the Max Labs project

"Data Fright II: Like Deja Vu All Over Again"

This time Max takes you deeper into data modeling, eg
normalization, many-to-many relationships, data "maps" (schemas), etc.
(*Good to know if you build your own app someday or just to help you make sure
whoever builds apps for you models your data right so the apps actually work!*)

- -
Prep: What do you need to start?
- -

☑ To do this lab, you need to have completed most of Lab 2a (everything but Steps 1-18).

- -
Learning Objectives: What to "get"
- -

☑ See for yourself why data modeling is so critical (duplication bad, integrity good).

☑ Confirm how you can always pull data back together again however you need, even after it's been broken up into separate objects (tables).

☑ Get a feel for the visual tools used to build/manage a data model in a system.

☑ Understand where the developers are coming from so you can get your data across to them clearly & they can build apps you can rely on for doing your job right & well.

- -
Deliverables: Get your points
- -

There are two points marked to stop & take a screencap (or pic) to submit for credit:

① After Step 143, your view should look like the screencap in the lab, showing two entries for contacts (with their emails) for firms located in Mountain View.

② After Step 148, your screen should look as much like the screencap in the lab as you can make it, showing the four objects & their relationships. It may take some dragging, zooming, etc.

Just make sure your name appears on every screencap! Just hit the little character icon at the top right corner for a popup that shows your name. If it covers some of your work, np—just zoom out your browser until the popup doesn't cover anything important. (Command-minus for Macs; Control-minus for Windows)

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Tips:Get more
- -

Remember: The goal is NOT to learn Salesforce! It's to learn the "why" & "how" of tech supporting business. Learning some Salesforce is a great side-effect, but focus on *understanding the ideas & concepts*.

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Resources: Get some help
- -

Stuck? You can probably fix it quick yourself at the Help FAQ at MaxzPlace. If not, post to the Help Forum.

Max's Distinctive, Impressive BizTech Student Blog

Data Fright II: Like Deja Vu All Over Again

So you know in scary movies, how at the end, the monster/bad guy/whatever finally gets killed in some heinous fashion and everything's all good & everyone's all relieved but then, magically, he pops up & starts terrorizing again one last time? And you can kind of tell, just before it happens bc things seem a little too ok? (And the credits didn't start rolling yet?) So yeah, welcome to my reality. Things seemed too ok like last time. :/

Yes, the clone-y/redundant data monster rose again. To show you, we need to fill back in all that **Meeting** data that got taken out of your **Pitches** object last time when you deleted those fields, but don't worry—data import to the rescue, again. But first, you need to make a tab for the **Meeting** object you created last time.

1. As usual, start by clicking the trusty old **Setup** gear icon on the top right, by the bell, & then click **Setup** and then on the lefthand menu, under **PLATFORM TOOLS**, click **User Interface** and then **Tabs**, below that

2. Under **Custom Object Tabs** click **New**
3. Pull down the **Object** menu & select **Meeting**
4. Click the magnifying glass next to **Tab Style** & click on the cute little red **Presenter** dude
5. Click **Next, Next & Save**

So I made an import file of data that was sitting in **Pitch** before we knew those fields actually belonged in **Meeting** instead—**Contact Name**, **Comments**, etc & I also added data values for the new **Enthusiasm** field too. So now you can just import all that straight into the new **Meeting** object you built last time.

Now, this import's slightly trickier than the one you did before back in the Slicer/Dicer post bc you have to connect the incoming **Meeting** records to the existing **Pitch** records they go with. So be safe—don't text & type! Just follow closely & no one gets hurt:

6. First, click the link below to download the **Meeting** data file. (If you're using Windows and certain browsers, you might need to option-click the link and select **Download**. If it opens in Excel, don't open it—just save it out as a file with the .csv extension. You just want to place it on your desktop or somewhere you can find it a few steps from now to bring the data into SF.)

http://tiny.cc/MaxsMeetingDataFile (Don't open—just download for now)

7. Then in SF, hit the **App Launcher**, pick **Marketing** and click on your new **Meetings** tab (NOT the down-arrow) next to the old **Pitches** tab

8. Now, looking at your empty list of zero **Meeting** records, click **Import** (upper right, between **New** and **Change Owner**)

9. Under "**What kind of data are you importing?**" click the **Custom Objects** tab and that should show just **Meetings**

10. Clicking on **Meetings** will fill in a middle box labelled **What do you want to do?**

11. Click on **Add new records**

12. ***NOW*** the slight twist—near the bottom of the center panel, where it says **Which Pitch field in your file do you want to match against to set the Pitch lookup field?,** pop open the menu labelled --**None**-- and select **Pitch Name**

13. Then, in the right hand column of the page, you'll see where you can drag that .csv file onto the panel labeled **Drag CSV file here to upload** so drag and drop it there now

14. Once you have the file selected properly, the green **Next** button that was dimmed before should be bright, inviting you to click it, so go ahead and click **Next**
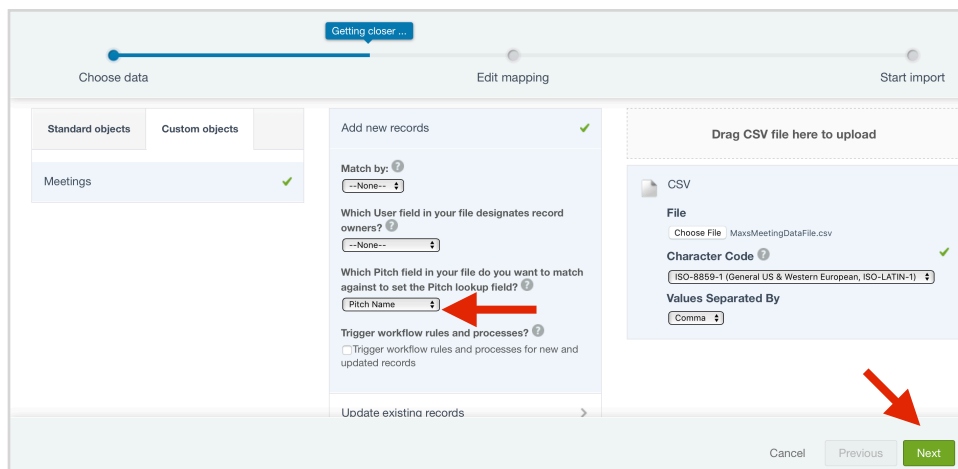
15. The next page that appears, **Edit Field Mapping: Meetings**, should show a perfect match between the **Meeting** object's field names and the column headers in the .csv file and it even shows you samples of the data that will be going in

16. Click the green **Next** button

17. The next page should say you have 7 mapped fields (0 unmapped ones) & then you can just click the green **Start Import** button (umapped fields?—probably misspelled them in **Meeting**; fix & try again)

18. A popup window should appear with a congratulations and you can just click **OK**

19. You'll get an email saying your import is complete

20. Then you should see a page of stats that you can ignore about the import

Now create a list view that'll show everything in the **Meeting** records:

21. Then, hit the **App Launcher**, pick **Marketing** and click on your new **Meetings** tab again

22. Then click the tiny gear icon, below **New** and **Import**, and select **New** from the dropdown

23. For **List Name** enter "All Meeting Data"

24. Tab to autofill **List API Name**

25. Click the blue **Save** button

26. Click the tiny gear again and click **Select Fields to Display** from the dropdown

27. In the **Available Fields** list, click **Meeting Date** to highlight it and then click the right arrow button under **Add** to move it into the **Selected Fields** list
28. Repeat the last step for **Contact Name**, **Email**, **Mobile**, **Enthusiasm** & **Comments**
29. Click the blue **Save** button & then click the pin icon so it sticks as default for the **Meetings** tab

Now you should see all the **Meeting** data, including the three records you created last time for the meetings with Julia Chavez at the top. Below that—ten records of meeting data that used to be in **Pitch,** eg the contact info, comments, etc. You can see the new **Meeting** records are all there, but are they really each connected to the right **Pitch** record? Let's see:

30. Click on the **Meeting ID** for the 9/17/19 meeting with Maria Valducci to see its details
31. Now you can see how that **Pitch** field you added to the **Meeting** object "connects" this meeting to its corresponding **Pitch** record—but is that really the right one for this **Meeting** record?
32. Turns out you can "follow" that connection to see the data at the other end—just hover over the **Pitch ID** value (**P-007**) to "peek" its key **Pitch** data & there it is…Valducci Amalgam—bingo!

33. To get more than a "peek," click that **Pitch ID** value (**P-007**) to open the whole **Pitch** record
34. Now, to see the connection from the other end, click the **Related** tab and there's the list of **Meeting** records for Valducci Amalgam (just one so far), showing the 9/17/19 meeting you were looking at
35. Now click the **Meeting ID** value (**Mtg-11**) and you're back where you were—full circle, hah!

So your data's in there, all connected & chaseable, but separated so you can add **Meeting** records to a **Pitch** without repeating all the **Pitch** stuff:

36. Click the little down-arrow on your **Meetings** tab and select the **+ New Meeting** shortcut to add a new record for your 2nd meeting with Maria
37. The first thing SF asks is which **Pitch ID** to connect it to—np…just enter "Valducci" in the **Search Pitches** slot and then click the little magnifying glass that says **"Valducci"** in **Pitches**
38. There it is, in the **Pitch Results** popup—**P-007** and you can just click it to fill it in (cool)
39. Now you could just fill in the rest of the slots, but for now just click **Cancel**

See why I thought everything was too ok? We killed the dupe monster at the end of the last episode, right?

Alas…the credits weren't rolling yet:

40. Just click on your **Meetings** tab again but this time take a closer look at those three Julia Chavez records at the top—notice anything…dupe–y looking?
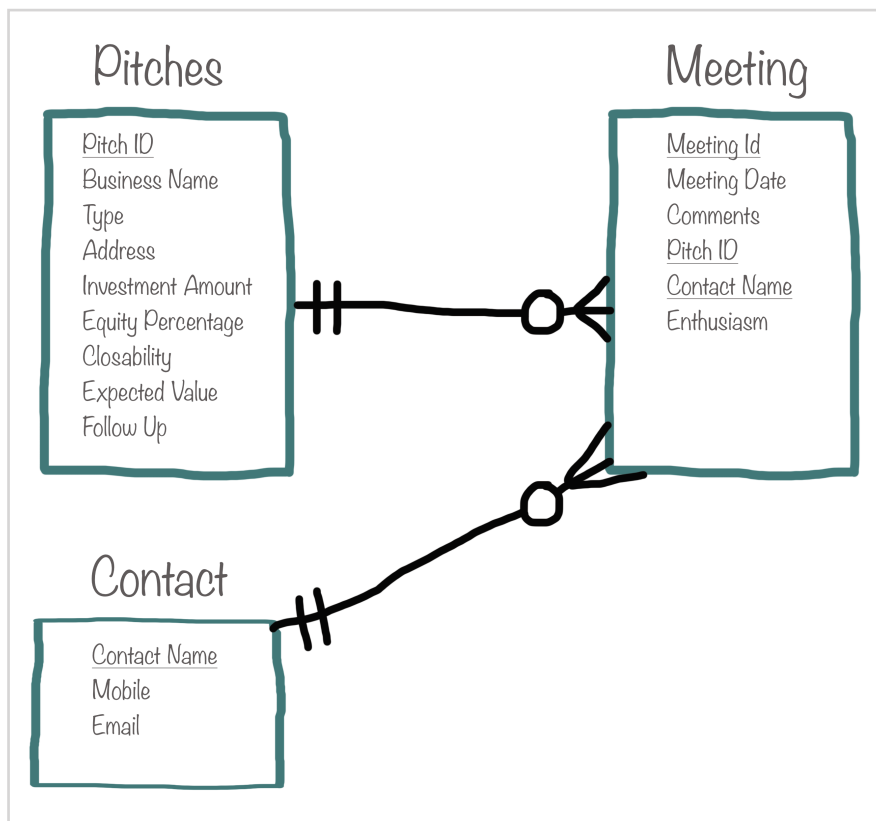
Remember, at the end of last time, you were pretending to be Riley. You had three meetings with Julia Chavez so you created the first meeting record and then cloned it twice to save time, right? (My bad—I told you to.) But you were duplicating her mobile and email address each time. See?

What if I told you she just changed her mobile to (408) 812–1223 or she gets a new email address? You would have to make sure you change it in all three of her meeting records or…yup, lost integrity again. That's what happened with my app for Riley. Not a Happy Halloween for yours truly.

Breaking Up, New Relationships & Becoming Normal(–ized): A Database Therapy Session

Last time, getting the meeting fields out of the **Pitch** object got rid of duplicated street address data for the businesses—one address for one pitched firm record, connected to all its meeting records—the famed "one to many relationship," right?

So why was there still duping happening? Finally lightning hit me (not literally, thank god)—*One contact has one phone number, one email, etc but can attend many meetings. The "many meetings" part is what's causing the duping, just like with* **Pitch** *before.*

Pitches

Pitch ID
Business Name
Type
Address
Investment Amount
Equity Percentage
Closability
Expected Value
Follow Up

Meeting

Meeting Id
Meeting Date
Comments
Pitch ID
Contact Name
Enthusiasm

Contact

Contact Name
Mobile
Email

Solution? Another breakout—**Contact** needs to be its own entity (object) too! One name, email and phone number for each contact, stored once and connected to that contact's meeting records by a relationship. so you can still find the contact info for who was at a meeting when you need to.

In SF, you have to take all the contact info fields out of the **Meeting** object and replace them with one new field (a "lookup" relationship)—a connector to a new **Contact** object where there will always be just one record (**Email**, **Mobile**, etc) for every contact—no dupes.

Mercifully, SF already has a **Contact** object built-in ("standard"), so you don't have to create it this time. And it's already got almost every field you could ever want. So you can just delete the contact info fields from **Meeting**:

41. Back to click the **Setup** gear up by the bell on the top right & click **Setup**
42. Lightning Experience Transition AssistantClick the **Object Manager** tab, then scroll down and click **Meeting**
43. On the left, click **Fields & Relationships**
44. Then, on the **Contact Name** row, click the down-arrow on the right and select **Delete** and then, in the popup, click the blue **Delete** button to confirm
45. Do the same thing to get **Mobile** and **Email** out of the **Meeting** object too

But you still need to connect up the **Meeting** records to their corresponding **Contact** records—just add a **Lookup Relationship** field to **Meeting**:

46. Still on the **Fields & Relationships** panel for **Meeting**, click **New**
47. Select **Lookup Relationship** & click **Next**
48. On the **Related To** drop-down menu, select **Contact** (NOT Cont**R**act!) and click **Next**
49. **Field Label** shows "Contact" but change it to "Contact Name"
50. Tab to autofill **Field Name**

51. Check the checkbox for **Always require a value in this field in order to save a record** bc, honestly, a meeting really needs to have someone for you to meet with otherwise it would be pointless, right? (That little bar on the E/R diagram, the 2nd nearest one to **Contact**, says there has to be a **Contact** record associated with every **Meeting** record.)

52. Click **Next** (pause to let the page fully load), **Next** (pause), **Next** (pause) **& Save**

So that's what prof calls "normalization"—arranging the data model ("schema") to match the actual "things" in the business (the pitches, meetings, people, etc) and the way they're connected. When the data model's right—no redundancy, no bad data, good integrity.

Now to see it in action, just open up one of the **Meeting** records for Julia and you can create her **Contact** record & connect it at the same time:

53. Hit the **App Launcher** and **Marketing** and then click your **Meetings** tab
54. Find the 10/7/19 record (1st meeting with Julia), click the down-arrow on the right & select **Edit**
55. On the edit page, find the new **Contact Name** field you just added—the one that connects to the **Contact** object record—and click on **Search Contacts…** in the slot
56. Click the **+ New Contact** tab that drops down

Edit Mtg-01

* Meeting Date

10/7/2019   📅

Comments

She thinks it's worth considering at the $600,000 level
(yay) for 30% equity, but she wants to see some

Enthusiasm

2

* Contact Name

Search Contacts…   🔍

➕   New Contact

Max Flanagan, 6/12/2019 2:10 AM

Last Modified By
Max Flanagan, 6/12/2019 2:10 AM

        Cancel   Save & New   Save

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57. Now fill in the **First Name** and **Last Name** slots with…"Julia" and "Chavez" (obviously)
58. Then enter "julia.chavez1981@gmail.com" for **Email**
59. And finally, enter "(510) 403–8995" for **Mobile** and click the blue **Save** button
60. Skip the other fields & just click **Save** at the bottom to create Julia's new **Contact** record
61. Back on that edit page, Julia's there, good to go, so just click **Save** & the connection's complete!

And now that Julia's got a record in **Contact**, you can easily connect her other **Meeting** records to it. First, connect up the 10/21/19 meeting:

62. Click the down-arrow on the right for the 10/21/19 Julia Chavez **Meeting** record & select **Edit**

Edit Mtg-02

*Meeting Date
10/21/2019

Comments
She liked the new revenue model, but now she's driving a hard bargain!

Enthusiasm
5

*Contact Name
Julia Chavez

Created By
Max Flanagan, 6/12/2019 2:11 AM

Last Modified By
Max Flanagan, 6/12/2019 2:11 AM

Cancel   Save & New   Save

63. Find the **Contact Name** slot, click on **Search Contacts…** & just click on the Julia Chavez tab that appears to slot it in (or if it doesn't appear automatically, type in "Julia" to search/find it)
64. Click the blue **Save** button and the connection's locked in

Now do the same for 10/31/19 meeting record:

65. Click the down arrow on the right for the 10/31/19 and select **Edit**
66. Find the **Contact Name** slot, click on **Search Contacts…** & just click on the Julia Chavez tab that appears to slot it in (or if it doesn't appear automatically, type in "Julia" to search/find it)
67. Click the blue **Save** button and that connection's locked in

Cool. Now to be complete, I still had to create **Contact** records for the rest of the contacts & then connect the meeting records to them, but you get the point, so let's move on.

So by now I was *sure* everything was "normal". Just one **Email** & **Mobile** on one **Contact** record for one contact, no matter how many meetings that contact was in. The good ol' one-to-many relationship (one contact/ many meetings), right? Not quite (sorry). The credits *still* weren't rolling just yet—Riley had this pitch meeting one day and there were three execs there in attendance—*three* contacts for this *one* meeting!

One Many-to-Many is One Too Many

So now the sad truth comes out! One contact can be at many meetings (got that covered) AND one meeting can have many contacts attending (not so covered—ouch)! Not a "one-to-many" after all—it's the dreaded <dum–da–da–dum> "many–to–many," scourge of the database universe. Oh, sure, you can draw it on paper in your E/R diagram, but can you build a many-to-many in SF or in any other database system? Negative.

And even if you could, where would you put the **Enthusiasm** field? It's supposed to tell how enthusiastic one specific contact was at one particular meeting. It can't stay with **Meeting** (every contact at that meeting gets their own value). And it can't go with **Contact** (each one gets an **Enthusiasm** rating for every meeting they attended, like Julia Chavez did). Soooooo? Two words: "junction entity."

Prof told us many–to–many relationships between two entities can be replaced by two one-to-many relationships that link both entities to a "junction" entity, inserted in-between. We'll call our junction entity **Meeting Attendance.** The **Contact** and **Meeting** would each have a one-to-many relationship to it, instead of a many-to-many relationship directly to each other. A **Meeting Attendance** record could show that this one **Contact** (say "Julia Chavez") attended this one **Meeting** (on 10/21) and on that day she was super enthusiastic (eg a "5"). Here's the new pic:
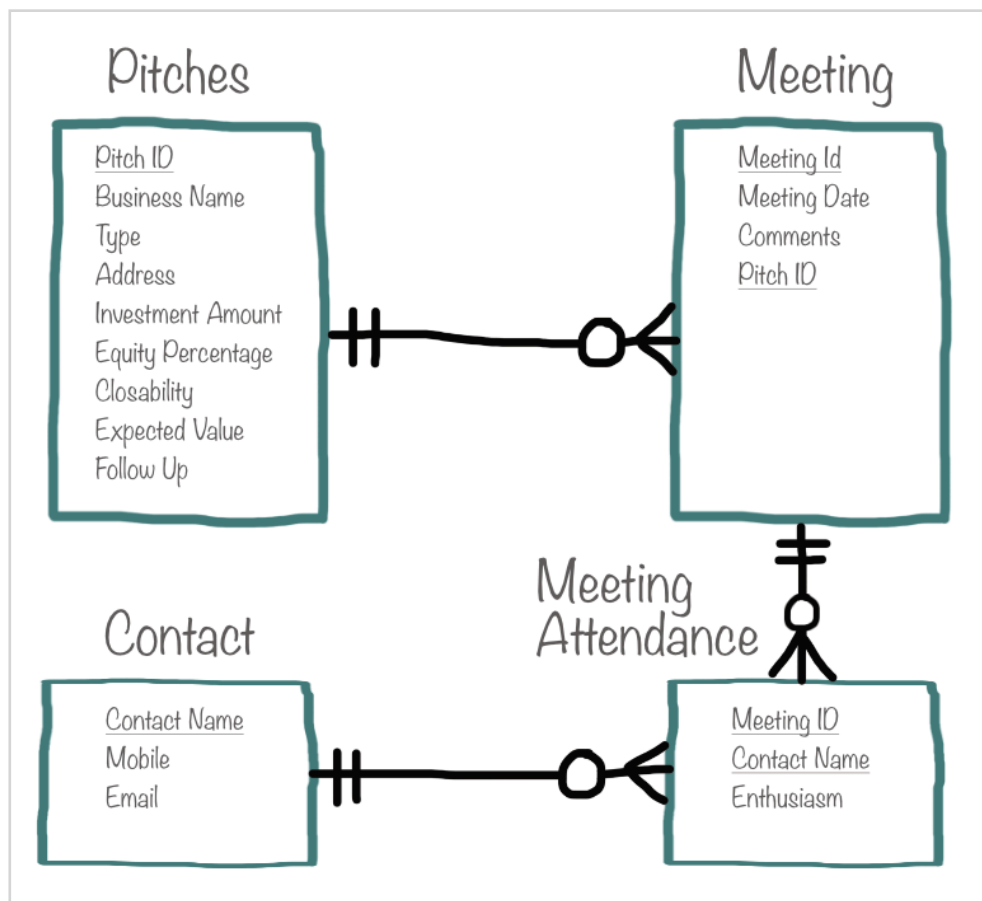
In case you don't know the markings, they go like this:

- a crow's feet symbol means "there might be many of these for one of those (at the other end of the relationship),"
- a circle means "there might be none of these for one of those,"
- a bar closest to the entity means "there can be no more than one of these for one of those," and
- a bar farther from the entity means "there has to be one of these for every one of those."

So yeah, a **Pitch** might not have any meetings set up yet or it might have several. But, going the other direction, one particular **Meeting** had better be for exactly one **Pitch**. No more, no less.

If a **Meeting** is with a bunch of contacts, there could be several **Meeting Attendances** for it, or none, if you haven't met yet. But every **Meeting Attendance** has to have one **Meeting** to go with. Just one.

A **Meeting Attendance** record definitely needs a **Meeting** to connect to AND a **Contact** to connect to, too. Makes no sense to record an **Enthusiasm** rating without *both* of those, right?

Now, to make the E/R diagram happen in SF, I had to create a junction—a custom object called **Meeting Attendance** with just one data field, **Enthusiasm**, and two lookup fields—one for **Contact** and one for **Meeting**, to make the connections (relationships). In other words, one **Enthusiasm** rating goes with one combination of one **Contact** and one **Meeting**. Piece-a-cake.

So first create your new junction object, **Meeting Attendance**:

68. Hit the **Setup** gear icon by the bell again & click **Setup**
69. Click the down-arrow on the **Object Manager** tab and hit the **+ New Object** shortcut
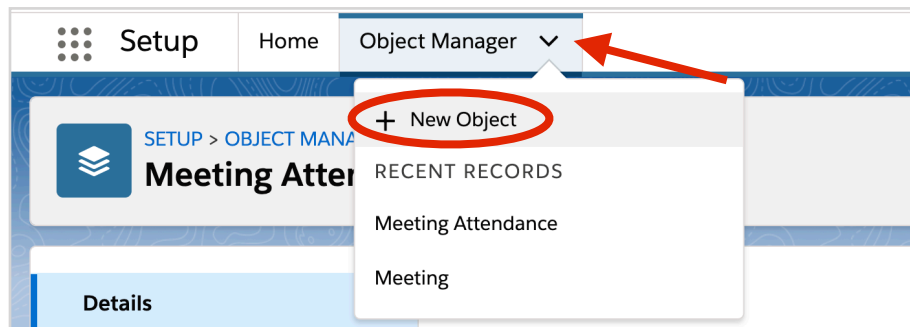
70. For **Label** enter "Meeting Attendance"
71. For **Plural Label** enter "Meeting Attendances"
72. **Object Name** should be auto-filled already as "Meeting_Attendance"
73. Edit **Record Name** to be "Meeting Attendance ID"
74. For **Data Type: Auto Number**
75. **Display Format: {0000}**
76. **Starting Number: 1**
77. Click **Save**

Now, add the relationship-making fields to **Meeting Attendance**—one connecting it to **Meeting**, and another connecting it to **Contact**, like in the E/R diagram above. Like before, you make a one-to-many relationship by adding a custom field at the "many" end so each record there will contain the ID number of the linked record at the "one" end.

So first, add a field for connecting to **Meeting**:

78. On the left, click **Fields and Relationships**
79. On the upper right-ish, click **New**, select **Lookup Relationship** & click **Next**
80. Use the **Related To** > menu to select **Meeting** & click **Next**
81. Set **Field Label** to "Meeting ID" to connect each **Meeting Attendance** record to the right **Meeting** record
82. Check the **Required** checkbox & then click **Next** (pause), **Next, Next** & then **Save & New**

Now do *almost* the same thing but this time, you're creating a field to connect **Meeting Attendance** to **Contact** (careful! – do NOT choose ContRact by mistake!):

83. Select the data type **Lookup Relationship** & click **Next** again but this time, on the **Related To** > menu, select **Contact** and click **Next**

84. Change the **Field Label** to "Contact Name" to connect each **Meeting Attendance** record to the right **Contact** record
85. Check the **Required** checkbox & then click **Next** (pause), **Next**, **Next** & then **Save & New**

Note: For both of those fields, SF automatically checked **Don't allow deletion of the lookup record that's part of a lookup relationship.** That's good. It prevents someone deleting a **Meeting** record that a **Meeting Attendance** record is connected to. Can't have a meeting attendance with no meeting—bad "referential integrity," Prof calls it. If you ever need to delete a **Meeting** record, just delete all its **Meeting Attendance** records first. (Same w/**Contact** records.)

Last, we already have an **Enthusiasm** field in the **Meeting** object, but now we know it belongs here in **Meeting Attendances** instead bc there's one value for every *combination* of a **Meeting** and a **Contact** at that meeting. So we'll delete it from **Meeting** in a sec, but first add it here:

86. For data type pick **Number**, for **Field Label** enter "Enthusiasm" and set **Length** = 1, **Decimal Places** = 0 and then slowly click **Next**, **Next** and then **Save**

Now, back to the **Meeting** object. It's still connected directly to **Contact** and we now know that's wrong. To disconnect it, just delete the **Lookup Relationship** field you added there before. And then delete the **Enthusiasm** field (bc it's in **Meeting Attendance** now), so:

87. Click the **Object Manager** tab (upper left) and scroll down to find & click **Meeting**
88. On the left, click **Fields & Relationships**
89. Find **Contact Name**, click its down-arrow (on the right), select **Delete**, and in the popup, click the blue **Delete** button to confirm
90. Last, find **Enthusiasm**, click its down-arrow, select **Delete** and in the popup, click the blue **Delete** button to confirm

Now the database structure in SF (the "schema") matches the E/R diagram & Riley can add all three contacts for that big meeting, each with their own enthusiasm ratings. And no duping!

So that's cool, but you're probably thinking—wait, the data's all broken up. Is that ok? What if you wanted to, for example, get email addresses for all contacts for all pitched firms in Mountain View to invite them to a demo reception you're holding downtown there next week? Is that still even possible?

After a Breakup, Can Fields Still Be Friends? (& Hang Out Together?)

Totally. SF has an option to create "virtual fields"—they look like they're part of an object, but their values are really just borrowed from the corresponding records of another object that's connected to it. So for this Mountain View reception deal, a **Meeting Attendance** record can just "borrow" the value of **Email** from the corresponding **Contact** record, on the fly, when you view it. Same for borrowing **Address** values from **Pitch** (via **Meeting**). Then you can filter to the results for Mountain View addresses:

91. Click the **Object Manager** tab again & scroll down to find & click **Meeting Attendance**
92. On the left, click **Fields & Relationships** then click **New**
93. For **Data Type** select **Formula** and click **Next**
94. For **Field Label** enter "Email" and then tab to autofill **Field Name**
95. For **Formula Return Type** select **Text** and click **Next**
96. On the next page, above the big text box, make sure the **Advanced Formula** tab is selected
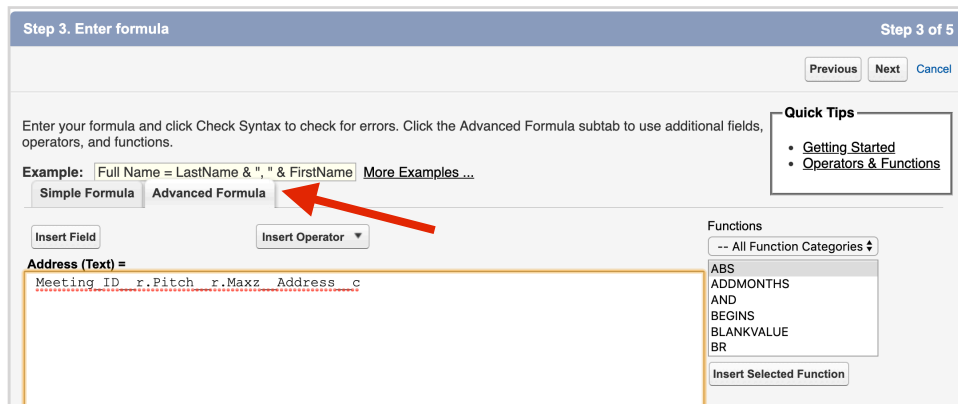
97. Click the **Insert Field** button to open a popup window with **Meeting Attendance >** highlighted in the listbox on the left (the > means "this one connects to more fields")
98. In the listbox on the right, you see the list of **Meeting Attendance** fields, including lookup fields you can follow to select fields from the objects at the other end of those relationships
99. Click **Contact Name >** (the ">" means the *relationship* to **Contact**) to open a third listbox of fields at the other end of that relationship whose values can be pulled in virtually when needed
100. Scroll down in that third listbox to find **Email** and click to highlight it
101. A fourth box will appear saying you selected **Contact_Name__r.Email** which, to SF, means "follow the **Contact Name** relationship to get the **Email** value of the corresponding record"
102. Click the **Insert** button
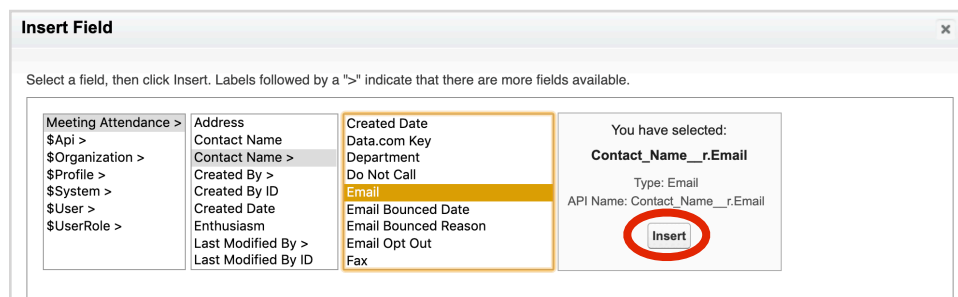
103. Click **Next** (pause to let the page fully load), **Next** (pause), **Save & New**

Now do the same but this time, it's to add the **Address** of the pitched firm, pulled all the way from the **Pitch** object by following the relationship to **Meeting** and then from **Meeting** to **Pitch**:

104. Select **Formula** and click **Next**
105. Enter "Address" for **Field Label**
106. Tab to auto-fill **Field Name**
107. Click the **Text** option for **Formula Return Type** and click **Next**
108. The **Advanced Formula** tab should still be selected but if not, click it
109. Click the **Insert Field** button
110. Again, **Meeting Attendance >** should be highlighted already, but if not then click on it
111. In the listbox on the right, scroll down to find **Meeting ID >** and click to highlight it
112. In the new listbox that opened up, scroll down to find **Pitch >** and click it
113. Then, in the new (4th) listbox that opened up, click **Address**
114. The next box opens to show you selected **Meeting_ID__r.Pitch__r.Maxz__Address__c** meaning: starting at **Meeting Attendance,** trace across the **Meeting_ID** relationship to the corresponding **Meeting** record and then trace from there, across the **Pitch** relationship, to the corresponding **Pitch** record, and then pull in its value for **Address** (perfect!)
115. Click the **Insert** button
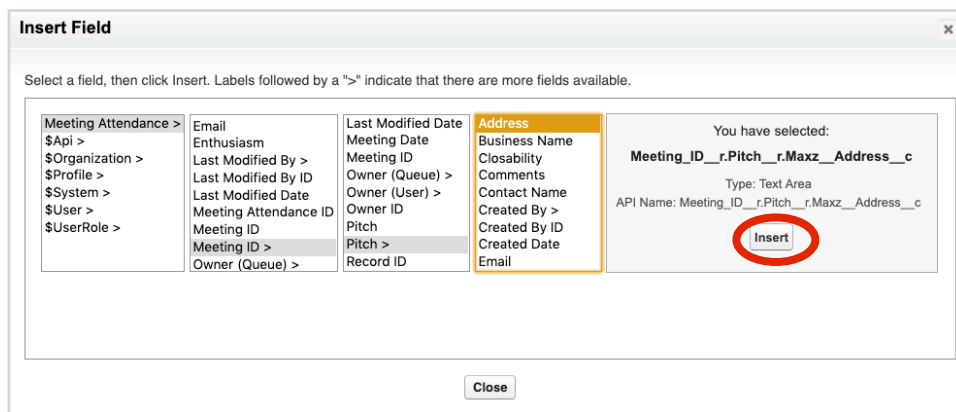
116. Click **Next** (pause to let the page fully load), **Next** (pause) and **Save**

Now create a tab for **Meeting Attendances** so you can see them & create a list view:

117. Hit the **Home** tab on the upper left & then open **User Interface** on the left & click **Tabs** below
118. Under **Custom Object Tabs** click **New**
119. For **Object**, select **Meeting Attendance**
120. For **Tab Style,** click the magnifying glass and select the little **Bridge** (appro for a junction object)
121. Click **Next** (pause to let the page fully load), **Next** (pause) and **Save**

Let's get a few records in there to see if it works:

122. Hit the **App Launcher**, then **Marketing** & then click on the **Meeting Attendances** tab on the right, by **Meetings** (if you don't see it, use the down-arrow and select it from the drop-down)
123. Click **New** to get a new record page to fill in **Meeting ID** for the corresponding **Meeting** record
124. Click on **Search Meetings…** and type in "01" there & then, in the drop-down that appears below, click on **"01" in Meetings** to see a list of all the matching **Meeting ID**s for the existing records
125. Click on **Mtg–01**, that's the 10/7/19 meeting, the first one with Julia Chavez

126. Now back on the new record page with the **Meeting ID** filled in, click on **Search Contacts…** in the **Contact Name** slot so you can connect this record to Julia's record in **Contacts**
127. If you see her name pop up in the tab underneath, then just click it to select, but if not, then enter "Julia" and click the magnifying glass and then select her from the results
128. Back on the new record page, with her name filled in, just enter her **Enthusiasm** rating for that meeting which was "2" and click **Save**
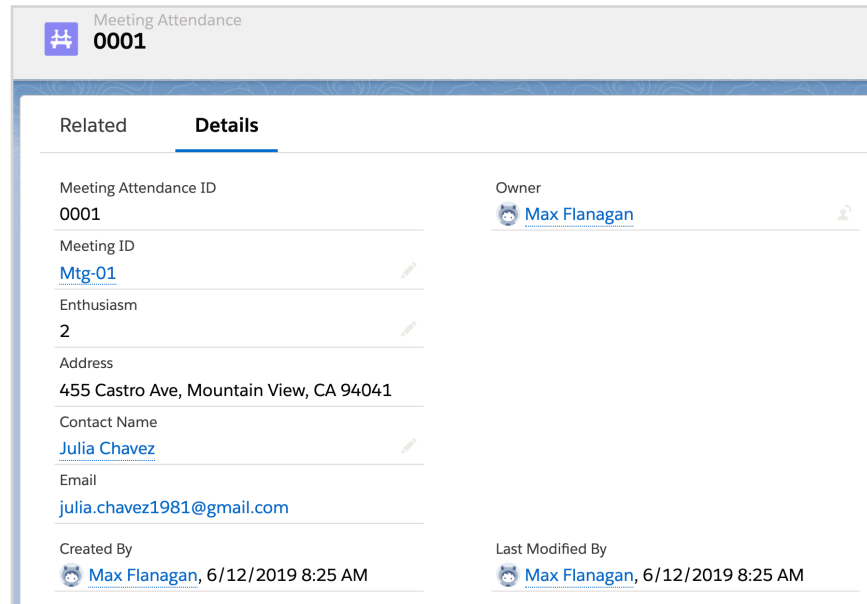
Back on the record details page for your new record and (hah!) SF is showing the data you just entered for the three fields that are actually stored in the **Meeting Attendance** object. Ok. Cool.

But *amazingly*(!), it's also pulled in Julia's **Email** from her **Contact** record!

And…even more amazingly, it pulled in Spray & Pray's street **Address** by first connecting to the **Mtg–01 Meeting** record and then using the **Pitch ID** it found there to connect to **Pitch** and find the right record there, like little *Oompa–Loompas* working their magic inside the SF cloud!

Notice, as expected, you can't hover over those two "virtual" fields to get the little pencil that lets you edit them —that's bc those two aren't really "there," they're just *appearing* there, *virtually*.

Now add one more **Meeting Attendance** record so your reception list will look more realistic:

129. Click the down-arrow on the **Meeting Attendances** tab & select the **+ New Meeting Attendance** shortcut
130. Click on **Search Meetings…** and type in "Mtg" there & then, in the drop-down that appears below, click on **"Mtg" in Meetings** to see a list of all the matching **Meeting ID**s for the existing records
131. Select the **Mtg–08** record for the 9/30/19 meeting (it was with a firm in Mountain View)
132. Now click the on **Search Contacts…** in the **Contact Name** slot to pop up the **Lookup** window for **Contact**
133. Click **+ New Contact** underneath to add back the **Contact** info for that meeting w/Anu Aggarwal (bc it was lost when you deleted the contact info fields from **Meeting** way back before)
134. Fill in her **First Name, Last Name** and enter "a_aggarwal@smarttechinv.com" for her **Email**

135. Click the **Save** button & you're back on the new record page with her **Contact Name** filled in
136. Fill in her **Enthusiasm** as "2" and click **Save**

Now let's see that list of invitees for your reception:

137. Click on your **Meeting Attendances** tab and then click the tiny gear icon below **New** (<u>NOT</u> the **Setup** gear) and select **New** from the dropdown
138. For **List Name** enter "Contact Info for Mountain View Reception"
139. Tab to auto-fill **List API Name** and click **Save**
140. Click **Add filter** (blue) on the right and in the popup, set **Field** to **Address**, set **Operator** to **Contains**, and for **Value**, enter "Mountain View" and click **Done**
141. Click the blue **Save** button in the filter panel under the Martini-shaped icon
142. Click the tiny gear again and click **Select Fields to Display**
143. Scroll the **Available Fields** list as needed and move **Contact Name**, **Address**, and **Email** over to **Visible Fields** and click **Save**
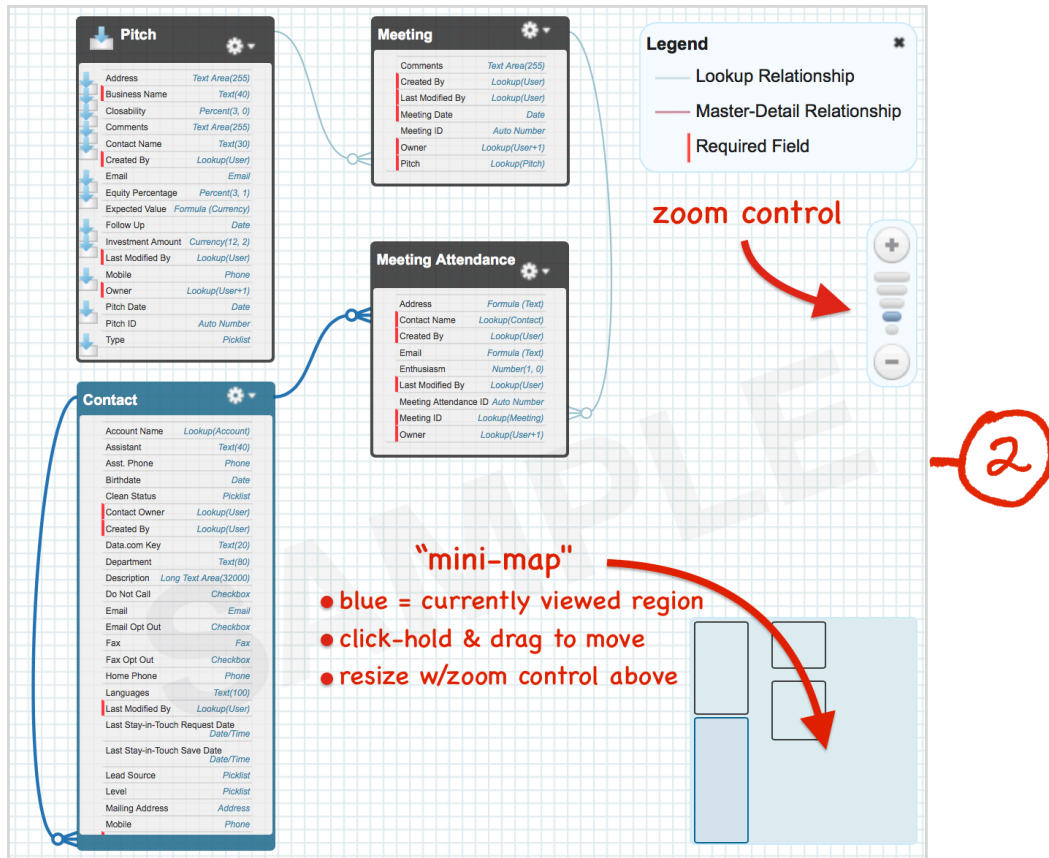

Now you've got your emailing list. (You can even click on one of the addresses to bring up a pre-addressed empty message, ready to go!)

I know. It seems like a lot of work connecting everything up, but SF does most of that for you behind the scenes. And the upside is that the model with the stuff separated out across objects gets rid of your data dupe/integrity nightmares. Totally normal(–ized) now. Finally.

Now database management systems like SF's have a name for the computer-defined version of the model—the "schema" & you can see SF's own pic of it, to make sure it looks like you intended, using the great and powerful **Schema Builder**:

144. Click on the **Setup** gear icon by the bell at the top right, click **Setup**, and then click **Objects & Fields** on the left to drop down those options and select **Schema Builder**
145. In the lefthand column, make sure you're on the **Objects** tab and click **Clear All** to hide all the objects for now—SF comes with a zillion built in objects (overwhelming!)
146. Now check the boxes for just the objects you need—your **Contact** (careful! – <u>NOT</u> Cont**R**act), **Pitch, Meeting** and **Meeting Attendance** objects—to unhide them, but you may have to zoom and drag them around, etc to see them like below
147. On the lower right, there's a mini-map of the currently viewed area and the +/– on the right let's you zoom in and out. You can click-hold and drag the schema map around or click-hold on objects to drag them around and the connectors will adjust automatically (see pic below)
148. A bit of tweaking & you can match that last E/R diagram above pretty darn close except 1) it's showing those **Pitch** fields that we hid from the layout but never bothered to delete—no way to hide them here, unfortunately, and 2) **Contact** has a ton of other built-in fields and also a relationship to itself that wasn't in the diagram above—SF is just set up that way.

Pitch

Address	Text Area(255)
Business Name	Text(40)
Closability	Percent(3, 0)
Comments	Text Area(255)
Contact Name	Text(30)
Created By	Lookup(User)
Email	Email
Equity Percentage	Percent(3, 1)
Expected Value	Formula (Currency)
Follow Up	Date
Investment Amount	Currency(12, 2)
Last Modified By	Lookup(User)
Mobile	Phone
Owner	Lookup(User+1)
Pitch Date	Date
Pitch ID	Auto Number
Type	Picklist

Meeting

Comments	Text Area(255)
Created By	Lookup(User)
Last Modified By	Lookup(User)
Meeting Date	Date
Meeting ID	Auto Number
Owner	Lookup(User+1)
Pitch	Lookup(Pitch)

Legend

———	Lookup Relationship
———	Master-Detail Relationship
		Required Field

zoom control

Meeting Attendance

Address	Formula (Text)
Contact Name	Lookup(Contact)
Created By	Lookup(User)
Email	Formula (Text)
Enthusiasm	Number(1, 0)
Last Modified By	Lookup(User)
Meeting Attendance ID	Auto Number
Meeting ID	Lookup(Meeting)
Owner	Lookup(User+1)

②

Contact

Account Name	Lookup(Account)
Assistant	Text(40)
Asst. Phone	Phone
Birthdate	Date
Clean Status	Picklist
Contact Owner	Lookup(User)
Created By	Lookup(User)
Data.com Key	Text(20)
Department	Text(80)
Description	Long Text Area(32000)
Do Not Call	Checkbox
Email	Email
Email Opt Out	Checkbox
Fax	Fax
Fax Opt Out	Checkbox
Home Phone	Phone
Languages	Text(100)
Last Modified By	Lookup(User)
Last Stay-in-Touch Request Date	Date/Time
Last Stay-in-Touch Save Date	Date/Time
Lead Source	Picklist
Level	Picklist
Mailing Address	Address
Mobile	Phone

"mini-map"
- blue = currently viewed region
- click-hold & drag to move
- resize w/zoom control above

It's a cool way to visualize your objects & relationships. You can even build your data model this way, dragging & dropping objects onto the schema, adding fields & connecting them up right here instead of all that **Next**-ing. (When you're done playing, click **Close** on the upper left, just below the **Schema Builder** label to get back to the regular interface you're used to.)

<credits roll...*finally*>

They say *it ain't over 'til it's over*. Well, this one's over. For real this time! Scary, but now at least you've got a truly normalized data model that still connects everything up and with no more duplicate data. Ever.

The Dupe-Monster is truly dead at last. Integrity reigns. Happy ending. Please drop your trash in the receptacles on the way out.

fin

All done? Good work!

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One entry/lab/student
Enter with every lab for the most chances to win

3 winners every term!