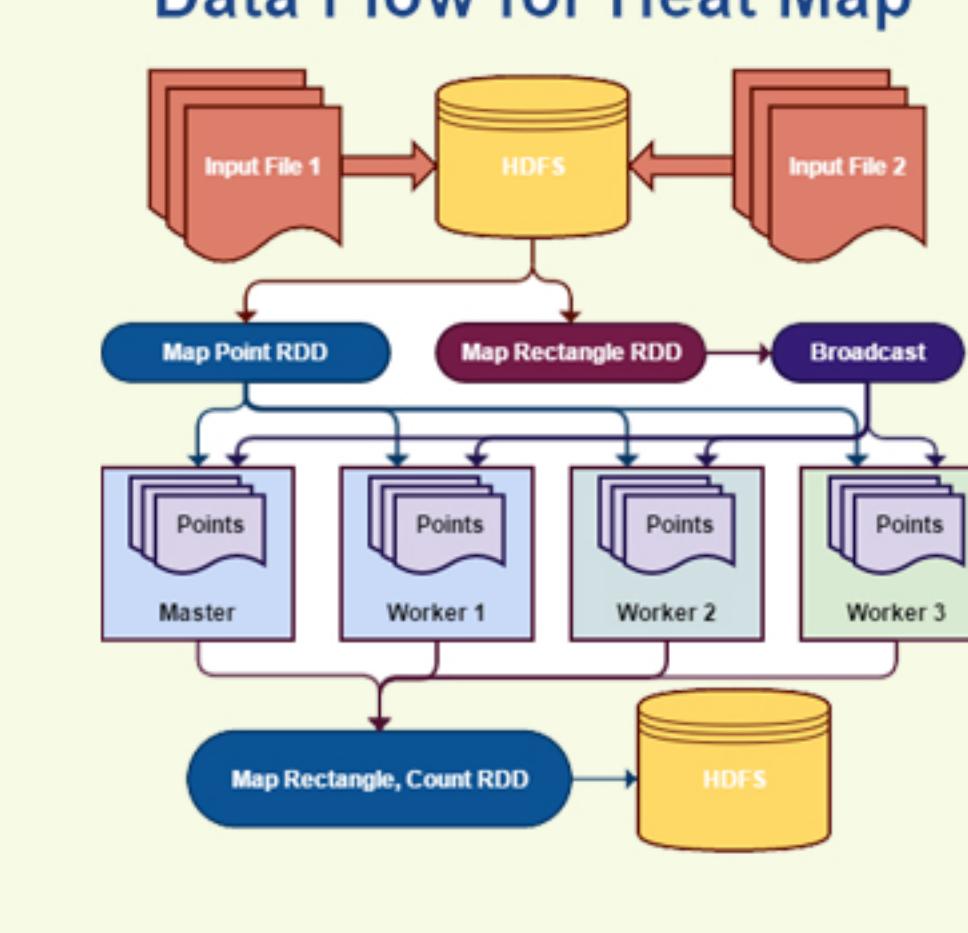
Data Flow of Spatial Join Query



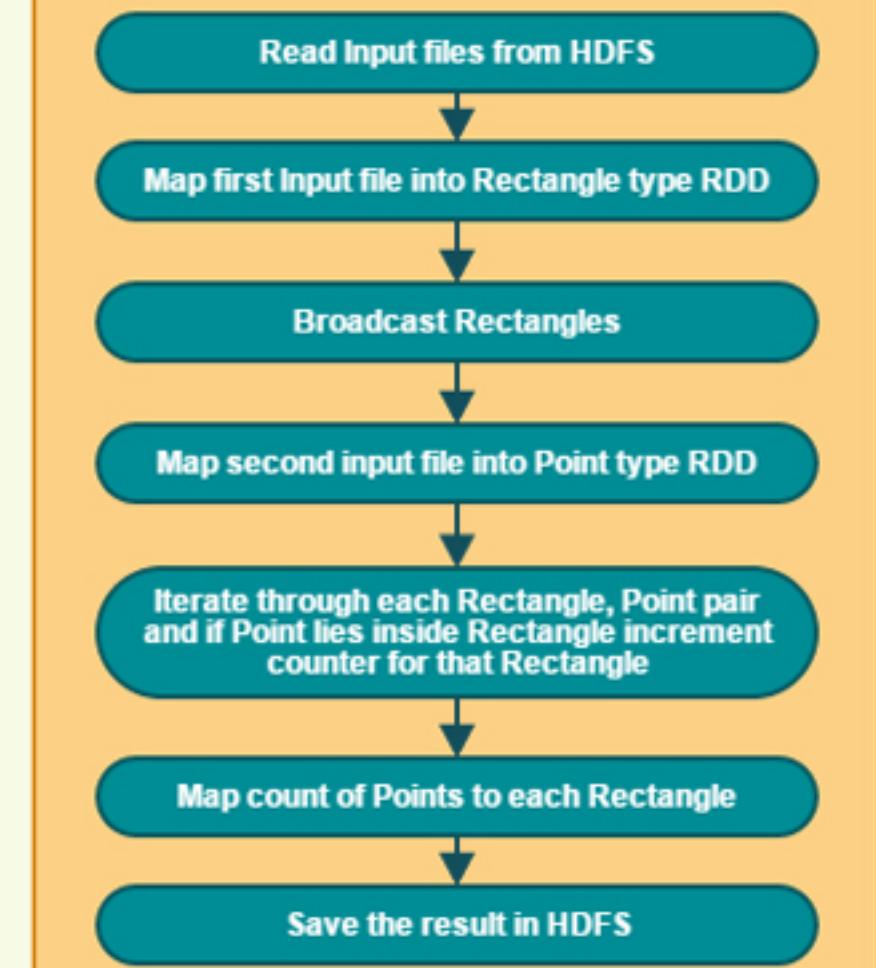
Code Flow of Spatial Join Query



Data Flow for Heat Map



Code Flow for Heat Map



PERFORMANCE ANALYSIS

CPU Usage and Communication Cost

Data Size	CPU Usage (%)		Communication Cost (MB)		Data Size	CPU Usage (%)		Communication Cost (MB)		Data Size	CPU Usage (%)		Communication Cost (MB)		Data Size	CPU Usage (%)		Communication Cost (MB)		
	1 - node	2 - nodes	4 - nodes	2 - nodes	4 - nodes	1 - node	2 - nodes	4 - nodes	2 - nodes	4 - nodes	1 - node	2 - nodes	4 - nodes	2 - nodes	4 - nodes	1 - node	2 - nodes	4 - nodes	2 - nodes	4 - nodes
Small	25.12	11.06	7.98	1.33	4.63	17.31	13.21	6.31	2.77	4.34	20.63	12.76	7.02	2.1	4.01	12.07	8.31	5.93	3.07	4.39
Medium	21.89	19.83	19.67	3.99	8.43	19.19	12.8	10.4	6.29	8.32	21.83	13.65	8.29	6.12	8.39	17.84	13	10.17	6.03	12.76
Large	21.89	20.98	20.43	5.19	10.34	31.8	11.23	7.32	10.45		27.69	17.25	6.75	7.91	12.56	17.09	16.37	12.67	10.52	15.34

RAM Usage and Time Taken

