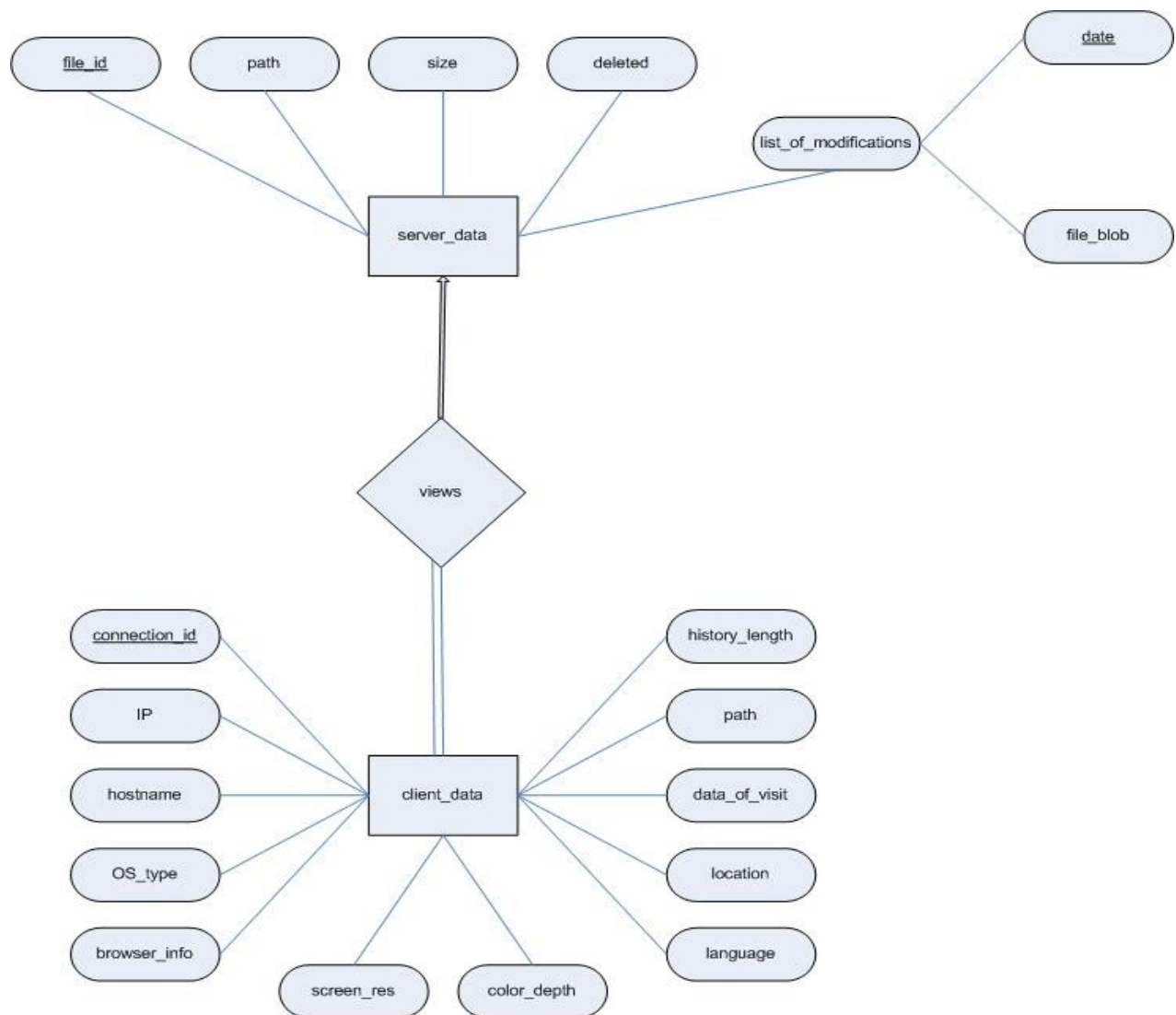


## HCI590 – Independent Study in Database Management Systems

### Normalization

This document displays the database design and discusses the notion of normalization. The aim is to point out in which – if any – normal form the database has been designed in to ensure an optimal design reducing redundancy and maximizing performance. In the following, an Entity-Relationship diagram of the database can be found along with a formal definition of the relations. For each relation schema, a list of normal form constraints (given a desired normal form) that are satisfied is shown.

### Entity-Relationship Diagram.



**Relation Schemas.**

In the following, please find the relation schemas in this database.

server\_data = (file\_id, path, size, deleted)  
 list\_of\_modifications = (server\_data.file\_id, date, file\_blob)  
 client\_data = (connection\_id, IP, hostname, OS\_type, browser\_info, screen\_res,  
 color\_depth, language, location, data\_of\_visit, path, history\_length)  
 views = (server\_data.file\_id, client\_data.connection\_id)

**Normalization to Boyce-Codd Normal Form.**

From the relation schemas, it follows that given an antecedent, a set of precedents can be inferred. This section lists all possible conclusions that can be drawn from the antecedents and which constraint of Boyce-Codd Normal Form are satisfied. BCNF is the desired normal form for this database.

<u>Antecedent</u> → <u>precedent</u>	<u>BCNF Constraints satisfied</u>
file_id → path, size, deleted	√ Antecedent is primary key √ Conclusion is not trivial
file_id, date → file_blob	√ Antecedent is primary key √ Conclusion is not trivial
connection_id → IP, hostname, OS_type, browser_info, screen_res, color_depth, language, location, data_of_visit, path, history_length	√ Antecedent is primary key √ Conclusion is not trivial
file_id, connection_id → path, size, deleted, IP, hostname, OS_type, browser_info, screen_res, color_depth, language, location, data_of_visit, history_length	√ Antecedent is primary key √ Conclusion is not trivial

All antecedents are primary keys and no precedent is trivial. It follows, that this database is in Boyce-Codd Normal Form. □