

Starting
shortly

Please
wait!

ActivityInfo

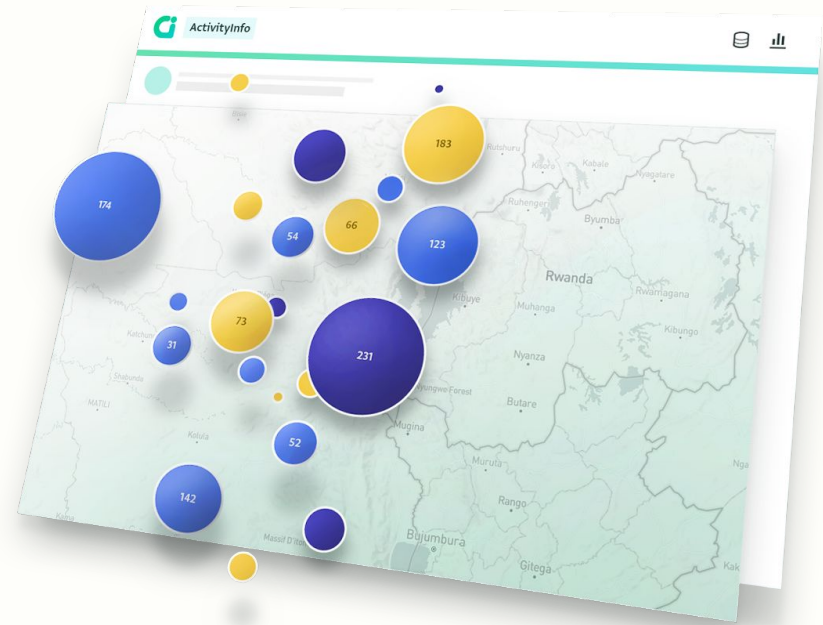
Database design principles and
designing new databases in ActivityInfo

INTRODUCTIONS

Presented by the ActivityInfo Team

Monitoring & Evaluation Software

- Track activities, outcomes
- Beneficiary management
- Surveys
- Work offline / online



POLL

1. How would you rate your proficiency in designing databases?
 - a. Beginner, I'm not really sure where to start
 - b. Intermediate, I know a bit but am looking to improve
 - c. Advanced, I already know how to design effective databases

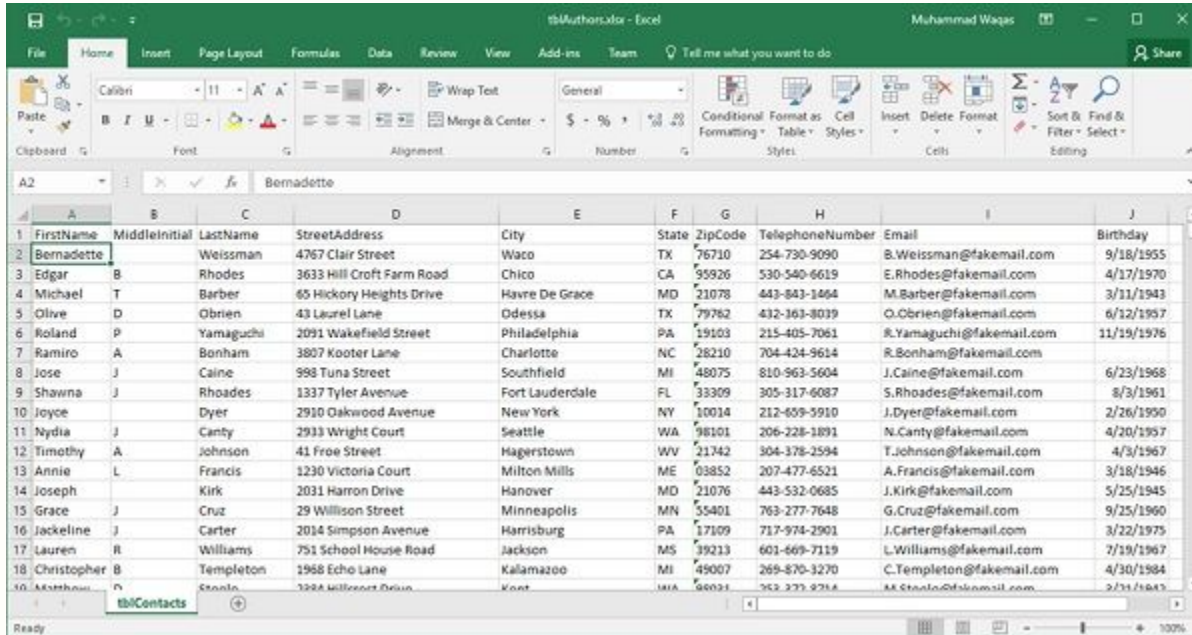
2. How long have you been using ActivityInfo for, if at all?
 - a. A few weeks
 - b. A few months
 - c. Over a year
 - d. I haven't used ActivityInfo yet

Agenda

1. Introductions and Housekeeping
2. Principles of good database design
3. Steps to designing an effective database
4. Applying the design principles in ActivityInfo
5. Q&A

How to design an effective database

Why think about database design?



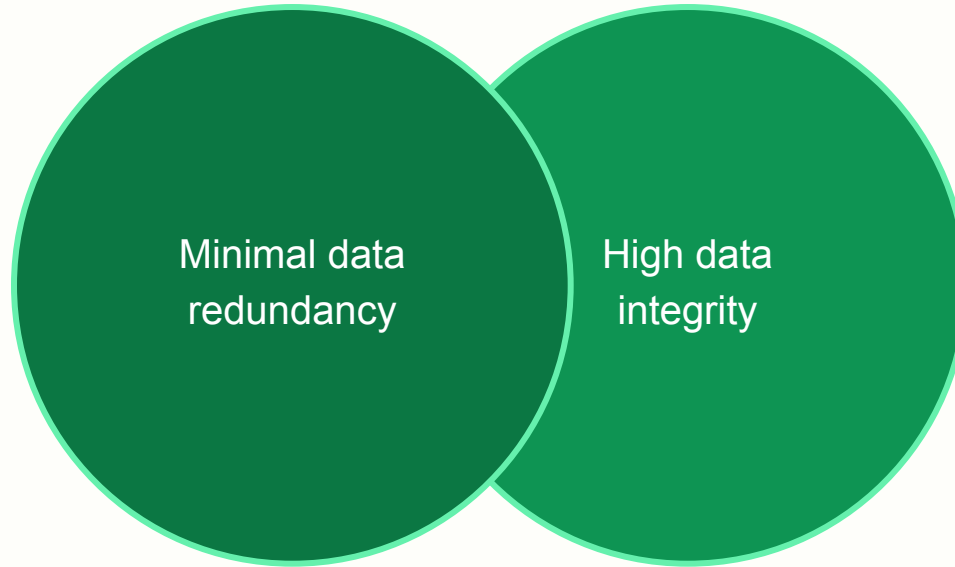
The screenshot shows an Excel spreadsheet titled "tblAuthors.xlsx - Excel" with the following data:

| | A | B | C | D | E | F | G | H | I | J |
|----|-------------|---------------|-----------|---------------------------|-----------------|-------|---------|-----------------|--------------------------|------------|
| 1 | FirstName | MiddleInitial | LastName | StreetAddress | City | State | ZipCode | TelephoneNumber | Email | Birthday |
| 2 | Bernadette | | Weissman | 4767 Clair Street | Waco | TX | 76710 | 254-730-9090 | B.Weissman@fakemail.com | 9/18/1955 |
| 3 | Edgar | B | Rhodes | 3633 Hill Croft Farm Road | Chico | CA | 95926 | 530-540-6619 | E.Rhodes@fakemail.com | 4/17/1970 |
| 4 | Michael | T | Barber | 65 Hickory Heights Drive | Havre De Grace | MD | 21078 | 443-843-1464 | M.Barber@fakemail.com | 3/11/1943 |
| 5 | Olive | D | Obrien | 43 Laurel Lane | Odessa | TX | 79762 | 432-363-8039 | O.Obrien@fakemail.com | 6/12/1957 |
| 6 | Roland | P | Yamaguchi | 2091 Wakefield Street | Philadelphia | PA | 19103 | 215-405-7061 | R.Yamaguchi@fakemail.com | 11/19/1976 |
| 7 | Ramiro | A | Bonham | 3807 Kooter Lane | Charlotte | NC | 28210 | 704-424-9614 | R.Bonham@fakemail.com | |
| 8 | Jose | J | Caine | 998 Tuna Street | Southfield | MI | 48075 | 810-963-5604 | J.Caine@fakemail.com | 6/23/1968 |
| 9 | Shawna | J | Rhoades | 1337 Tyler Avenue | Fort Lauderdale | FL | 33309 | 305-317-6087 | S.Rhoades@fakemail.com | 8/3/1961 |
| 10 | Joyce | | Dyer | 2910 Oakwood Avenue | New York | NY | 10014 | 212-659-5910 | J.Dyer@fakemail.com | 2/26/1990 |
| 11 | Nydia | J | Canty | 2933 Wright Court | Seattle | WA | 98101 | 206-228-1891 | N.Canty@fakemail.com | 4/20/1957 |
| 12 | Timothy | A | Johnson | 41 Froe Street | Hagerstown | WV | 21742 | 304-378-2594 | T.Johnson@fakemail.com | 4/3/1967 |
| 13 | Annie | L | Francis | 1230 Victoria Court | Milton Mills | ME | 03852 | 207-477-6521 | A.Francis@fakemail.com | 3/18/1946 |
| 14 | Joseph | | Kirk | 2031 Harron Drive | Hanover | MD | 21076 | 443-532-0685 | J.Kirk@fakemail.com | 5/25/1945 |
| 15 | Grace | J | Cruz | 29 Willison Street | Minneapolis | MN | 55401 | 763-277-7648 | G.Cruz@fakemail.com | 9/25/1960 |
| 16 | Jackeline | J | Carter | 2014 Simpson Avenue | Harrisburg | PA | 17109 | 717-974-2901 | J.Carter@fakemail.com | 3/22/1975 |
| 17 | Lauren | R | Williams | 751 School House Road | Jackson | MS | 39213 | 601-669-7119 | L.Williams@fakemail.com | 7/19/1967 |
| 18 | Christopher | B | Templeton | 1968 Echo Lane | Kalamazoo | MI | 49007 | 269-870-3270 | C.Templeton@fakemail.com | 4/30/1984 |
| 19 | Matthew | | Stanton | 3884 Willson Drive | Koot | MI | 49001 | 763-273-2718 | M.Stanton@fakemail.com | 2/21/1943 |

Why think about database design?

1. Maximize efficiency in your data workflows
 - a. Minimize duplication of effort
 - b. Maximize value of each data point
2. Minimize storage
 - a. Reduces cost
 - b. Improves performance
3. Minimize the need for future restructuring

What does a good database look like?



Steps to designing an effective database

Step 1
Identify
entities

Step 2
Identify
attributes

Step 3
Identify
relationships

Step 4
Assign
keys

Step 5
Normalize

Step 1: Identify Entities

Entity: a discrete data object, the basic building block of your database

Beneficiaries

Training Courses

Training Sessions

Step 2: Identify Attributes

Attribute: a characteristic that describes your entity in some way

| Beneficiaries |
|--|
| <ul style="list-style-type: none">• Name• Date of birth• Sex• Age |

| Training Courses |
|---|
| <ul style="list-style-type: none">• Course Name• Instructor• Location |

| Training Sessions |
|--|
| <ul style="list-style-type: none">• Date• Participants• Number of participants |

Step 2: Identify Attributes

Attribute: a characteristic that describes your entity in some way

| Beneficiaries |
|--|
| <ul style="list-style-type: none">• Name (text)• Date of birth (date)• Sex (defined list)• Age (quantity) |

| Training Courses |
|--|
| <ul style="list-style-type: none">• Course Name (text)• Instructor (text)• Location (text) |

| Training Sessions |
|---|
| <ul style="list-style-type: none">• Date (date)• Participants (text)• Number of participants (quantity) |

Tip: Think about data types

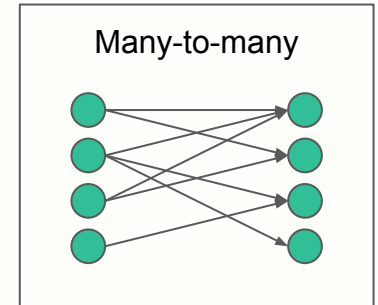
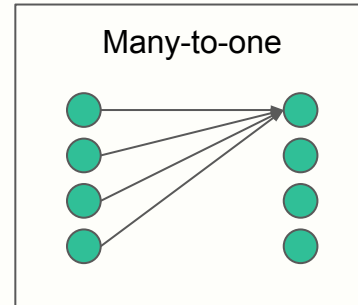
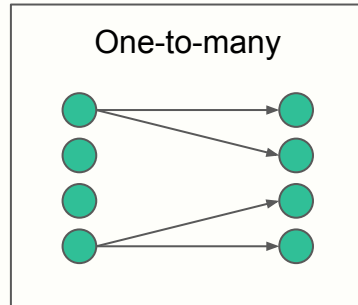
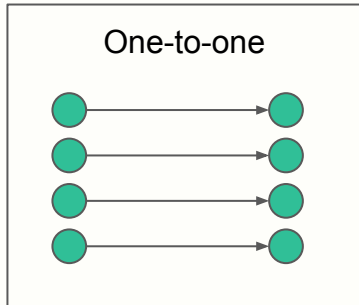
Step 3: Identify Relationships

Relationship: how entities relate to each other

- Training Course → Training Session: each Training Course can be conducted over multiple sessions
- Training Session → Training Course: each Training Session covers only one Training Course
- Beneficiary → Training Session: each beneficiary can attend multiple Training Sessions
- Training Session → Beneficiary: each Training Session can be attended by multiple Beneficiaries

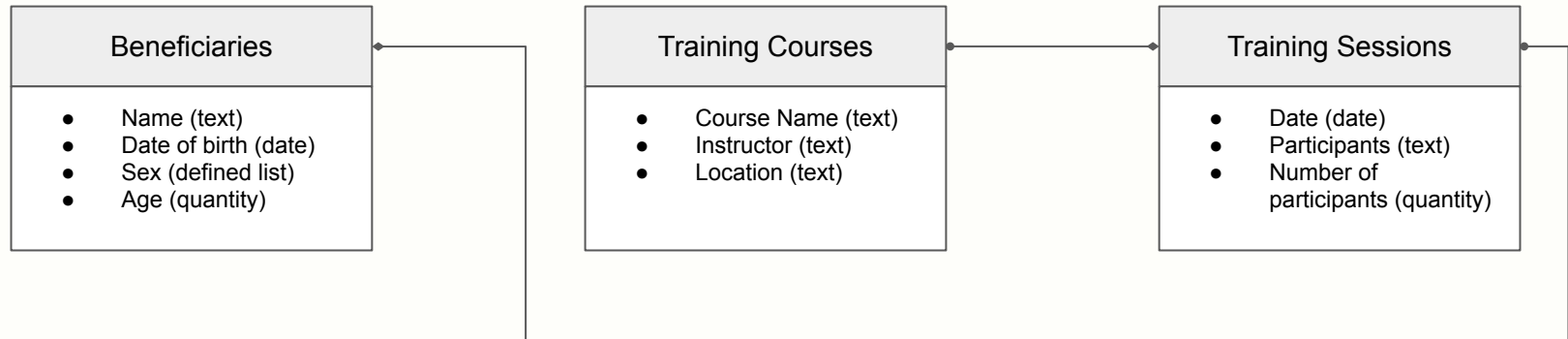
Step 3: Identify Relationships

Cardinality: how many on one side of the relationship relate to how many on the other side of the relationship



Step 3: Identify Relationships

Tip: Visualize the relationships in a data model



Step 4: Assign Keys

Key: an attribute or combination of attributes used to *uniquely* identify an entity

| Beneficiaries |
|---|
| <ul style="list-style-type: none">• Name (text)• Date of birth (date)• Sex (defined list)• Age (quantity) |

| Training Courses |
|---|
| <ul style="list-style-type: none">• Course Name (text)• Instructor (text)• Location (text) |

| Training Sessions |
|--|
| <ul style="list-style-type: none">• Date (date)• Participants (text)• Number of participants (quantity) |

Step 5: Database Normalization

Normalization: the process of *organizing* your data in your database *more efficiently*

2 Goals of Normalization:

1. Eliminate redundant data
2. Improve integrity of data

Step 5: Database Normalization

An example

| Training Name | Trainer | Training Institute | Training Location | Participants |
|----------------------|----------------|---------------------------|--------------------------|----------------------------|
| Income generation | Tom Berry | Training Days College | Manchester | Bill Ferris, Odil Sam |
| Data management | Ermin Raen | Practice School | Glasgow | Farin Roe, Petra Kaleb |
| English for business | Bob Morrin | Centaur Institute | Birmingham | Elaine Phil, Andrew Shiren |

Step 5: Database Normalization

First Normal Form: Each attribute should only have **one** value

| Training Name | Trainer | Training Institute | Training Location | Participants |
|----------------------|------------|-----------------------|-------------------|---------------|
| Income generation | Tom Berry | Training Days College | Manchester | Bill Ferris |
| Income generation | Tom Berry | Training Days College | Manchester | Odil Sam |
| Data management | Ermin Raen | Practice School | Glasgow | Farin Roe |
| Data management | Ermin Raen | Practice School | Glasgow | Petra Kaleb |
| English for business | Bob Morrin | Centaur Institute | Birmingham | Elaine Phil |
| English for business | Bob Morrin | Centaur Institute | Birmingham | Andrew Shiren |

Step 5: Database Normalization

Second Normal Form: All other values must be *functionally dependent* on the whole primary key

| Training Name | Trainer | Training Institute | Training Location |
|----------------------|------------|-----------------------|-------------------|
| Income generation | Tom Berry | Training Days College | Manchester |
| Data management | Ermin Raen | Practice School | Glasgow |
| English for business | Bob Morrin | Centaur Institute | Birmingham |

| Training Name | Participants |
|----------------------|---------------|
| Income generation | Bill Ferris |
| Income generation | Odil Sam |
| Data management | Farin Roe |
| Data management | Petra Kaleb |
| English for business | Elaine Phil |
| English for business | Andrew Shiren |

Step 5: Database Normalization

Third Normal Form: No transitive functional dependencies

| Training Name (PK) | Trainer | Training Institute (FK) |
|----------------------|------------|-------------------------|
| Income generation | Tom Berry | Training Days College |
| Data management | Ermin Raen | Practice School |
| English for business | Bob Morrin | Centaur Institute |

| Training Institute (PK) | Training Location |
|-------------------------|-------------------|
| Training Days College | Manchester |
| Practice School | Glasgow |
| Centaur Institute | Birmingham |

| Training Name (FK) | Participants (PK) |
|----------------------|-------------------|
| Income generation | Bill Ferris |
| Income generation | Odil Sam |
| Data management | Farin Roe |
| Data management | Petra Kaleb |
| English for business | Elaine Phil |
| English for business | Andrew Shiren |

Glossary

Entity: a discrete data object, the basic building block of your database

Attribute: a characteristic that describes your entity in some way

Relationship: how entities relate to each other

Cardinality: how many on one side of the relationship relate to how many on the other side of the relationship

Key: an attribute or combination of attributes used to uniquely identify an entity

Normalization: the process of organizing your data in your database more efficiently

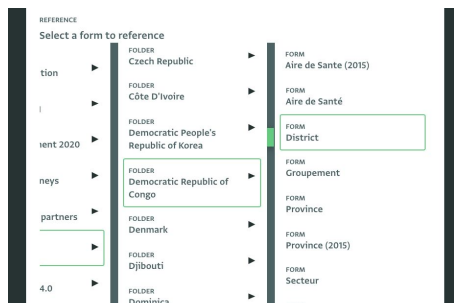
Designing databases in ActivityInfo

What is ActivityInfo?

An end-to-end solution for managing your data.

Data management

Organize your information according to your workflow



Data collection

Easily collect the data you need from anywhere

Date of reporting
Select a date (YYYY-MM-DD)

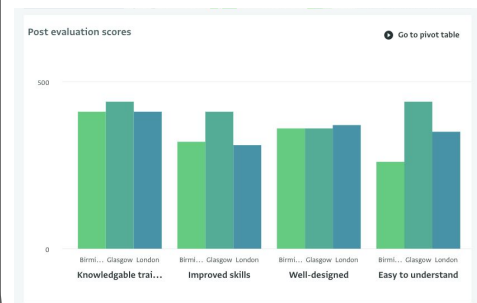
Province
Select Name

Theme of assistance

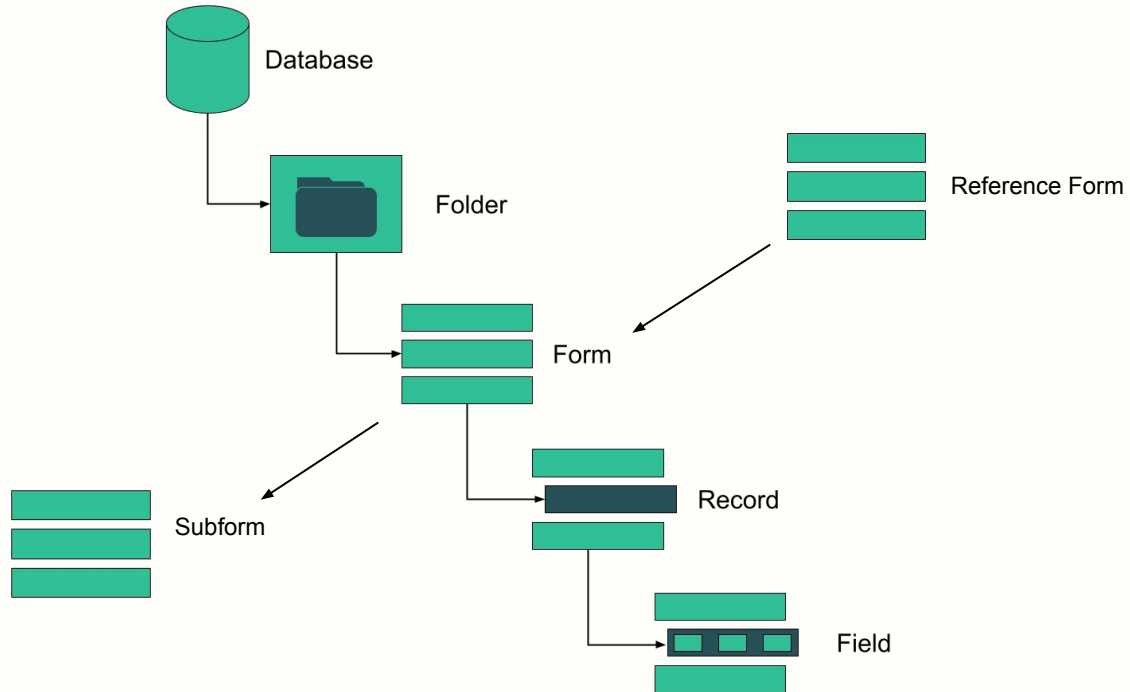
households participating

Data analysis

Generate actionable insights in real-time



Hierarchy of data in ActivityInfo



Hierarchy of data in ActivityInfo

| Level | Rule of thumb | Examples |
|-----------------|--|---|
| <i>Database</i> | A dedicated space for a discrete team with a specific use case | One database for each country office |
| <i>Folder</i> | Collection of forms relating to a common theme | Forms grouped into folders by sector |
| <i>Form</i> | A specific data set representing a list of entities each having a common set of attributes | Beneficiary registry, Baseline Survey, List of Partners |
| <i>Record</i> | An individual, discrete entity | Beneficiary, Partner, Activity |
| <i>Field</i> | A specific attribute that describes the entity in some way | Name, Sex, Location, Date |

Some general recommendations

1. Create Reference Forms for standard lists that will be used in multiple places
 - a. Create a folder that will contain all of your Reference Forms
2. Use Subforms to capture 1:N relationships
3. Automate where you can to minimize error and ensure data integrity
 - a. Input masks
 - b. Validation rules
 - c. Calculated fields
4. Use one of our pre-designed templates as a starting point

Demonstration

Q&A