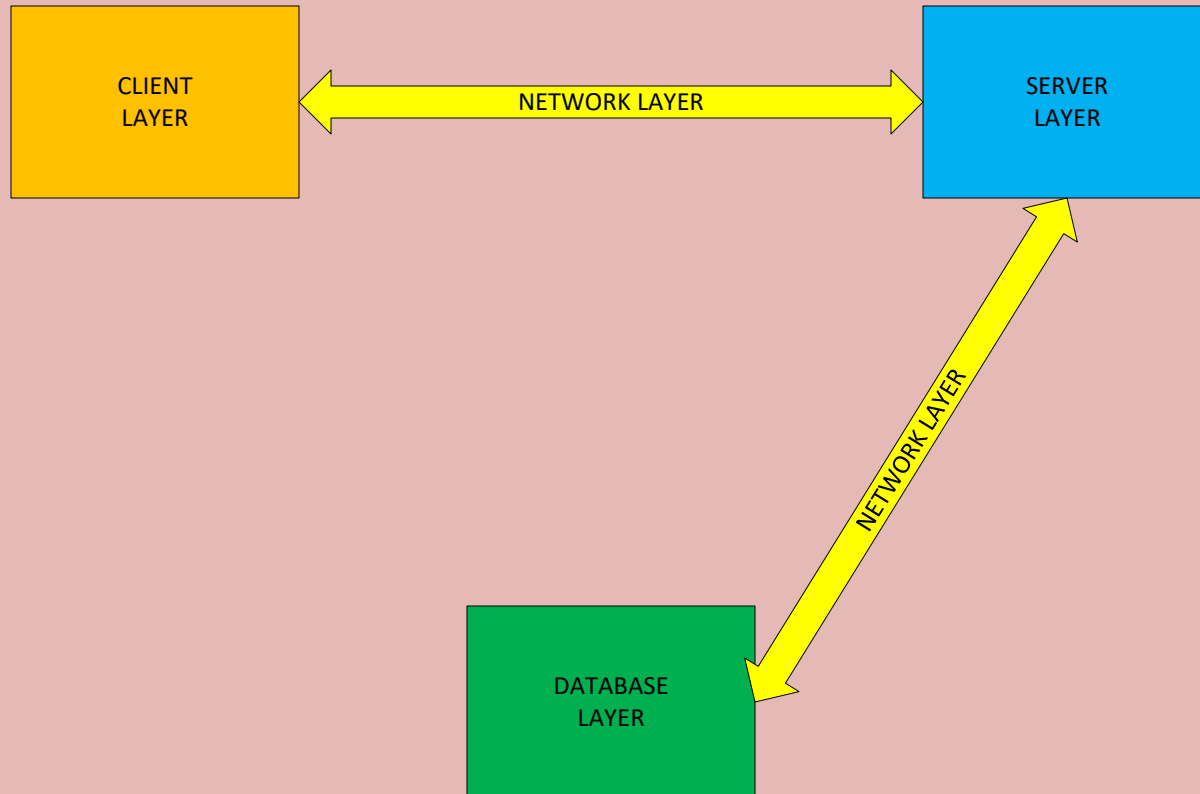
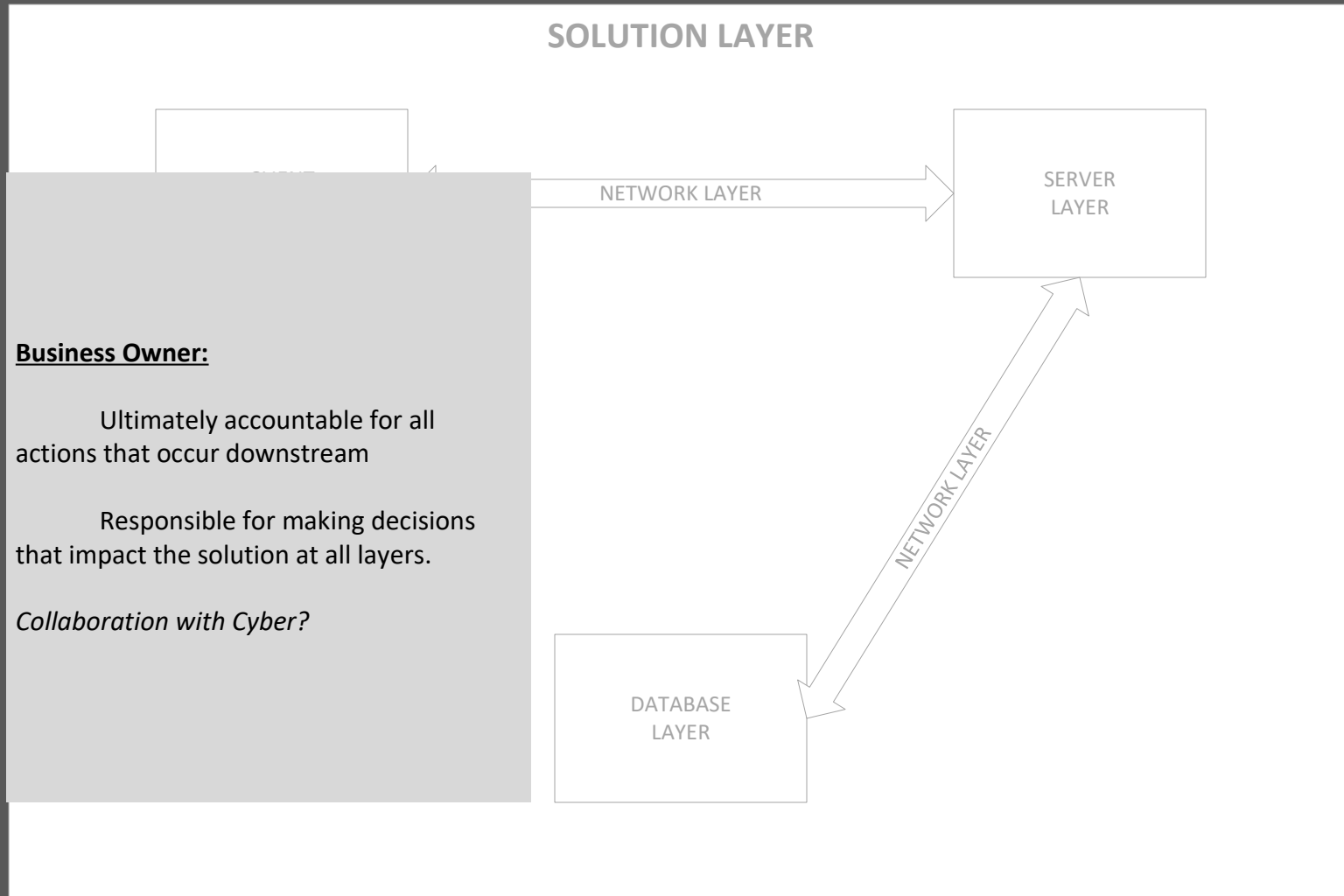


BUSINESS LAYER

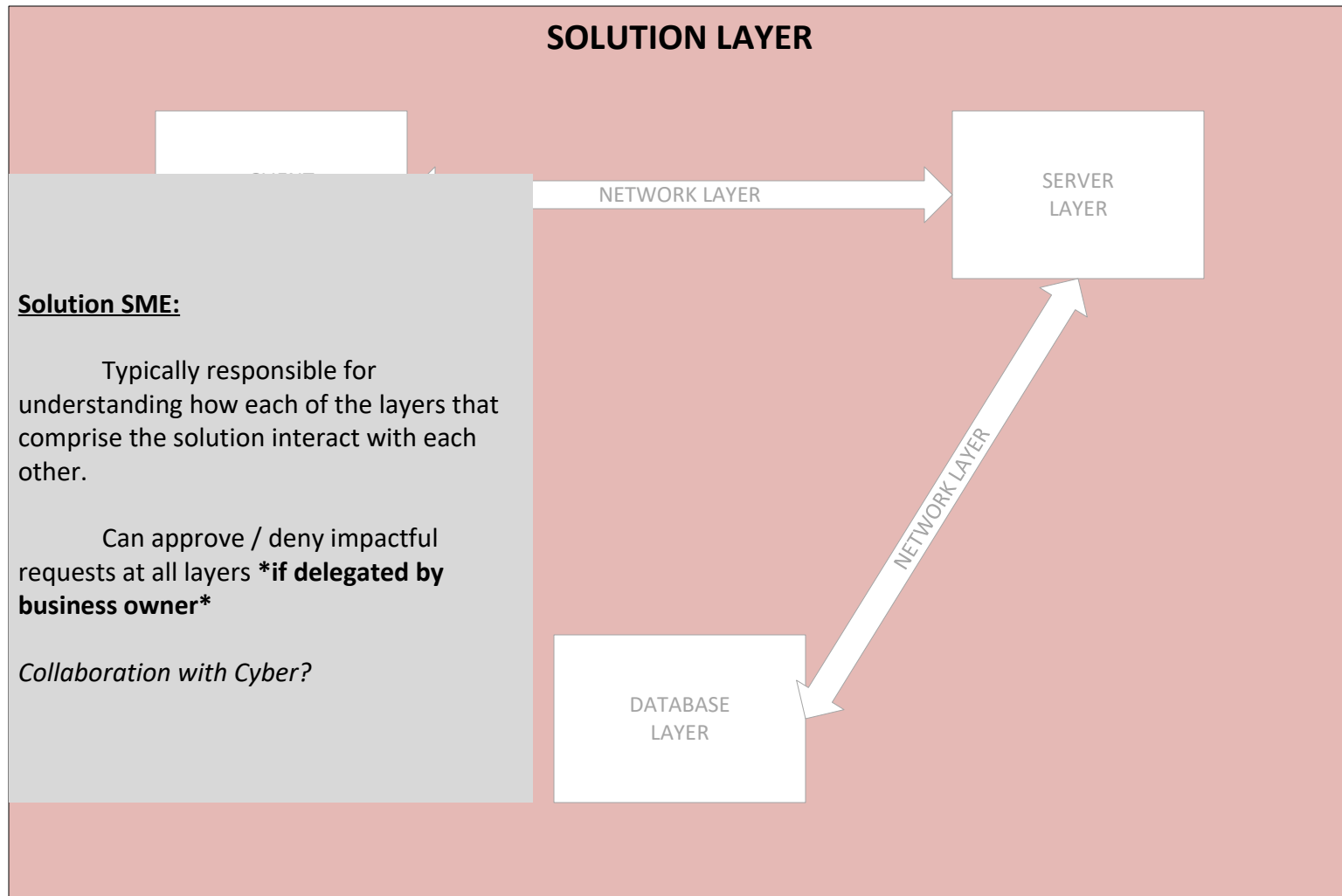
SOLUTION LAYER



BUSINESS LAYER

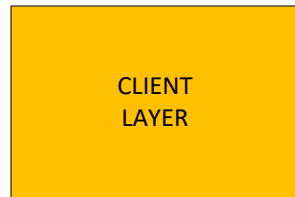


BUSINESS LAYER



BUSINESS LAYER

SOLUTION LAYER



NETWORK LAYER

A horizontal double-headed arrow with the text 'NETWORK LAYER' centered above it, connecting the CLIENT LAYER box to the SERVER box.

SERVER

A white rectangular box with a black border, containing the text 'SERVER' in black, uppercase letters. It is positioned at the top of a large gray block.

Client Application Support:

Desktop level support in
collaboration with Solution SME

DATABASE
LAYER

A white rectangular box with a black border, containing the text 'DATABASE LAYER' in black, uppercase letters. It is positioned at the bottom of a large gray block.

BUSINESS LAYER

```
graph LR; subgraph Business_Layer [BUSINESS LAYER]; subgraph Solution_Layer [SOLUTION LAYER]; subgraph Systems_Group [Systems Group]; direction TB; Host[“Host” layer of the enterprise, in collaboration with IT and Solution SMEs]; end; end; subgraph Server_Layer [SERVER LAYER]; end; subgraph Database_Layer [DATABASE LAYER]; end; Systems_Group -- NETWORK LAYER --> Server_Layer; Database_Layer -- NETWORK LAYER --> Server_Layer;
```

The diagram illustrates the Business Layer architecture, which is composed of several interconnected components:

- Systems Group:** A large grey rectangular block on the left. It contains a smaller white box at the top labeled "Host" layer of the enterprise, in collaboration with IT and Solution SMEs.
- Solution Layer:** A large white rectangular block on the right, containing the **SERVER LAYER** (a blue box) and the **DATABASE LAYER** (a white box).
- Network Layer:** Two arrows labeled "NETWORK LAYER" connect the **Systems Group** to the **SERVER LAYER** and the **DATABASE LAYER** to the **SERVER LAYER**.

BUSINESS LAYER

```
graph LR; subgraph Business_Layer [BUSINESS LAYER]; subgraph Solution_Layer [SOLUTION LAYER]; subgraph Systems_Group [Systems Group]; direction TB; Host[“Host” layer of the enterprise, in collaboration with IT and Solution SMEs]; end; end; subgraph Server_Layer [SERVER LAYER]; end; subgraph Database_Layer [DATABASE LAYER]; end; Systems_Group -- NETWORK LAYER --> Server_Layer; Database_Layer -- NETWORK LAYER --> Server_Layer;
```

The diagram illustrates the Business Layer architecture, which is divided into the Solution Layer and the Server Layer. The Solution Layer contains the Systems Group, which is responsible for supporting the “Host” layer of the enterprise, in collaboration with IT and Solution SMEs. The Systems Group is connected to the Server Layer via a Network Layer. The Database Layer is also connected to the Server Layer via a Network Layer.

SOLUTION LAYER

Systems Group:

Responsible for supporting the “Host” layer of the enterprise, in collaboration with IT and Solution SMEs

SERVER LAYER

DATABASE LAYER

NETWORK LAYER

BUSINESS LAYER

The diagram illustrates the Business Layer architecture, which is part of a larger system. It is contained within a box labeled "SOLUTION LAYER".

Systems Group:
Responsible for supporting the "Host" layer of the enterprise, in collaboration with IT and Solution SMEs

Database Layer

Server Layer

Network Layer (connecting Systems Group to Server Layer)

Network Layer (connecting Database Layer to Server Layer)

```
graph LR; subgraph SOLUTION_LAYER [SOLUTION LAYER]; subgraph BUSINESS_LAYER [BUSINESS LAYER]; SG[Systems Group]; DL[Database Layer]; SL[Server Layer]; SG -- NETWORK LAYER --> SL; DL -- NETWORK LAYER --> SL; end; end;
```

BUSINESS LAYER

The diagram illustrates the Business Layer architecture, which is part of a larger system. It is contained within a box labeled "SOLUTION LAYER".

Systems Group:
Responsible for supporting the "Host" layer of the enterprise, in collaboration with IT and Solution SMEs

Database Layer

Server Layer

Network Layer (connecting Systems Group to Server Layer)

Network Layer (connecting Database Layer to Server Layer)

```
graph LR; subgraph SOLUTION_LAYER [SOLUTION LAYER]; subgraph BUSINESS_LAYER [BUSINESS LAYER]; SG[Systems Group]; DL[Database Layer]; SL[Server Layer]; SG -- NETWORK LAYER --> SL; DL -- NETWORK LAYER --> SL; end; end;
```

BUSINESS LAYER

The diagram illustrates the Business Layer architecture, which is part of a larger system. It is contained within a box labeled "SOLUTION LAYER".

Systems Group:
Responsible for supporting the "Host" layer of the enterprise, in collaboration with IT and Solution SMEs

Database Layer

Server Layer

Network Layer (connecting Systems Group to Server Layer)

Network Layer (connecting Database Layer to Server Layer)

```
graph LR; subgraph SOLUTION_LAYER [SOLUTION LAYER]; subgraph BUSINESS_LAYER [BUSINESS LAYER]; SG[Systems Group]; DL[Database Layer]; SL[Server Layer]; SG -- NETWORK LAYER --> SL; DL -- NETWORK LAYER --> SL; end; end;
```

BUSINESS LAYER

```
graph LR; subgraph SOLUTION_LAYER [SOLUTION LAYER]; subgraph SYSTEMS_GROUP [Systems Group]; direction TB; Host[Host layer of the enterprise]; end; end; subgraph DB_LAYER [DATABASE LAYER]; direction TB; DB[Database]; end; subgraph SERVER_LAYER [SERVER LAYER]; direction TB; Server[Server]; end; SYSTEMS_GROUP -- NETWORK LAYER --> SERVER_LAYER; DB_LAYER -- NETWORK LAYER --> SERVER_LAYER;
```

The diagram illustrates the Business Layer architecture, which is part of the SOLUTION LAYER. It features three main components:

- Systems Group:** A large grey box on the left, responsible for supporting the "Host" layer of the enterprise, in collaboration with IT and Solution SMEs. It contains a smaller box labeled "Host" at the top.
- Database Layer:** A white box at the bottom center, containing a box labeled "Database".
- Server Layer:** A blue box on the right, containing a box labeled "Server".

Connections between the layers are indicated by arrows labeled "NETWORK LAYER":

- A horizontal arrow connects the Systems Group to the Server Layer.
- A diagonal arrow connects the Database Layer to the Server Layer.

BUSINESS LAYER

```
graph LR; subgraph SOLUTION_LAYER [SOLUTION LAYER]; subgraph SYSTEMS_GROUP [Systems Group]; direction TB; Host[Host layer of the enterprise]; end; end; subgraph DB_LAYER [DATABASE LAYER]; direction TB; DB[Database]; end; subgraph SERVER_LAYER [SERVER LAYER]; direction TB; Server[Server]; end; SYSTEMS_GROUP -- NETWORK LAYER --> SERVER_LAYER; DB_LAYER -- NETWORK LAYER --> SERVER_LAYER;
```

The diagram illustrates the Business Layer architecture, which is part of the SOLUTION LAYER. It features three main components:

- Systems Group:** A large grey box on the left, responsible for supporting the "Host" layer of the enterprise, in collaboration with IT and Solution SMEs. It contains a smaller box labeled "Host" at the top.
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- A horizontal arrow connects the Systems Group to the Server Layer.
- A diagonal arrow connects the Database Layer to the Server Layer.

BUSINESS LAYER

```
graph LR; subgraph SOLUTION_LAYER [SOLUTION LAYER]; subgraph SYSTEMS_GROUP [Systems Group]; direction TB; Host[Host layer of the enterprise]; end; end; subgraph DB_LAYER [DATABASE LAYER]; direction TB; DB[Database]; end; subgraph SERVER_LAYER [SERVER LAYER]; direction TB; Server[Server]; end; SYSTEMS_GROUP -- NETWORK LAYER --> SERVER_LAYER; DB_LAYER -- NETWORK LAYER --> SERVER_LAYER;
```

The diagram illustrates the Business Layer architecture, which is part of a larger system. It is contained within a box labeled **SOLUTION LAYER**.

Systems Group:

Responsible for supporting the “Host” layer of the enterprise, in collaboration with IT and Solution SMEs

The Systems Group is connected to the **SERVER LAYER** via a **NETWORK LAYER**. The **SERVER LAYER** is also connected to the **DATABASE LAYER** via a **NETWORK LAYER**.

BUSINESS LAYER

Database Group:

Responsible for supporting all solution artifacts that start at the DBMS Instance layer, in collaboration with Solution SMEs. *(see supporting diagram)*

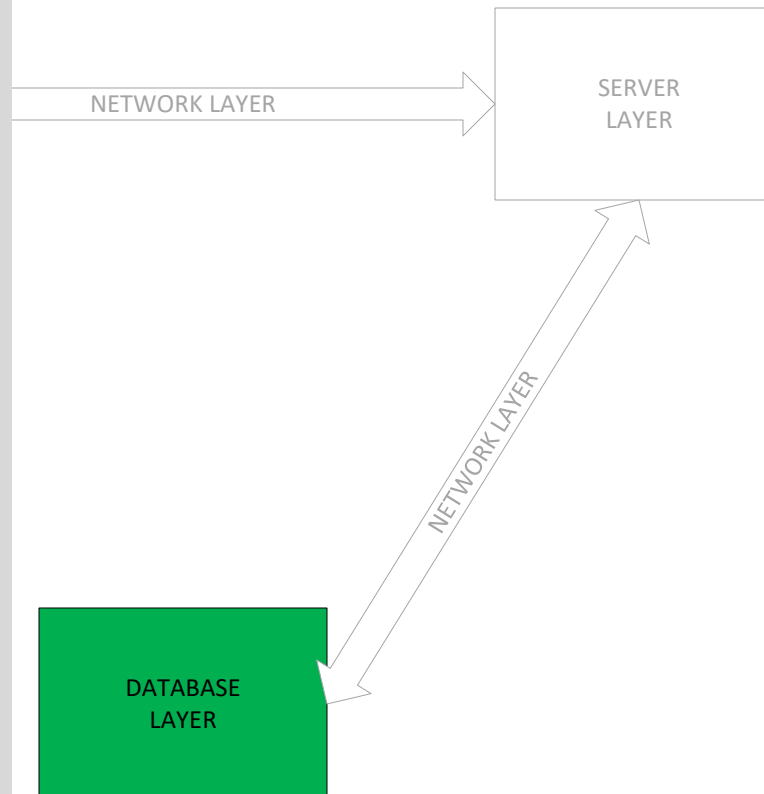
Dependency on Systems Group to provision Hosts, and Network Group to provision data transport throughput.

*Dependency on Cyber(?) to provision Active Directory accounts / groups that contribute to DBMS instance layer operation.

*Dependency on Cyber(?) and Business Owner / Solution SME collaboration to provision membership to Active Directory accounts / groups that provide access to DB Layer

**Current Sierra Space specific dependency*

SOLUTION LAYER



BUSINESS LAYER

SOLUTION LAYER

CLIENT
LAYER

NETWORK LAYER

SERVER
LAYER

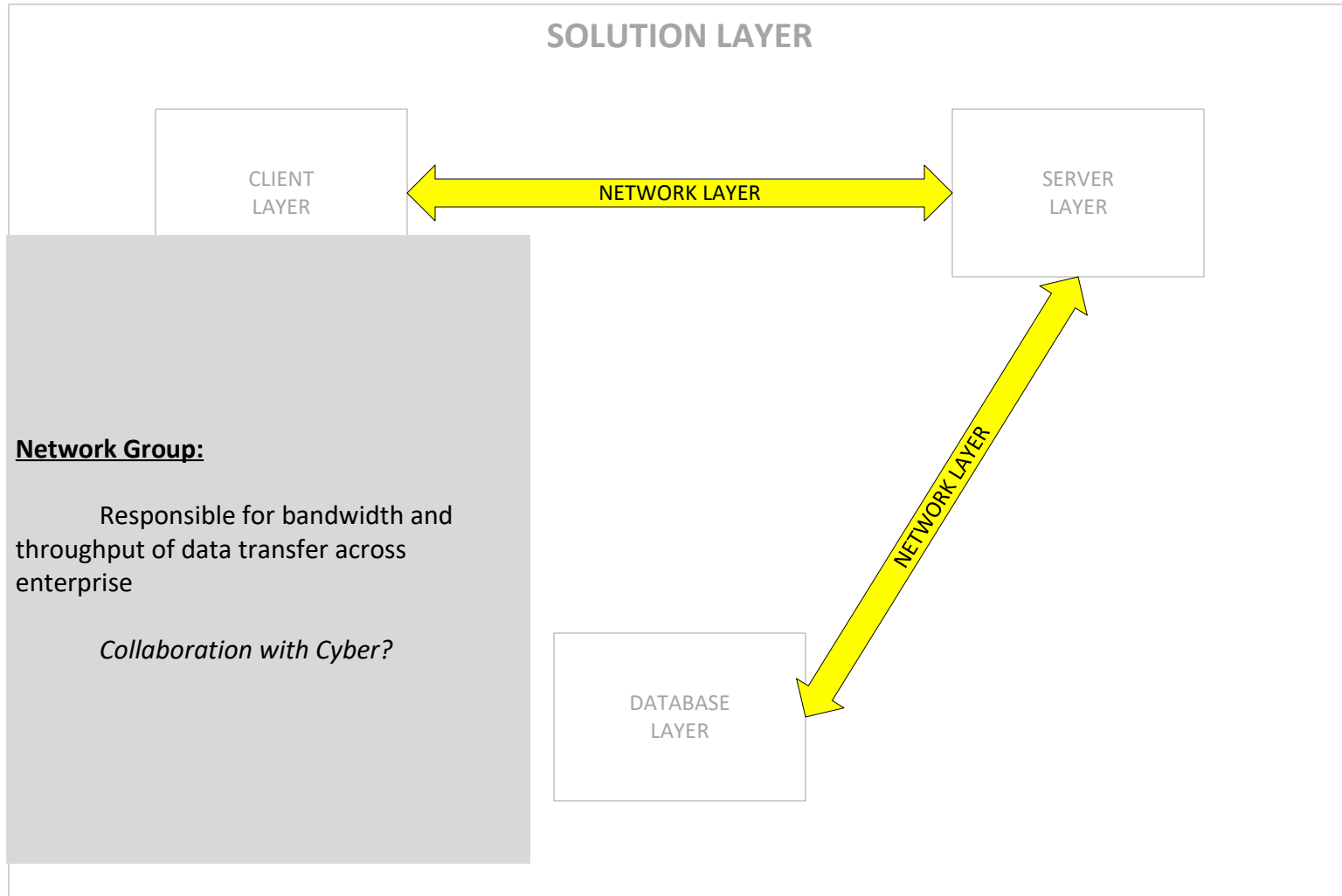
NETWORK LAYER

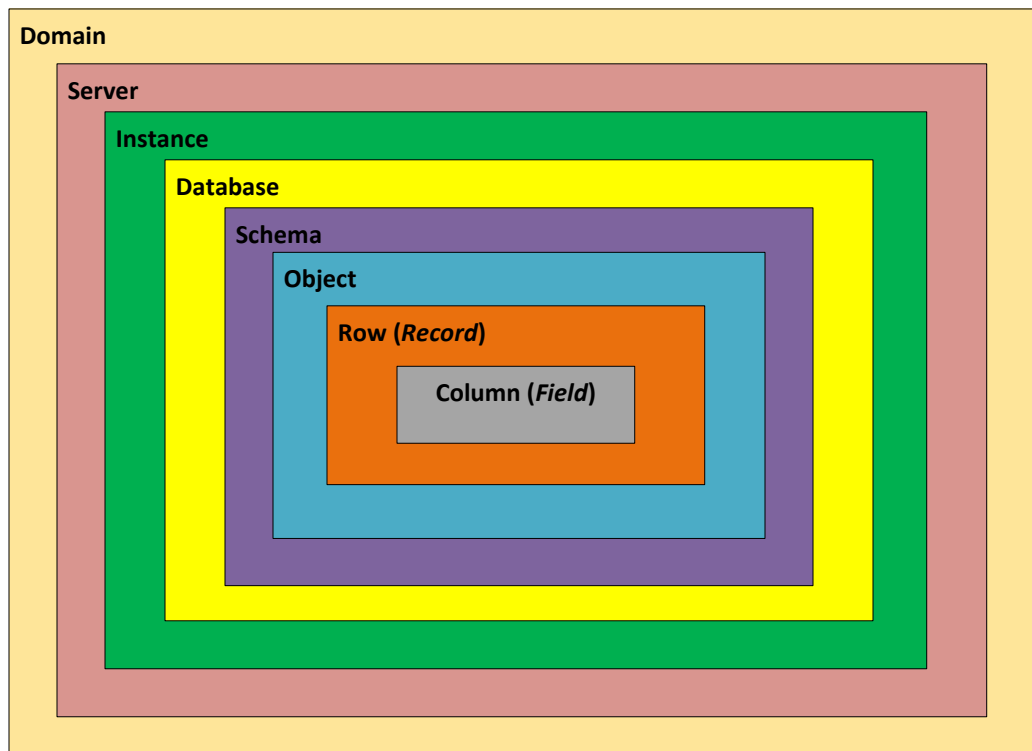
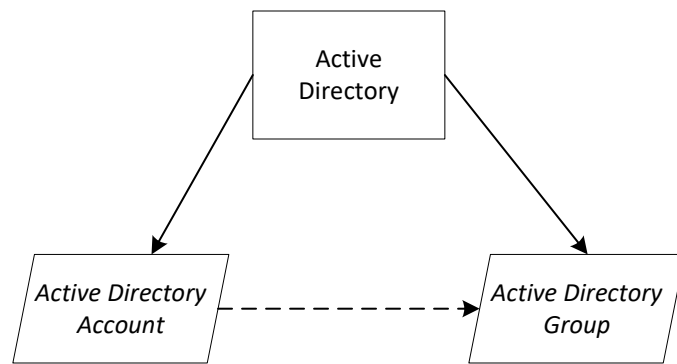
DATABASE
LAYER

Network Group:

Responsible for bandwidth and
throughput of data transfer across
enterprise

Collaboration with Cyber?





Database Environment / Dependent Objects:

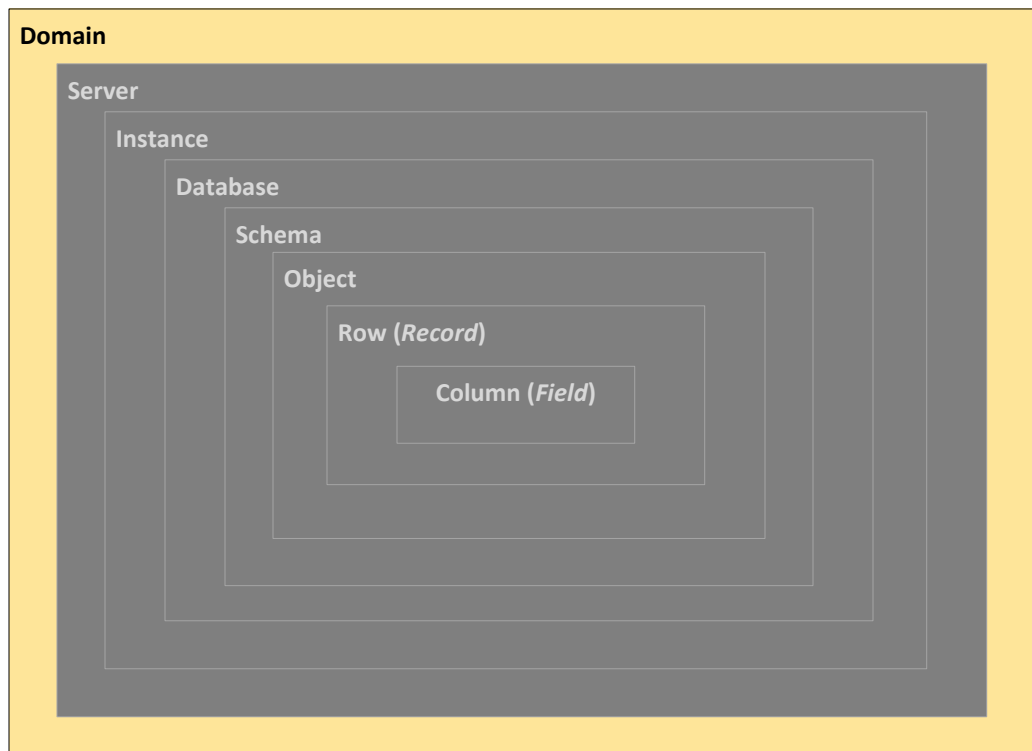
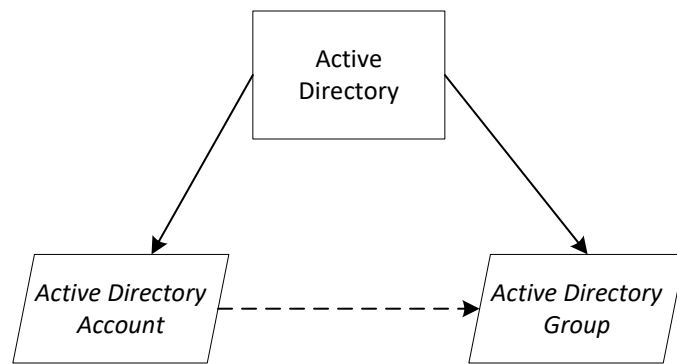
Domain (contains servers, accounts, groups)
 Server (contains instances, accounts, groups)
 Instance (contains databases, accounts, groups)
 Database (contains schemas, objects, users)
 Schema (contains objects, users)
 Object (contains rows, columns, data)
 Row (contains columns)
 Column (contains data)

(Cyber)Security
Application

Business
Application

SQL Server
Auth. Account

Local Server
Account



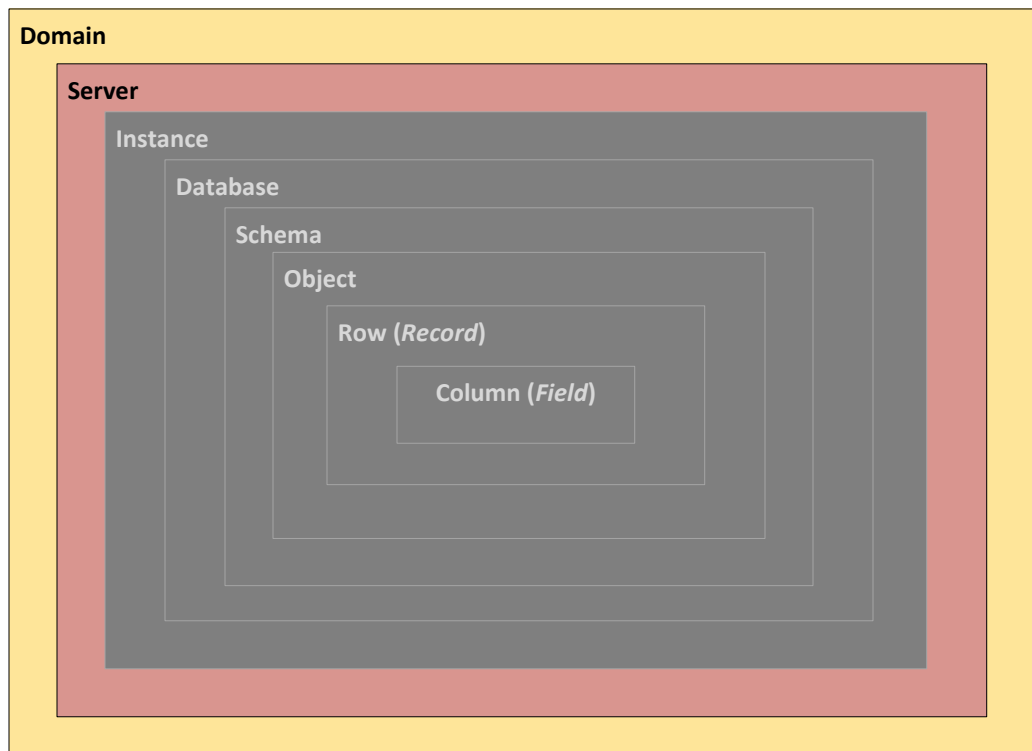
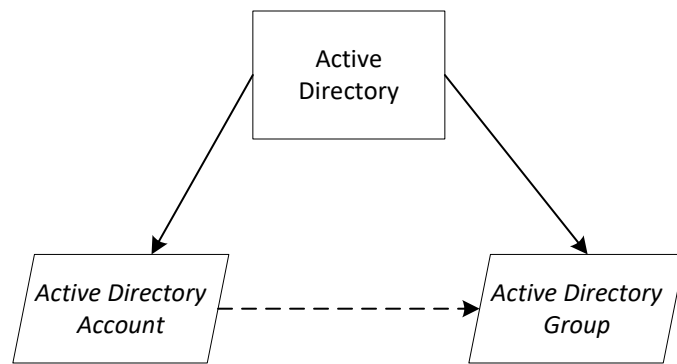
(Cyber)Security
Application

Business
Application

SQL Server
Auth. Account

Local Server
Account

- Active Directory Accounts are created within Active Directory.
- Active Directory Security Groups are created within Active Directory, and populated with Active Directory Accounts.
- Active Directory Accounts and Groups exist on a Domain.



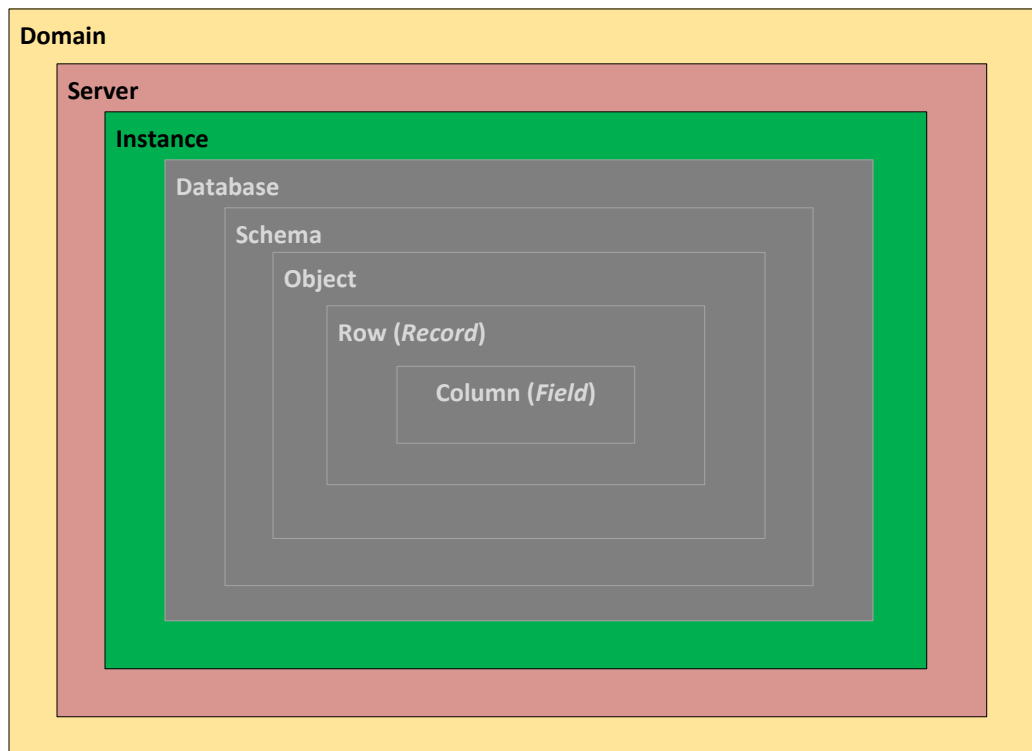
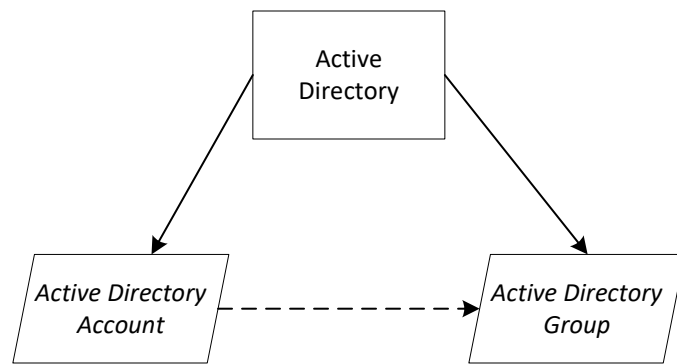
(Cyber)Security
Application

Business
Application

SQL Server
Auth. Account

Local Server
Account

- Servers are created on, and exist within a domain.
 - Active Directory Accounts and Groups that exist on a Domain, *can be* added to a Server that exists on a Domain.
 - If an Active Directory Account or Group is added to a Server that exists on a domain, that Account or Group is assigned a set of permissions that apply to the Server.
 - Local Server accounts exist outside of the Active Directory / Domain scope, and do not inherit any permissions.
- By default, no Server level permissions are inherited by child database artifacts.**



(Cyber)Security
Application

Business
Application

SQL Server
Auth. Account

Local Server
Account

- Active Directory Account status (locked / unlocked, active / inactive, etc.) is configured at the Active Directory layer.

- Membership to Active Directory groups is configured at the Active Directory layer.

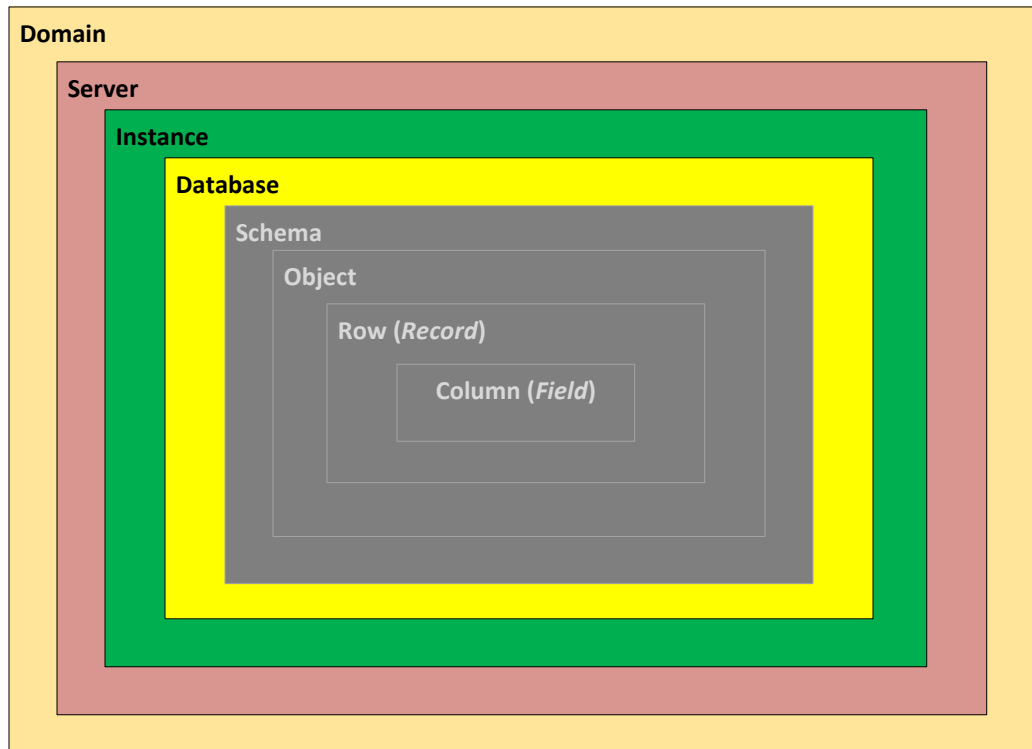
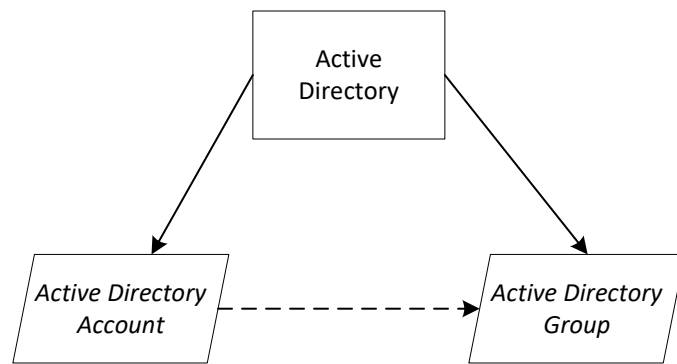
- Active Directory Accounts, *and* Active Directory Groups can be added to an Instance. By default, there are no implied permissions at the Instance layer given to an Account or Group that originates at the Active Directory layer. Permissions to the Instance for the Account or Group are configured / granted / revoked at the Instance layer.

- Local Server Accounts, *and* Local Server Groups can be added to an Instance. By default, there are no implied permissions at the Instance layer given to an Account or Group that originates at the Local Server layer. Permissions to the Instance for the Account or Group are configured / granted / revoked at the Instance layer.

- SQL Server Authenticated Accounts can be created at the Instance layer, and exist totally outside of the Domain and Server scopes. There are no implied upstream, or downstream permissions granted by default.

- "User Groups" do not exist at the SQL Server Authentication level.

- ActiveDirectory accounts, AD groups, Security Applications, Business Applications, etc. have no influence whatsoever by default.

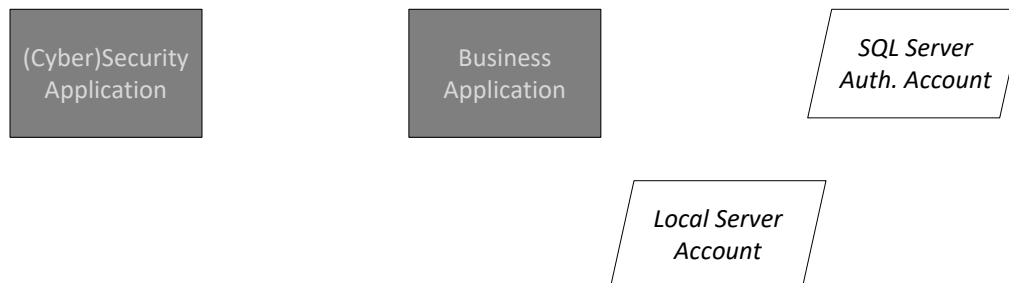


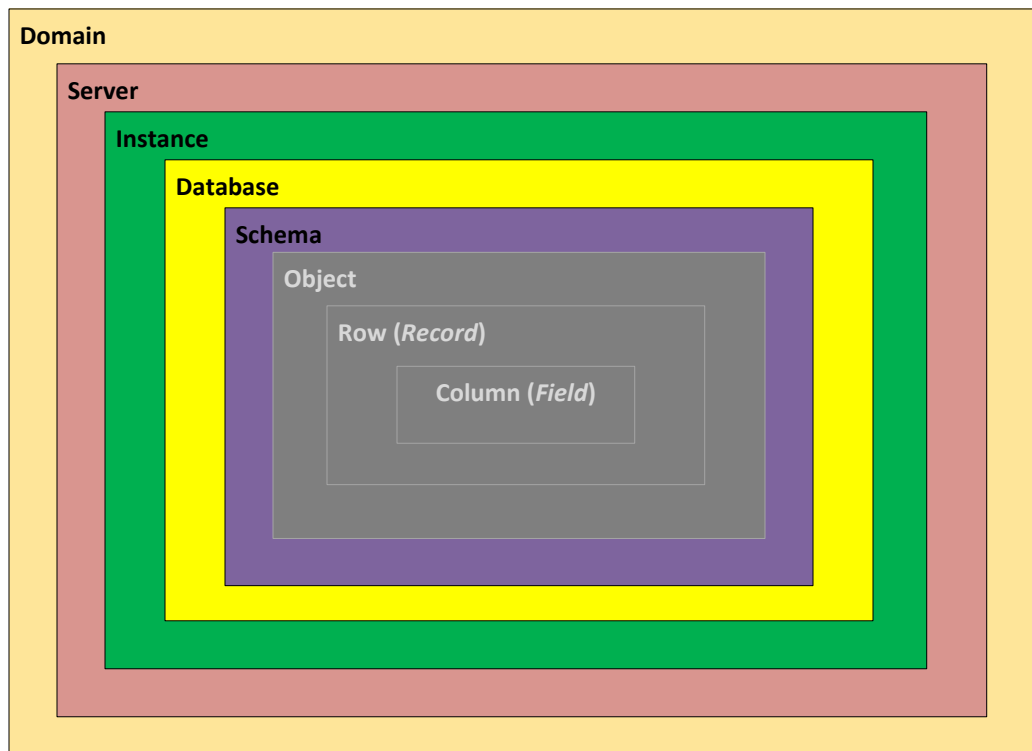
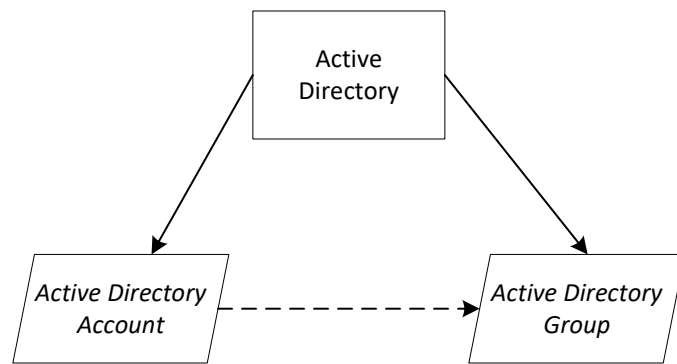
- Accounts ("logins") that exist at the Instance layer, irrespective of where they originate from (AD, Local, SQL, etc.) can be mapped to individual Users that exist at the Database level, and assigned permissions that apply to the Database level.

- There ***are*** levels of access that can be granted at the Instance layer that can supersede any permissions granted at the Database layer by default (*for example, membership to the sysadmin role at the Instance layer grants unrestricted access to **all** databases that exist within an instance*).

- Conversely, accounts that are granted rights at either the Domain or Server level (*or both*) will **NOT** inherit those rights at the Instance level by default.

- ActiveDirectory accounts, AD groups, Security Applications, Business Applications, etc. have no influence whatsoever by default.





- Schemas exist within the Database scope, and contain logical groupings of objects. By default, permissions are inherited from the Database scope.

Fine-grained control over discrete objects within a database can be achieved through the use of schemas.

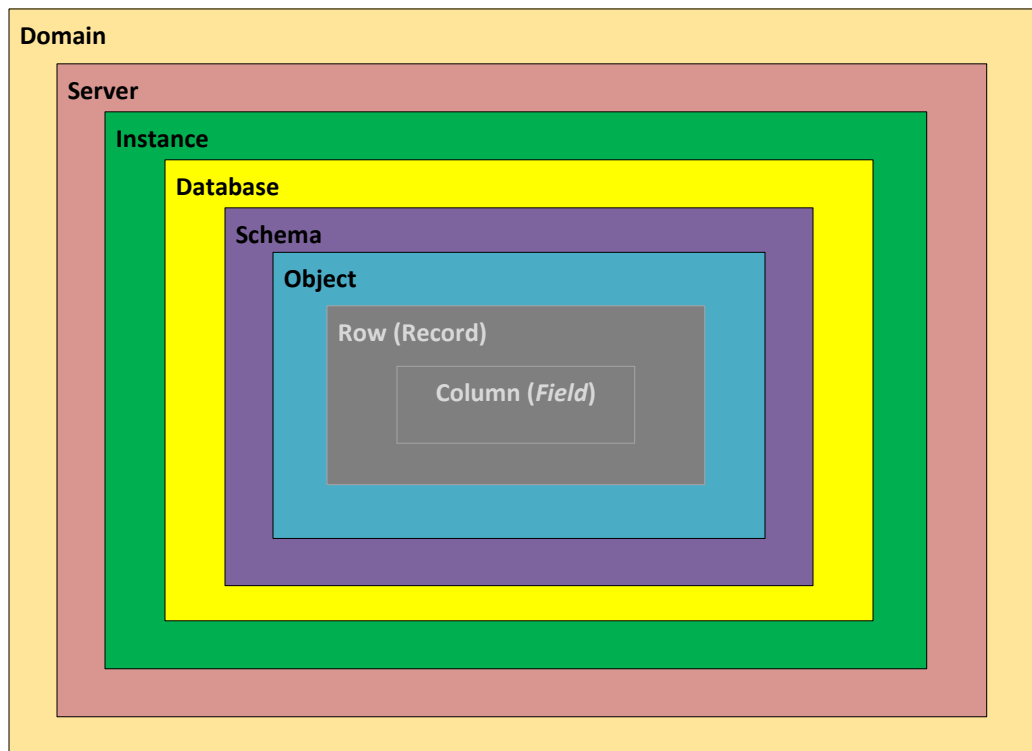
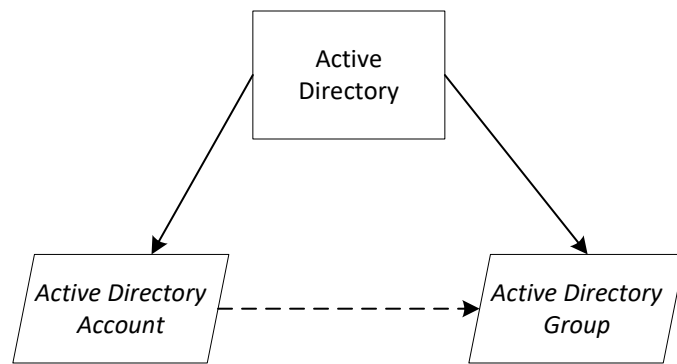
- ActiveDirectory accounts, AD groups, Security Applications, Business Applications, etc. have no influence whatsoever by default.

(Cyber)Security Application

Business Application

SQL Server Auth. Account

Local Server Account



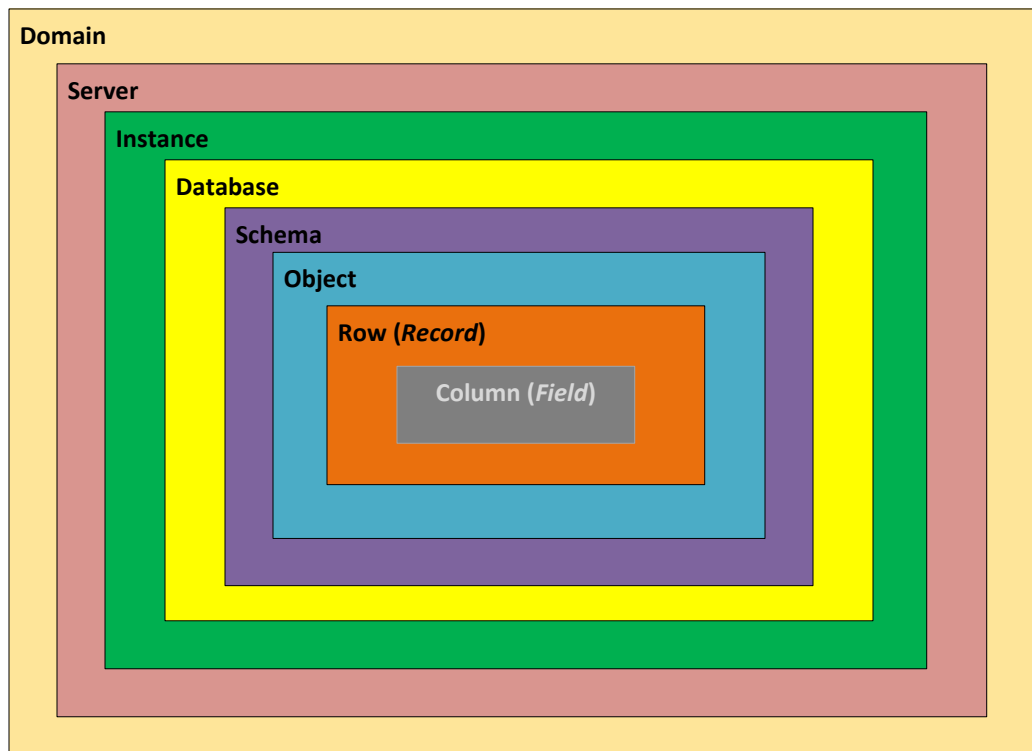
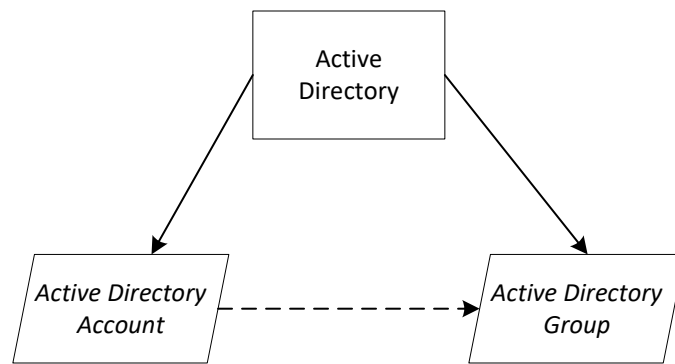
(Cyber)Security
Application

Business
Application

SQL Server
Auth. Account

Local Server
Account

- Objects (tables) contain rows of data with specific attributes identified by columns.
- Fine-grained control over specific objects within a database can be achieved through the use advanced security controls.
- ActiveDirectory accounts, AD groups, Security Applications, Business Applications, etc. have no influence whatsoever by default.



-Rows contain a collection of columns (fields) that are identified by name.

Fine-grained control over specific rows within an object (table) can be achieved through the use advanced security controls.

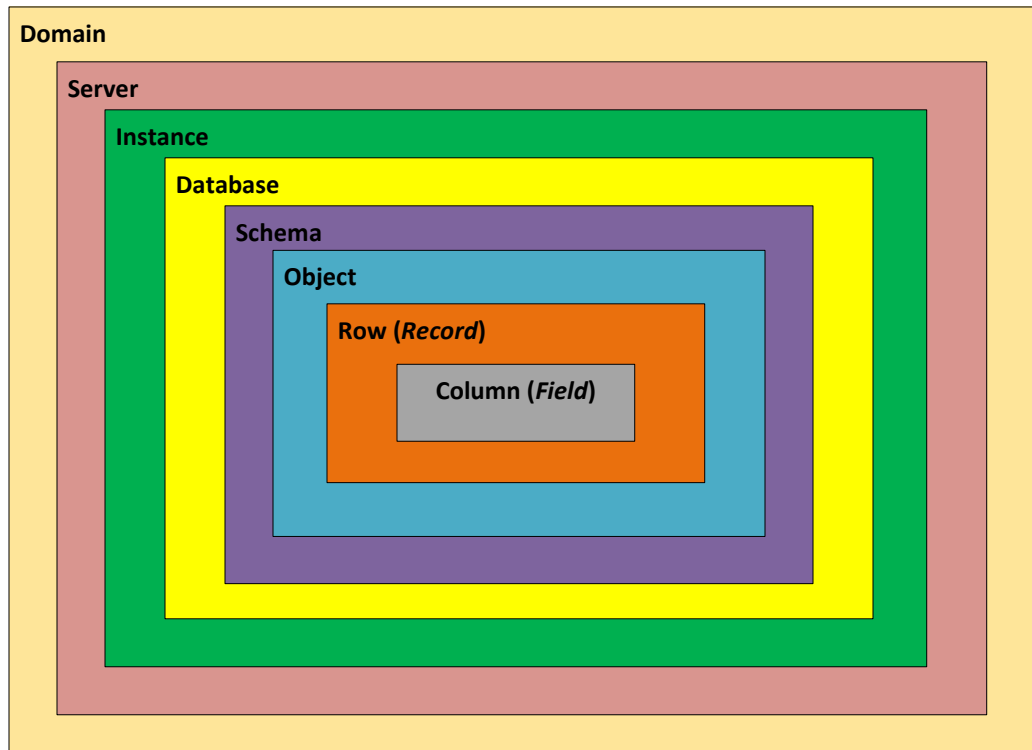
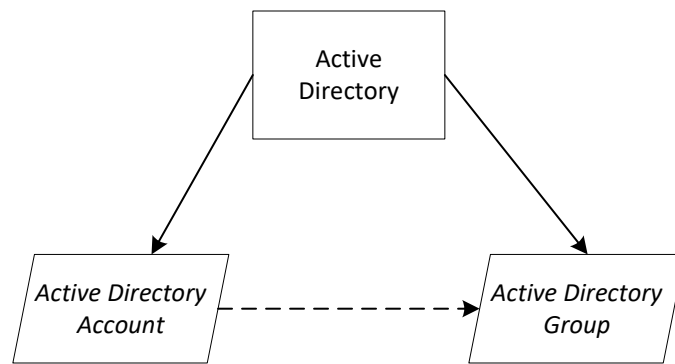
- ActiveDirectory accounts, AD groups, Security Applications, Business Applications, etc. have no influence whatsoever by default.

(Cyber)Security
Application

Business
Application

SQL Server
Auth. Account

Local Server
Account



-Columns (fields) exist within a row, and can contain various data attributes.

Fine-grained control over specific columns within an object (table) can be achieved through the use advanced security controls.

- ActiveDirectory accounts, AD groups, Security Applications, Business Applications, etc. have no influence whatsoever by default.

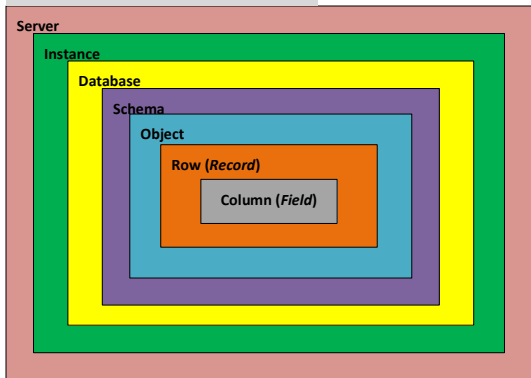
(Cyber)Security
Application

Business
Application

SQL Server
Auth. Account

Local Server
Account

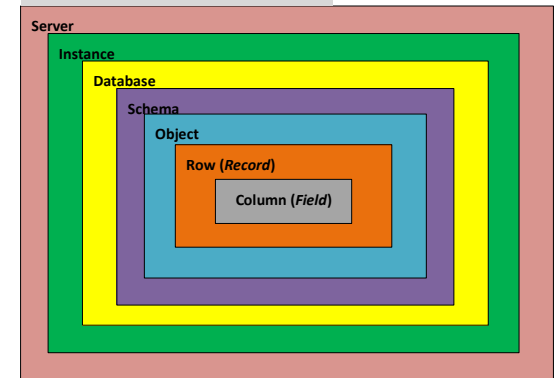
PRODUCTION



DATABASE LAYER

What's often referred to colloquially as "the database" or "SQL" is more accurately represented as shown on this page.

DEVELOPMENT



Relationships / Multiplicity:

Single Solution -> Multiple Apps

Single Application -> Multiple Servers

Single Server -> Multiple Instances

Single Instance -> Multiple Databases

Single Database -> Multiple Schemas

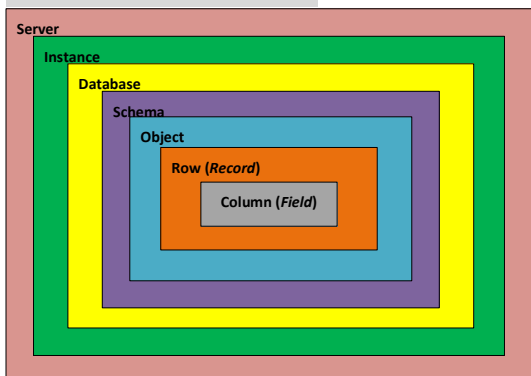
Single Schema -> Multiple Objects

Single Object -> Multiple Rows

Single Row -> Multiple Columns

Single Column -> Multiple Values

UAT



TEST

