The Definitive Guide to building your own

Employee Directory with Office 365 or SharePoint

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About this guide

At Hyperfish we are passionate about employee profiles and the business benefits realized when profiles are complete and up-to-date.

We have received many requests from our customers, wanting to extend the out of box people search functionality in Microsoft products.

It's for reason we've collaborated with industry experts in Microsoft SharePoint and Office 365 to bring you this comprehensive guide to Build your own Office 365 Employee Directory, helping your organization to find people and expertise quickly and easily.

The guide provides:

- Detailed analysis on the out of the box people search functionality available in Outlook, Skype for Business, SharePoint, Delve, and Microsoft Teams;
- Outlines the architecture of People search in both SharePoint Online and SharePoint on-premises;
- Provides you step by step instructions to build an employee directory in Office 365 and SharePoint with a A-Z index navigation.

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Introduction

Every organization has a method for employees to look up other employees contact information. Over the decades, these methods have changed for most organizations. From printed paper references to an integral part of the digital workplace. For those of you reading this, you likely have users that:

- Live in Outlook that use the Outlook address book via email address;
- Are in Skype for Business doing name lookups;
- Have Office 365 and jump into Delve through the app launcher;
- Chat in Microsoft Teams and navigate via the organizational chart; or
- Are using SharePoint Enterprise search center to search for people.

Why Do We Need An Employee Directory?

At Hyperfish we've invested a lot of time understanding how people use people information. The largest use case from our research is finding people and expertize quickly and easily in the organization. There are a few key pivots to this discovery which are described below.

Finding by name

The most common is when users know either the first name or last name of the person they are trying to find.

TIP: Office 365 handles phonetic suggestions so "Jacob" would show results for "Jakob".

Locating someone in a department

Users frequently want to find someone in a department, like Human Resources, because they are trying to solve a problem that they think they'll know the answer to.

TIP: Often people will type "HR", you can train SharePoint search to handle responding with correct results for this.

Locating someone with a similar role

When users are new to a role in the organization, often they want to find people with similar job titles to them. That way they can ask them questions about their own role or get feedback from people who are likely to be able to help.

TIP: Unfortunately, none of the search experiences store historic values for job titles. So you can't use previous work experience to find people that may have been able to help.

Locating the office location of an employee

When users are trying to organize in-person meetings, they'll often want to add the office of one of the people they are meeting. To do that they'll look up the person by name, or even click on their contact card in the email thread and copy and pasted the office location.

Locating someone by navigating the org chart

There are situations where users know someone in the organization and are looking for someone in a specific role either above them or below them in the hierarchy. Being able to search for that individual they know, and then view the organizational hierarchy of that person and navigate up and down is a critical way to discover individuals.

Who is the contact for < insert responsibility >

As an employee, there are often scenarios where they need to find the person that is responsible for payroll enquiries, expense enquiries or legal counsel. Many organizations will track these responsibilities against profiles of individuals to streamline reaching out to them.

TIP: You can create an additional SharePoint User Profile property to track these responsibilities.

Skills searches

When users are working on projects, often they want to get feedback and have things reviewed by subject matter experts. Being able to search for people with specific skills allows users to locate experts across the entire company.

TIP: Storing skills is a great way to work around the fact you can't search historic job titles.

Out Of The Box People Search Experience

Each of these approaches to discovering people in the organization has its pros and cons.

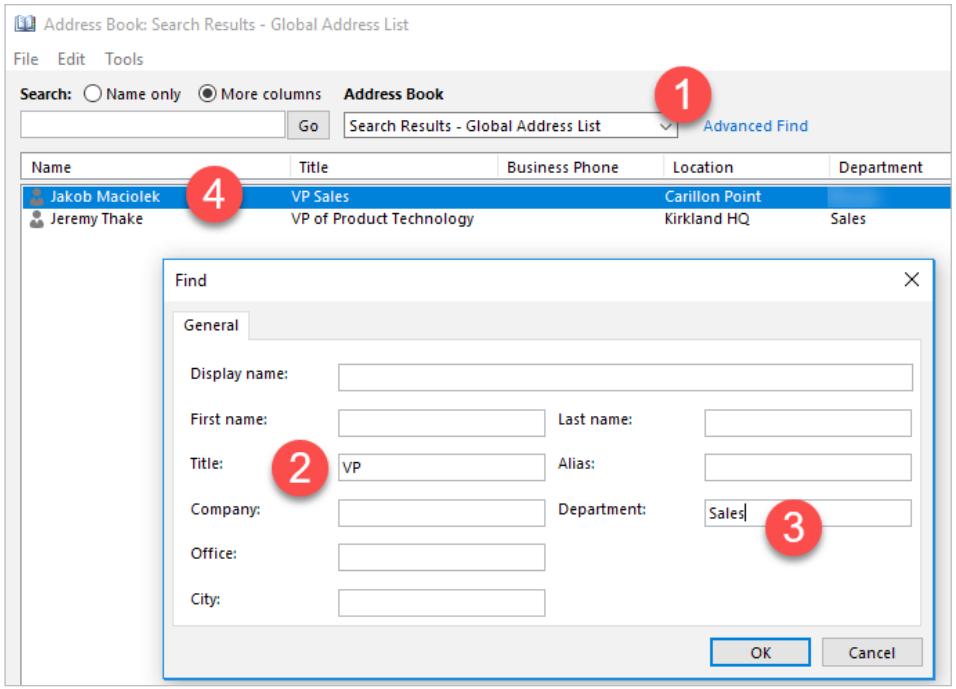
There are some common missing features:

IM Presence	✓	✓	✓	✓	✓
Profile information shown	First name Last name Title Alias Company Department Office Address Manager Assistant Business Phone Home Phone Fax Pager	First name Last name Title Alias Company Department Office Address Manager Assistant Business Phone Home Phone Fax Pager Skills Past projects Education	First name Last name Title Alias Company Department Office Address Manager Assistant Business Phone Home Phone Fax Pager Skills Past projects Education	First name Last name Title Department Office Manager Business Phone	First name Last name Title Department Office Manager Business Phone
Display custom profile information	✗	✗	✓	✗	✗
Phonetic searching	✓	✓[1]	✓[2]	✓	✓
Basic Search matches multiple attributes	ALL	✓	ALL	First name Last name	First name Last name
Advanced search criteria	✓	✗	✓	✗	✗
Search result refiners	✗	✗	✓	✗	✗
Show attribute history	✗	✗	✗	✗	✗
Follow updates	✗	✗	✗	✗	✗
Best bets for search terms	✗	✗	✓	✗	✗

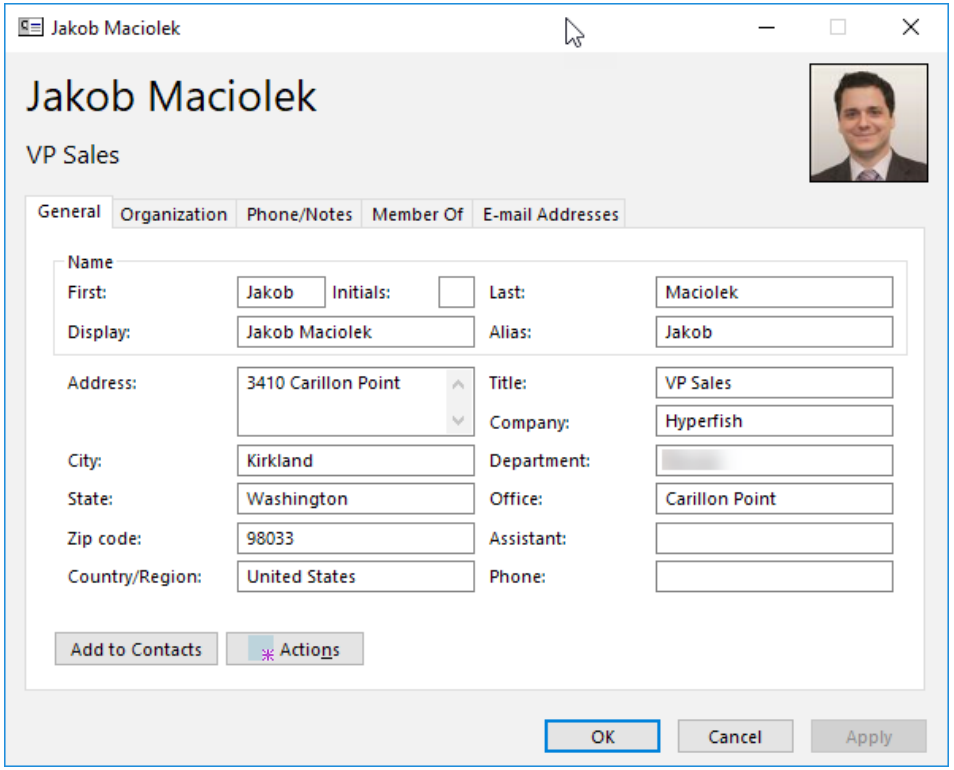
[1] Works in search as you type, not in result. [2] Does work on SharePoint Home. Nickname search however works on SharePoint Home.

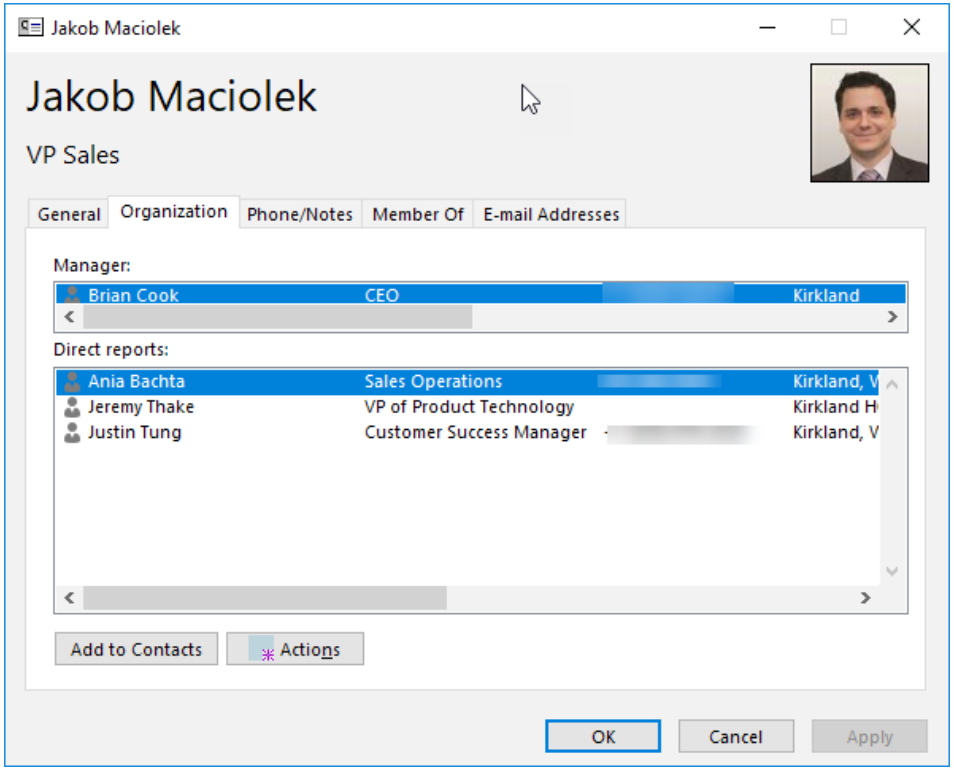
Outlook address book

The most popular way to discover people has been around since Outlook came out in 1997. It has not evolved much over the years, primarily because the Global Address Book is sourced by Active Directory and that hasn't evolved much either. It does provide the ability to search not only the corporate directory (global address book) but also your own contacts that are stored personally in your exchange mailbox…and likely sync'd from your iOS/Android contacts. Unfortunately, the contact cards that show when viewing results are very dated from a user interface perspective.



TIP: One risk here is that users "Add to contacts". What that means is if Jakob, in this example, updates his office location/phone number, it does not sync the changes to the locally stored contact record. It is common practice to educate users on this issue.

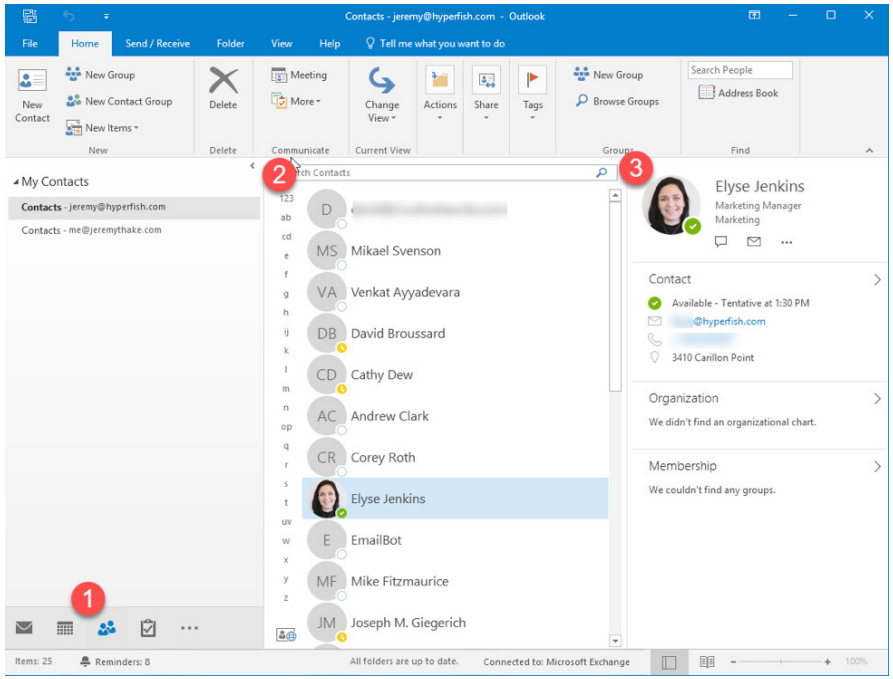




The organization tab view is very limiting and flat. You can double click on the manager and it'll pop open another contact window and you can keep doing this, it is not as easy to navigate as more visual org charts can be.

Outlook People view in Windows desktop

The people view in Outlook is underused based on our research over the Address book. It has similar functionality and provides information not shown in the contact window in the address book.



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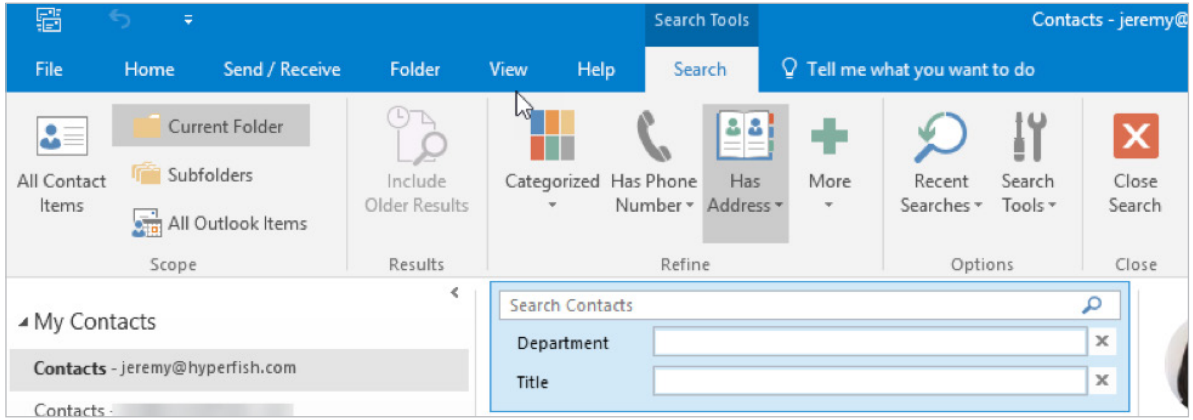
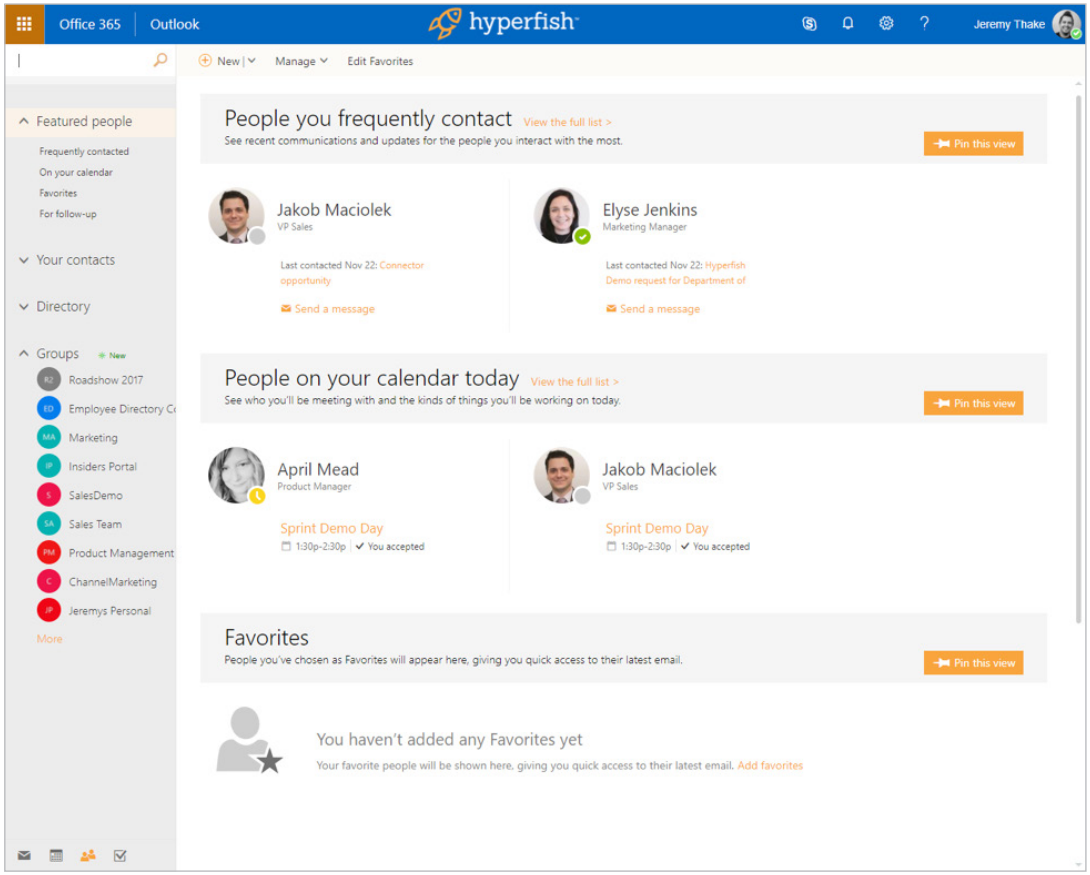
This has some advanced filters such as "Has Address" and "Has Phone number". You can also see recent searches and build advanced search refiners across more properties than the address book.



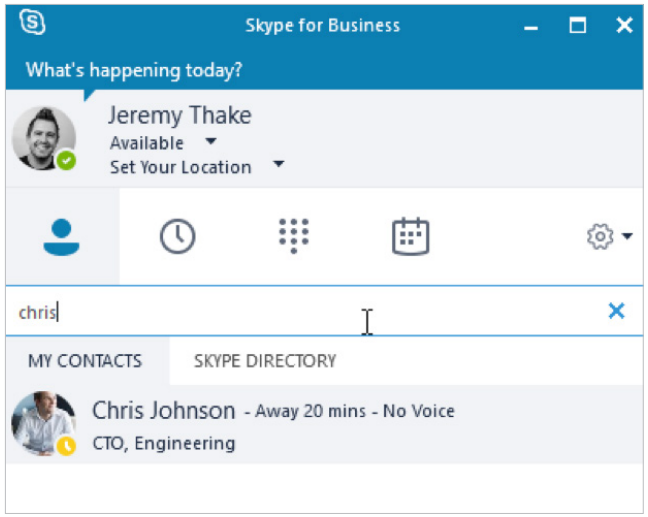
Outlook People view in browser

This view has been recently updated to leverage the Microsoft Graph to suggest contacts based on people you frequently collaborate with. You can even add favorites to make it easy to start conversations with them. Unfortunately, there is no advanced search here and the free text search in the top left will only search inside the names of contacts so searching for "sales" will not return all people with the department name of "sales".



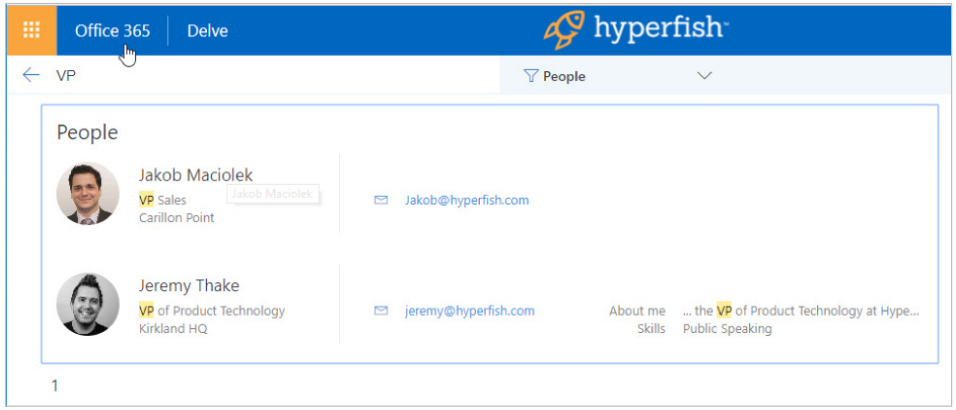
Skype for Business

Skype for Business has a very simple search experience that allows only to search by name. But hovering over the results does show contact cards similar to Outlook. From our research, this is the second most popular way to discover people.



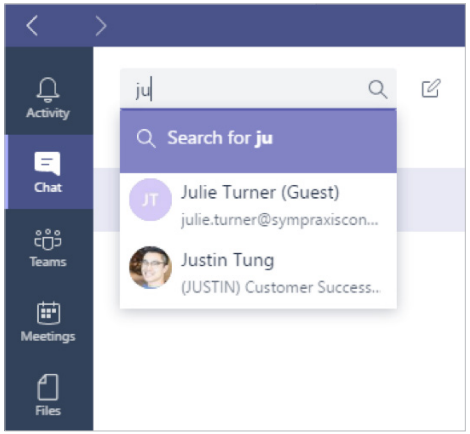
Delve

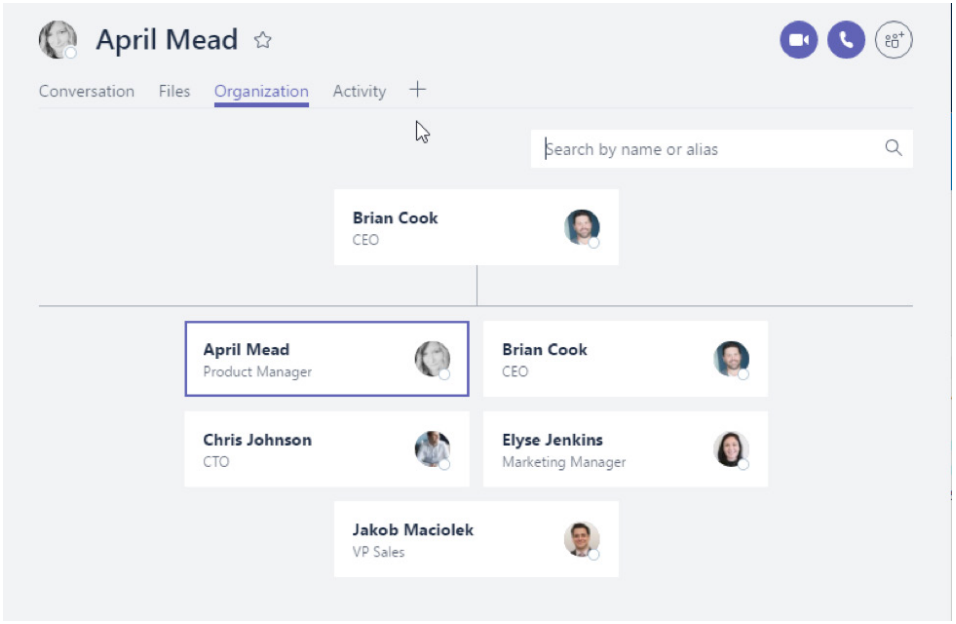
Delve was the first interface in Office 365 to focus on the power of the Microsoft Graph. It has not evolved much since launching in 2015 but has got people search capabilities via one search text box. This works for many indexable attributes in peoples profiles. The Delve profile page is also where most of the other experiences listed above actually link to if you click "see more" on people.



Microsoft Teams

Microsoft Teams is a relative new comer but has similar search capabilities to Skype for Business. One nice addition here is the organization chart view that is much more visual than Outlook and Delve.

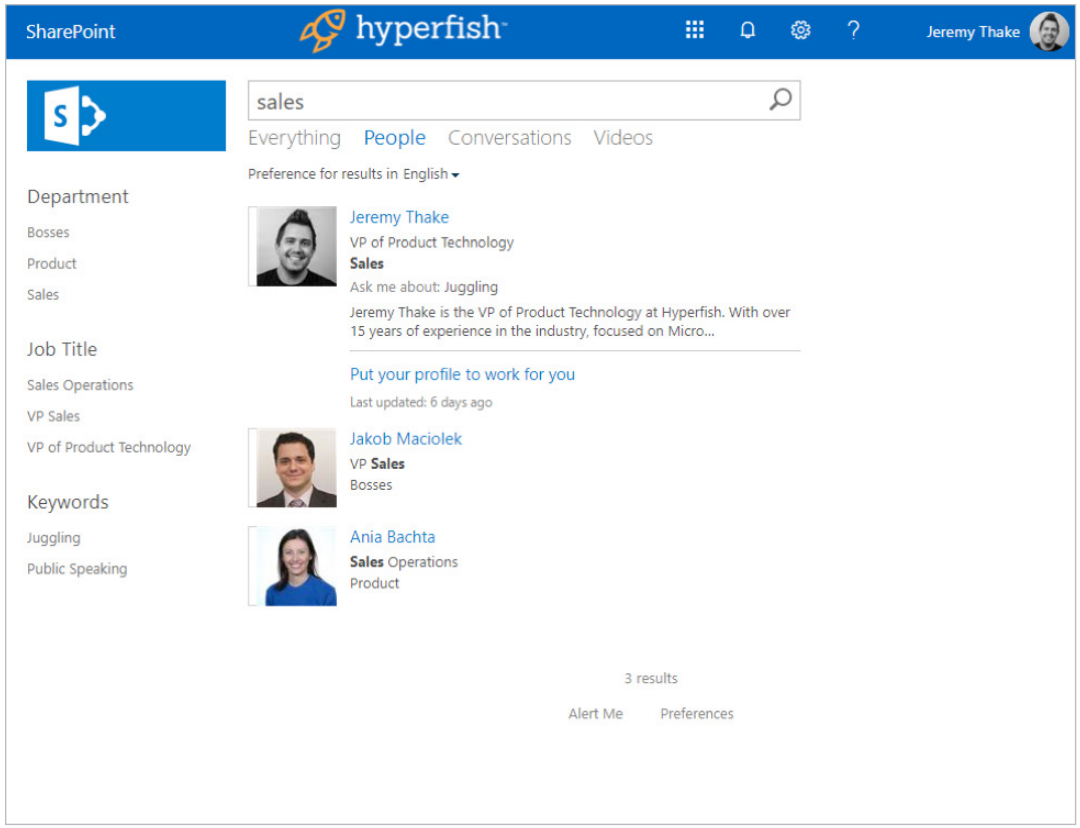


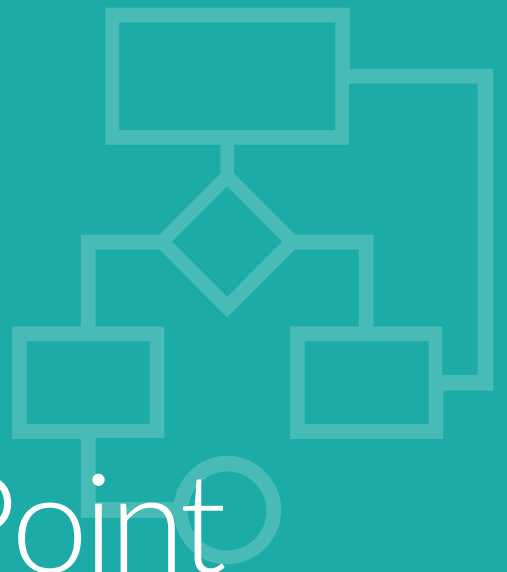


SharePoint Enterprise Search Center

Most people are using SharePoint already and don't even realize that there is a hidden gem inside the Enterprise Search Portal that gives the ultimate in employee directory experiences. This site collection is created by default in Office 365. It can be accessed by https://<<TENANT>>.sharepoint.com/search.

The SharePoint extensibility models allow you to fully tailor the search experience. Many intranet-in-a-box vendors are already taking advantage of these features such as Bonzai, Powell365, Unily and Valo.





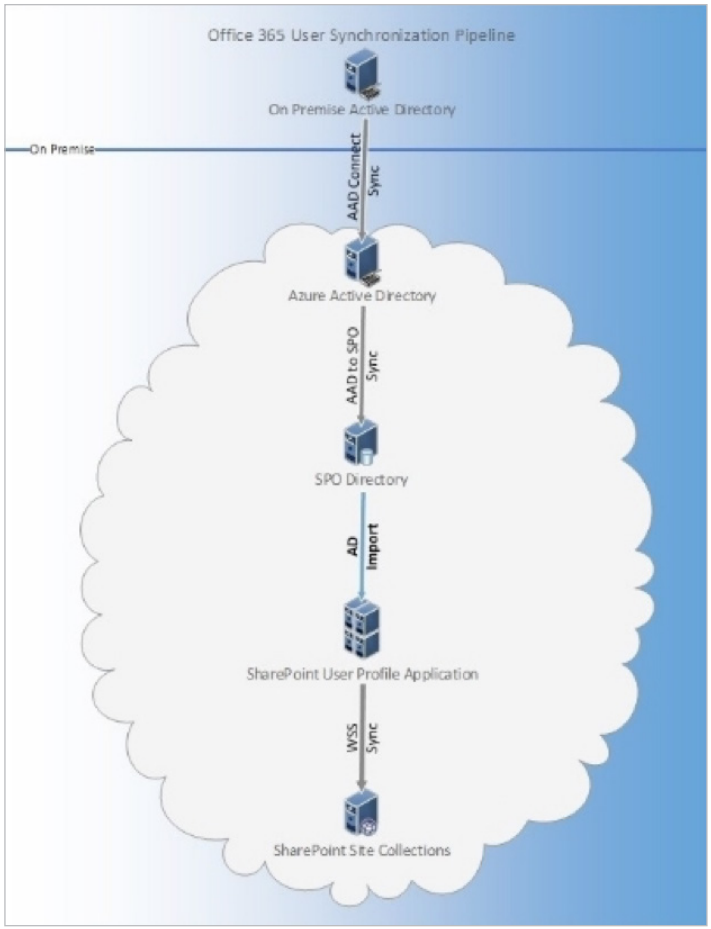
Architecture of SharePoint People Search

People search in SharePoint and Delve relies at a basic level on information from Active Directory being synchronized to SharePoint, and then indexed into the search engine.

Synchronization pipeline

At granular level data flow via four processes:

SYNC PROCESS	DESCRIPTION
AZURE AD CONNECT	Azure AD Connect syncs data from your on-premises Active Directory to Azure Active Directory. For more information.
AAD TO SPO SYNC	Azure Active Directory syncs data from Azure Active Directory to the SPO Directory Store.
AD IMPORT	Active Directory Import syncs data from the SPO Directory Store to the User Profile Application.
WSS SYNC	WSS Sync syncs data from the User Profile Application to the SharePoint Online site collection.



The main difference for people search in SharePoint Online and on-premises is that the attributes synchronized per profile from AAD to SharePoint Online is set. For any extra attribute you wish to include in the Delve profile or in people search outside those in Table 1 you must employ a custom synchronize mechanism. The same goes if you synchronized custom data from line of business systems using BCS to the User Profile Application on-premises. This capability is not present in SharePoint Online.

For SharePoint Online, the list of attributes being synchronized is:

Azure Active Directory attribute	SPO User Profile property	Notes
UserPrincipalName	**DisplayName:** User Name **Name:** UserName	The value in this property is used to create the path of a user's OneDrive for Business site collection. For example: gherrera@contoso.com and /gherrera_contoso_com/ This property is replicated to the site collection by WSS Sync.
UserPrincipalName	**DisplayName:** Account name **Name:** AccountName	This property stores the claims-encoded User Principal Name for the user. For example: i:0#.f|membership|gherrera@contoso.com This property is used to look up the user profile.
UserPrincipalName	**DisplayName:** Claim User Identifier **Name:** SPS-ClaimID	This property stores the user's claims identifier. The identifier is the User Principal Name. For example: gherrera@contoso.com
UserPrincipalName	**DisplayName:** User Principal Name **Name:** SPS-UserPrincipalName	This property stores the User Principal Name of the user. For example: gherrera@contoso.com
GivenName	**DisplayName:** First name **Name:** FirstName	This property is replicated to the site collection by WSS Sync. For example: Gabriela
sn	**DisplayName:** Last name Name: LastName	This property is replicated to the site collection by WSS Sync. For example: Herrara
Manager	**DisplayName:** Manager **Name:** Manager	The manager property is used to determine colleagues and will be used in the user profile and OneDrive for Business deletion process. For more information see: 3042522 How user profiles are deleted in SharePoint Online and OneDrive for Business.
DisplayName	**DisplayName:** Name **Name:** PreferredName	This property is replicated to the site collection by WSS Sync. For example: Gabriela Herrara
telephoneNumber	**DisplayName:** Work phone **Name:** WorkPhone	This property is replicated to the site collection by WSS Sync. For example: (123) 456-7890
proxyAddresses	**DisplayName:** Work email **Name:** WorkEmail	Processed in this order when it's added to the profile: WorkEmail if the value in proxy address is prefixed with SMTP: (Must be in CAPS) WorkEmail if the value in proxy address is prefixed with smtp: (Must be lowercase) This property is replicated to the site collection by WSS Sync. For example: gherrera@contoso.com

ProxyAddresses	**DisplayName:** SIP Address **Name:** SPS-SIPAddress	SPS-SIPAddress if the value in proxy address is prefixed with sip:. This property is replicated to the site collection by WSS Sync.
PhysicalDeliveryOfficeName	**DisplayName:** Office **Name:** Office	This property is replicated to the site collection by WSS Sync.
Title	**DisplayName:** Title **Name:** Title	This property is replicated to the site collection by WSS Sync
Title	**DisplayName:** Job Title **Name:** SPS-JobTitle	SPS-JobTitle contains the same value as Title. SPS-JobTitle is connected to a Term Set. This property isn't replicated to the site collection.
Department	**DisplayName:** Department **Name:** Department	This property is replicated to the site collection by WSS Sync.
Department	**DisplayName:** Department **Name:** SPS-Department	SPS-Department contains the same value as Department. SPS-Department is connected to a Term Set. This property isn't replicated to the site collections.
WWWHomePage	**DisplayName:** Public site redirect **Name:** PublicSiteRedirect	
PreferredLanguage	**DisplayName:** Language Preferences **Name:** SPS-MUILanguages	SPS-MUILangauges is used by SPO to determine which language a site is displayed in for the user when MUI is enabled.
msExchHideFromAddressList	**DisplayName:** SPS-HideFromAddressLists **Name:** SPS-HideFromAddressLists	
msExchRecipientTypeDetails	**DisplayName:** SPS-RecipientTypeDetails **Name:** SPS-RecipientTypeDetails	
ObjectGuid	**DisplayName:** Active Directory Id **Name:** ADGuid	Internal
DistinguishedName	**DisplayName:** Distinguished Name **Name:** SPS-DistinguishedName	Internal
ObjectId	**DisplayName:** msonline-ObjectId **Name:** msOnline-ObjectId	Internal
UserType	**DisplayName:** SPS-UserType **Name:** SPS-UserType	Internal

Reference: https://support.microsoft.com/en-us/help/3168272/information-about-user-profile-synchronization-in-sharepoint-online

User defined profile properties

In addition to the properties making its way from Active Directory the user can have any number of fields in the Delve profile which they themselves can fill in. Examples of these are the Ask me about and Skills properties, this information is stored in the SharePoint Online User Profile store (sometimes called SharePoint Online Directory).

Crawling

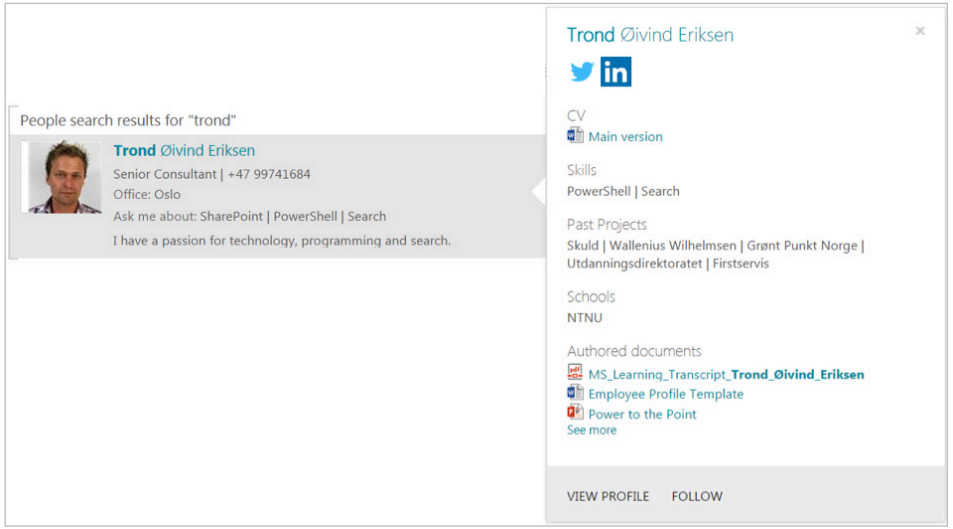
Once data makes its way up the chain to the SharePoint Online User Profile store it will be indexed and made searchable. Typically, a change in a user's profile can take up to 6 hours before being reflected in the search results.
A common scenario for people search is that you after a while discover the need to make more properties searchable in the user profiles. Once you have made the necessary changes you need to re-index the user profiles for these properties to be available.

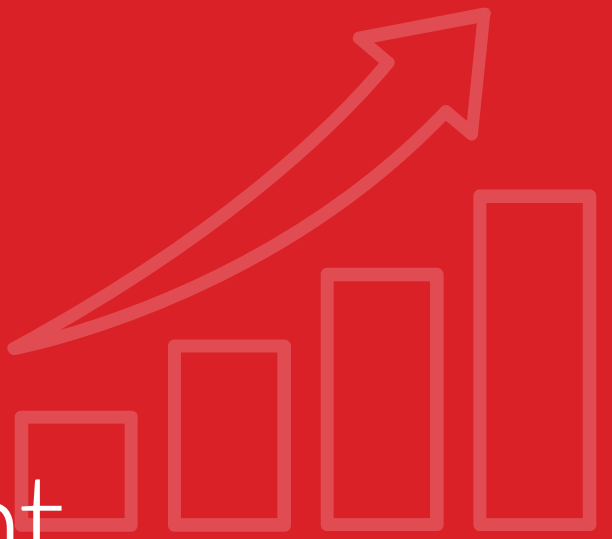
In an on-premises environment you could start a full crawl of the user profiles, but this is not possible in SharePoint Online. The solution is to "update" each and every single user profile so that the last modified date changes, which the crawler picks up on and re-index the data.

TIP: MVP Mikael Svenson has a PowerShell script available at https://github.com/wobba/SPO-Trigger-Reindex which helps with this, or if you are a UI person take a look at SharePoint Online Search Toolbox by Puzzlepart, a SharePoint Add-in available from the Office Store.

In the land of people search, content is king. To make your people search as good as possible you should strive to get your employees to take a few minutes and update their profile information. The screenshots below illustrate the difference between a two people search results. If Jane Moneypenny spent a couple of minutes and updated her profile picture, title, office, ask me about and about me fields, her result would be very similar to Mads Nissen's.

Moreover, the icing on the cake is of course the hover panels. If your employees enrich their profile information, this will be displayed in the hover panels for the people results as presented below.





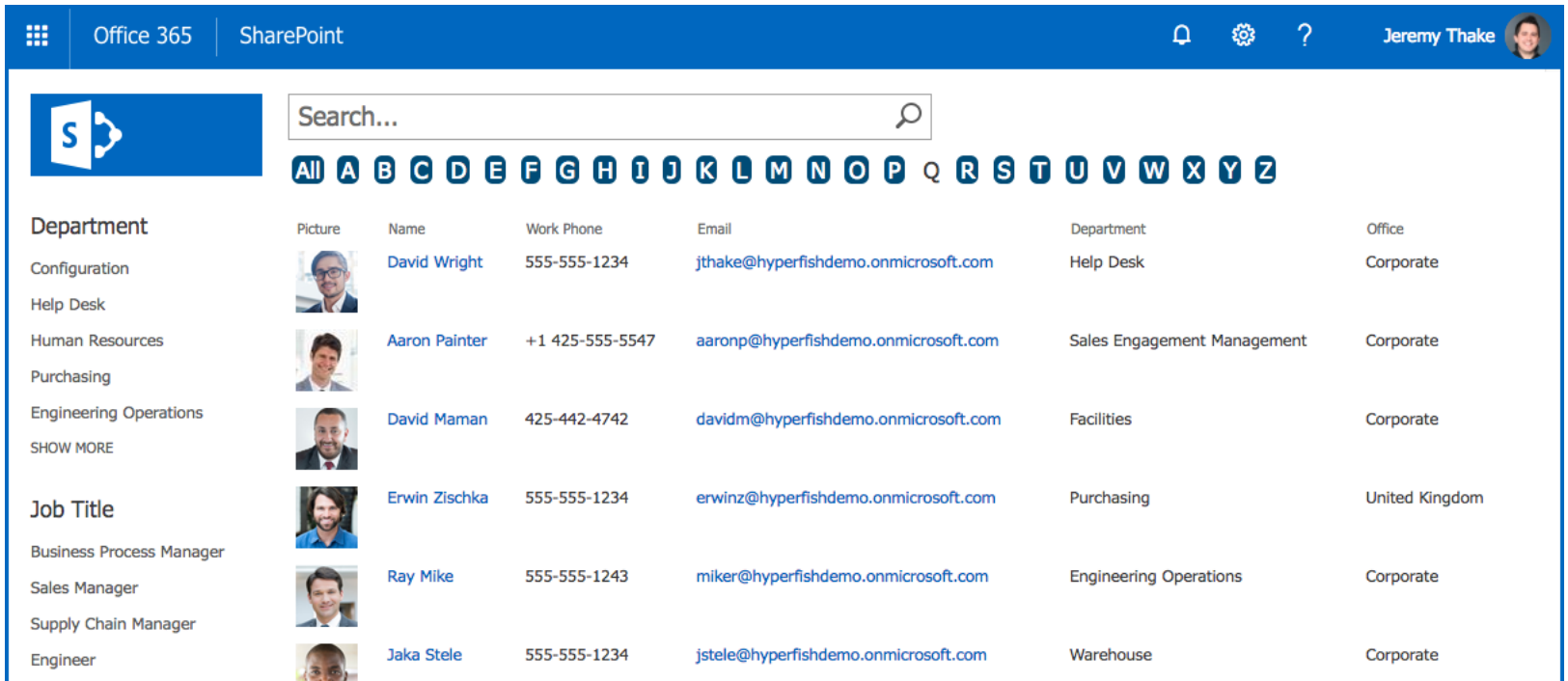
Enhancing SharePoint People Search

This step by step guide will help you to enhance your employee directory in SharePoint. It works for SharePoint Server 2013/2016 and SharePoint Online.

This is based on a series of blog posts with permission by Marc Anderson (http://sympmarc.com/series/create-a-simple-sharepoint-2013-employee-directory-on-office365/). This creates a table like employee directory with a A-Z index navigation.

There are basically four mandatroy steps with a bunch of optional steps:

1. Employee Directory search page set up
2. Default results setup
3. Upload Display template customizations
4. Change to custom display template



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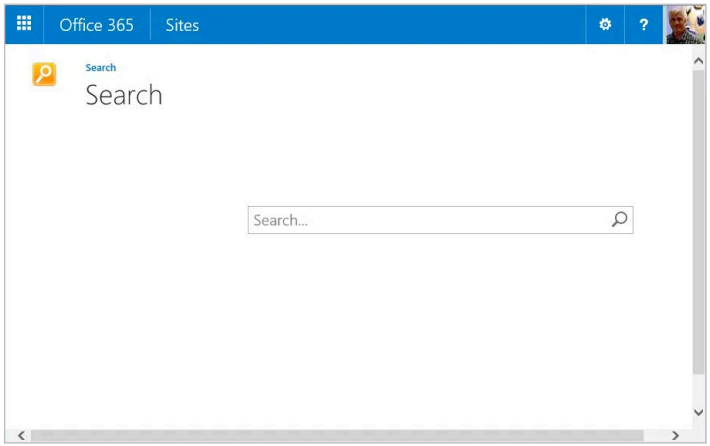
STEP 1

Employee Directory search page set up

The first step is, of course, to create a page where the Employee Directory will live. The approach we're taking here is to use a page in the Search Site Collection in Office 365. By default the Search Site Collection lives at https://[tenant name].sharepoint.com/search.

When you go to the Search Site Collection directly, you'll land on a very bland search page:



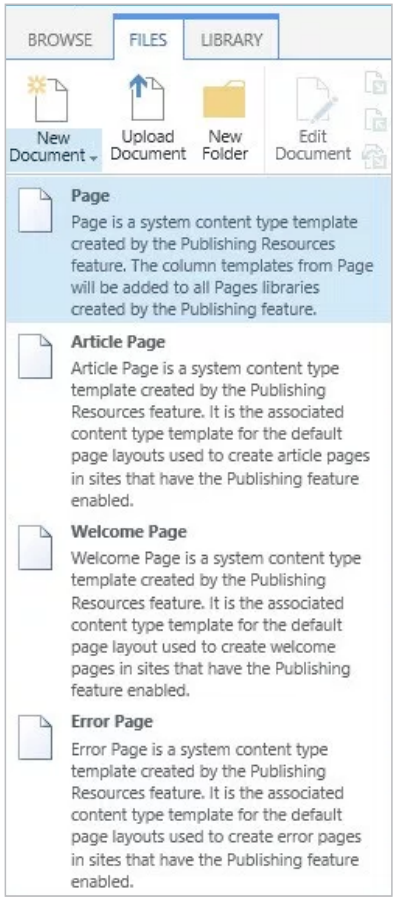
You may also have created your own Enterprise Search Center, which may look a little different. It doesn't really matter, though. All we want to do is to create a new page in the Search Site Collection you are using to house the Employee Directory.

Click on the cog in the top right and then Site Contents option. This should show you all the lists and libraries available in the Site Collection root. If you can't get this far, then you may not have the appropriate permissions.

Go directly to Jail, do not pass Go, and do not collect $200. You'll need to talk to your Tenant or Site Collection Administrator to get the right permissions.

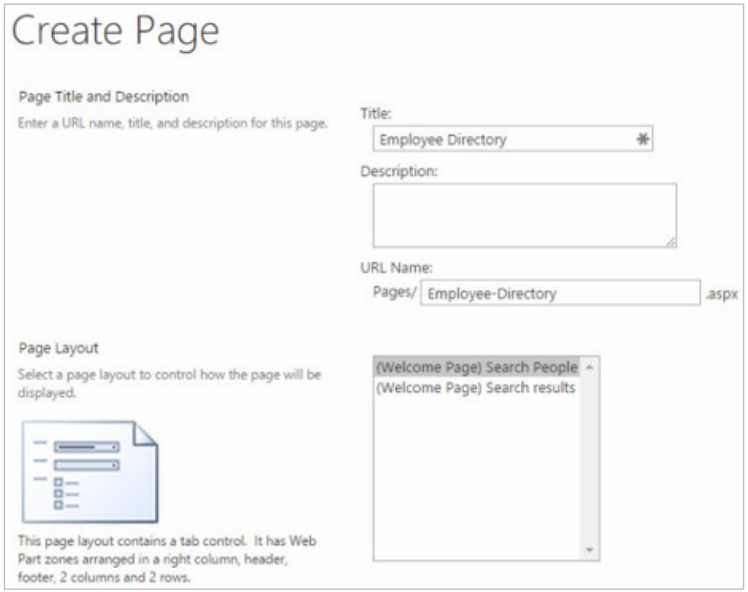
If permissions aren't a problem, then click on the Pages Library icon.

Once in the Pages library, go to the ribbon and create a new page.



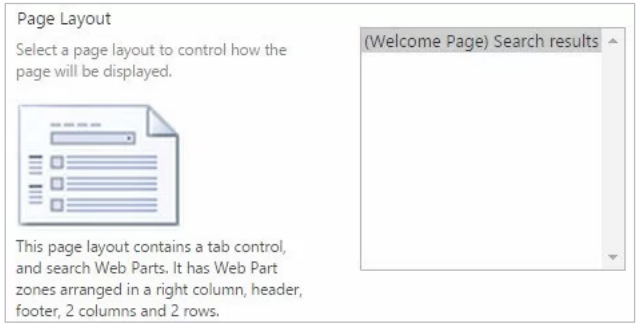
When you select Page, you'll end up on the page where you can create the page. What you're looking for here is the "(Welcome Page) Search People" page layout.

I'm calling mine "Employee Directory" with the URL set to Employee-Directory.aspx. Be sure to choose the "(Welcome Page) Search People" page layout.

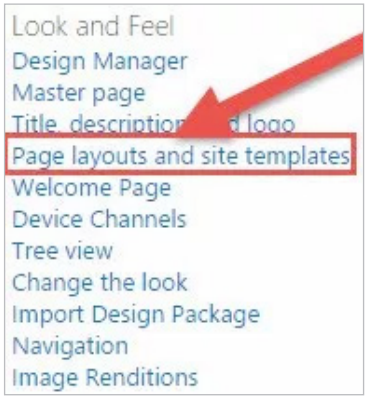


Detour: Missing page layout

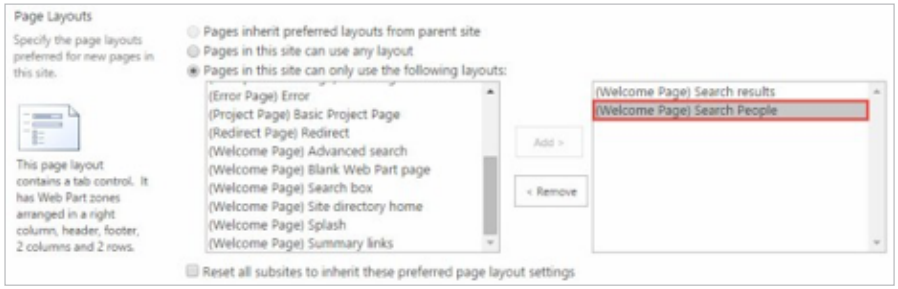
In the image below, the page layout is not available. If it is, choose it and keep rolling. If not, first take this little detour.



Click on the cog, go into Site Settings, and choose "Page layouts and site templates" under the "Look and Feel" section at the top of the right column.

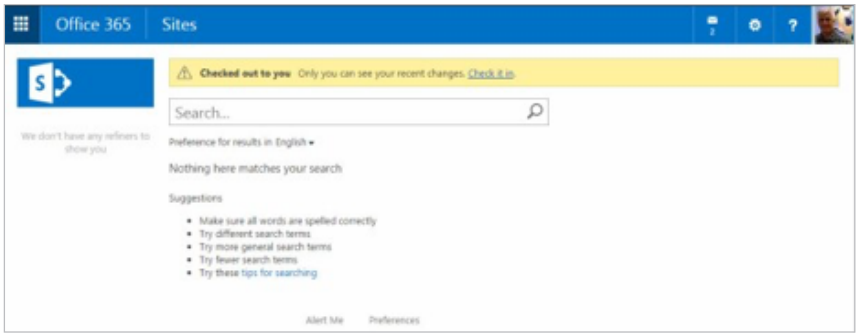


In the Page Layouts section, add the "(Welcome Page) Search People" page layout. The section should then look like this below:



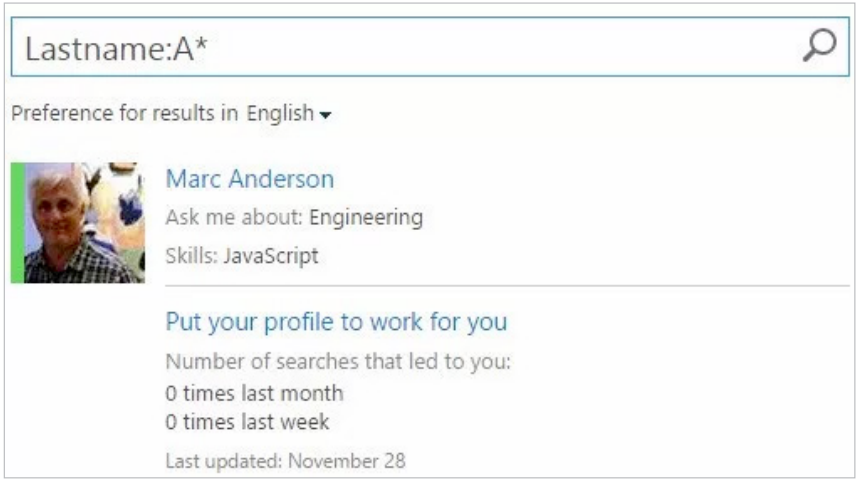
Now go back to the Pages library and create the new page.

When you click Create, you'll end up back in the Pages library.



Click on the Employee Directory page. It'll look something like this, though if you see my photo it'll be a little weird.

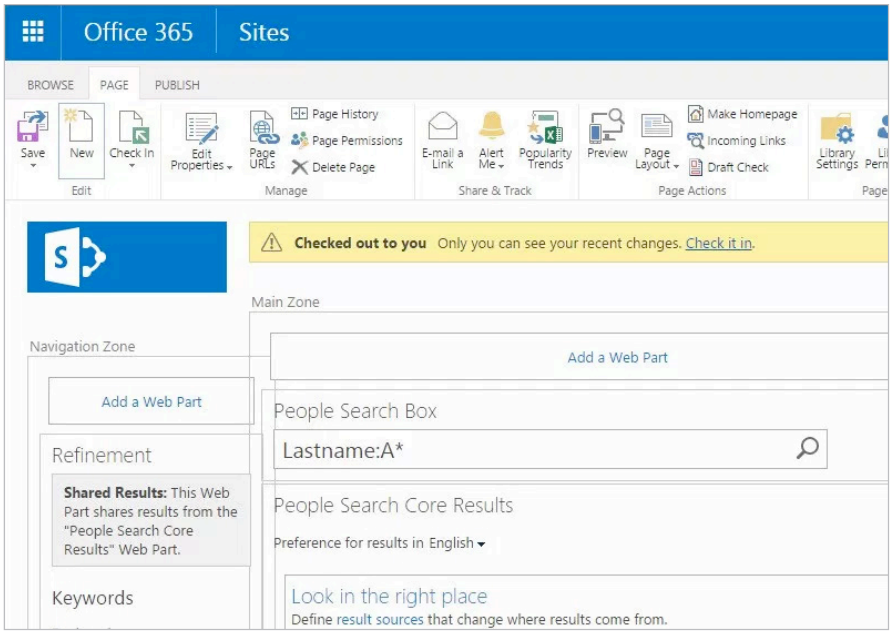
Believe it or not, you now have a fully functional page that will do much of what you want. For instance, if you type "Lastname:A*" in the search box, you'll get all of the people whose last name starts with the letter A.



STEP 2

Default results setup

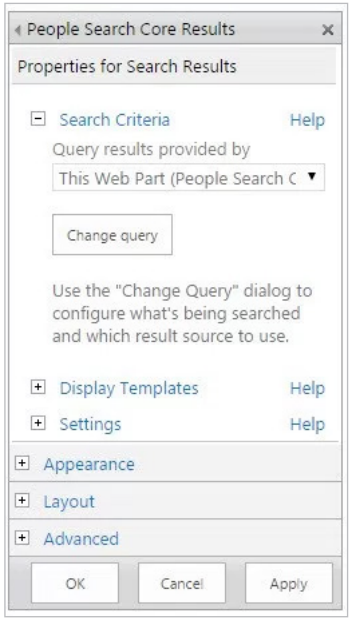
We don't want to land on the page with no results showing. That would require more work than we want people to do. Instead, let's set the Search Results Web Part up so that it shows some of the people in the tenant by default.



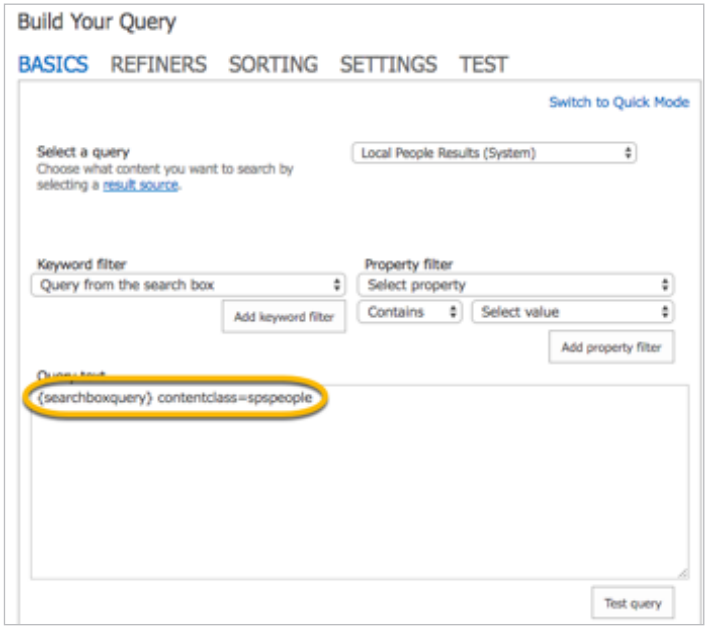
Click on the cog and Edit Page. If you've never done this on a Search Results page before, you may be surprised to realize that it's just a Web Part Page with some special Web Parts already set up for you. You'll see that you have two Web Part Zones.

- On the left, you have the Navigation zone. It contains only one Web Part: the Refinement Web Part
- On the right, you have the Main Zone. It contains two Web Parts: the People Search Box Web Part and the People Search Core Results Web Part.

Click on the dropdown at the top right of the People Search Core Results Web Part and choose Edit Web Part. This will open the Tool Pane for the Web Part.



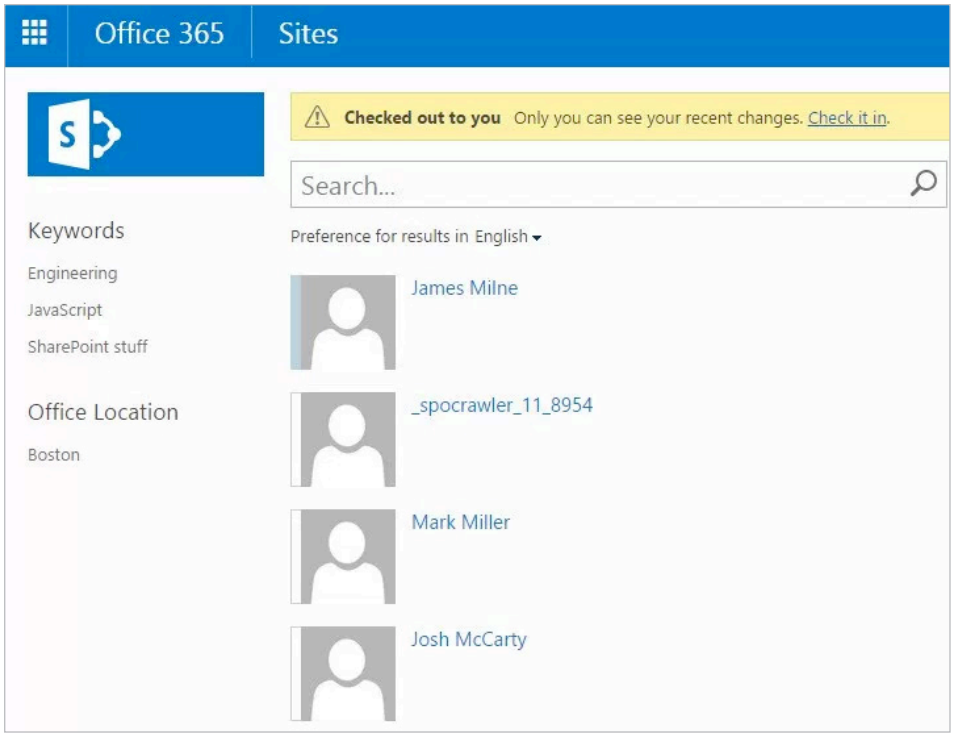
There's a great deal we can do with these settings, but for now we are going to just do one simple thing. Click on the Change Query button. In the Query Text box, simply add " contentclass=spspeople". This sets the default search to return all people, filtered by whatever is in the search box. If you click the Test query button, you should see at least a few people show up on the right in the Search Result Preview box.



Click OK to save the query. Then OK to save the Web Part settings. Then Save on the ribbon to save the page.

Now you should have a very rough first pass at an Employee Directory. You should see up to 10 people in the results, perhaps along with a photo (if they have one in their profile) and a little information about each person (if certain profile properties are populated).

You may also see some strange "people-like" entities. These will usually be some crawler accounts, for example _spocrwl_19284, etc. We'll take care of those later.



STEP 3

Upload display template customizations

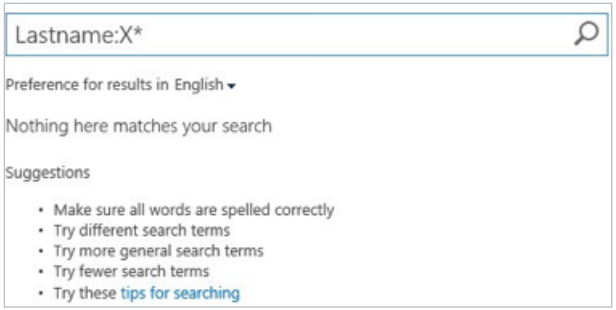
What you'll want to do here will vary based on the characteristics of your organization. What's useful for an organization with 10 people will be quite different than what's useful for one with 100k+ people.

The client I needed this directory for has about 100 employees. As with many organizations, the Employee Directory is effectively replacing something that has been maintained in Excel and emailed out regularly. Everyone prints it out and hangs up a copy in their cube. So we really want this directory to look a lot like that old-fashioned phone list. It will have a little more info and if the data maintenance side of things holds up, the data will always be current. At the same time, since we are using Display Templates, we're well-positioned to expand the information we display over time. In small- to medium-sized organizations like this, it's helpful to have an alphabetic filter. I've created a Control Display Template which shows the alphabetical filtering links and an Item Display Template that shows each person's details.

Here's what the alphabetic filtering looks like:

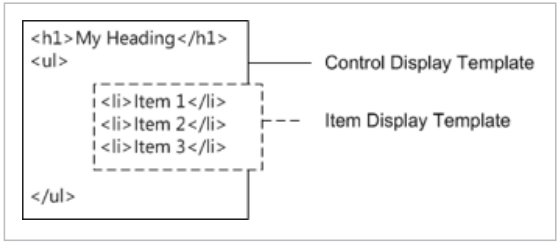
All A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

Note that several of the letters are not "lit up". That's because no one in the organization has a last name starting with I, Q, X, or Y. Few things are more annoying than clicking on a link like this only to be told that "Nothing here matches your search".



If nothing matches, then why did you show me the link?!?!?! So there's a little magic in the Control Display Template to figure out which letters should not be lit up. That logic will ensure that we only can click on letters where there are actual results, even as people come and go.

There are two Display Templates here.



Think of the Control template as the outer one and the Item template as the inner one which we iterate for every individual item in the result set coming back from search. This can be a little tricky and also a little confusing. Where should we draw that dotted line? Well, you'll see a lot of inconsistency on this. In my two Display Templates for the Employee Directory, I'm using the Control template to display the alphabetic filter links and to create the table which will contain the items, but I'm rendering the table header in the Item template.

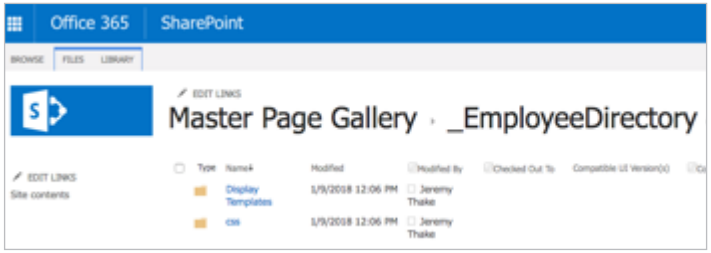
That just seems to make more sense to me because that way the column headers sit with the rendering of the actual data, not is a separate place (the Control template). Another thing to consider here is that ideally, we want the two types of Display Templates to work atomically: we should be able to mix and match different Control and Item templates based on our needs. For instance, in a really large organization, we may not need to check for which letter to light up, so we could just use a Control Template that doesn't do that piece.

For the next step, you'll need the zip file, which is on the download page where you got this PDF from:

www.hyperfish.com/employee-directory

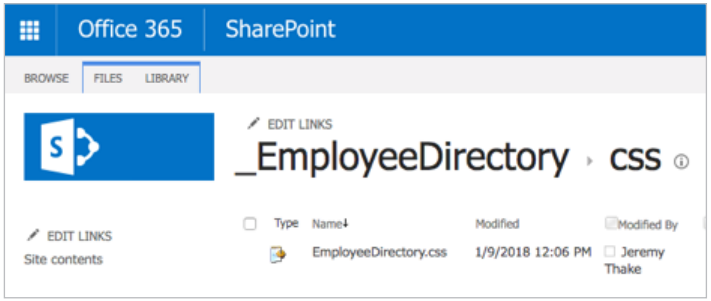
With the zip package extracted on your computer.

1. Go to Site Settings in the cog menu.
2. Then click "Master pages and page layouts" under "Web Designer Galleries".
3. Then in the ribbon click "Files" tab and then "New Folder". Create the folder named "_EmployeeDirectory".
4. Create two sub folders called "css" and "Display Templates". Create a sub folder of "Display Templates" called "search

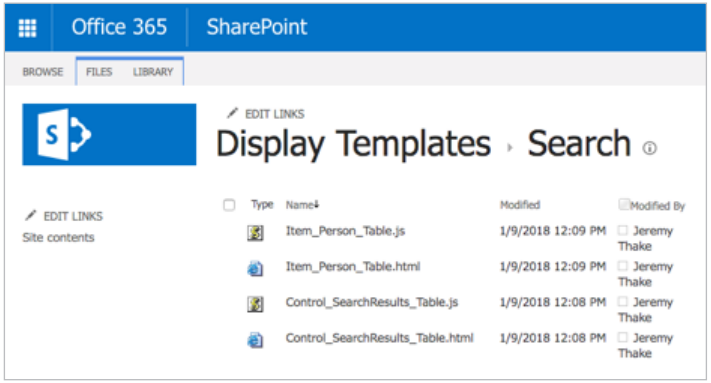


TIP: In the real installation, that folder is named for the client, but here I've called it "_EmployeeDirectory". Note the leading underscore: that ensures that the folder will always show up at the top of the listing under masterpage; otherwise I have to scroll a lot.

Using the Files tab upload the files into the directories from the zip package. Keep the default settings when prompted for metadata for all files uploaded.



You will notice when you upload the html files into the Search folder, there will be a javascript file created automatically.



It is recommended that you get organized about how I store things in the folder. Having subfolders for different functions helps new people understand your customizations. This approach mimics how SharePoint uses files out of the box.

- css—Any CSS files that are a part of this solution.
- Display Templates—Mirroring the subfolder names, like Search, makes it clear what type of Display Templates are in there. Because each of the Display Templates has a Content Type in it, SharePoint knows how to find the files in these custom folders.

If I had any custom JavaScript in the solution, I'd have a js folder, images files would go into an images folder, etc.

Control Display Template explanation

Here are the custom parts of the Control Display Template. The basic logic is this:

- Line 3—Include some custom CSS. In a full installation, this would probably occur in the master page, but I've chunked it out to share the important bits here.
- Line 4—Include jQuery. I'm using jQuery to handle a bunch of things since it makes life easier.
- Line 7—This div is just the outer container for the template.
- Lines 10-15—Declare some variables we'll need later
- Lines 19-36—Emits the markup for the alphabetic filters.
- Lines 22-28—Loop through all of the letters in the alphabet and make the calls to search to find out if that letter should be "lit up".
- Line 31—Emit the hard-wired "All" link.
- Lines 38-53—This block is where I figure out which letters to unlight change the CSS for each. Yes, After fiddling around with this for a while, I decided to load the page with *all* the letter lit up, and turn off the ones that don't have data behind them. This makes for a good regression if we have one: all the links will be lit up even if the script fails.
- Lines 55-76—This function called getSearchResultsUsingREST makes a call to the Search Service using REST and passes back a promise. Each call requests just the first result (rowlimit=1) and only the WorkId property (selectproperties='WorkId'). This makes the call extremely "light". We don't need to know how many people fall into the letters bucket; we just want to know if *any* do.

Lite Item Display Template explanation

Next up is the Item Display Template. In this one, I've gone as simple as possible. I've gotten rid of a lot of the encoding, null value tests, etc. that most of the out-of-the-box Display Templates have just to keep it simple. Below I'm showing *everything* in the body of the template. It's really stripped down.

- Line 9-21—If this is the first item in the result set, emit the table header.
- Line 23-33—Emit the details for each person in the result set. Here I'm showing:

  - Name (full name)

  - Work Phone

  - Email

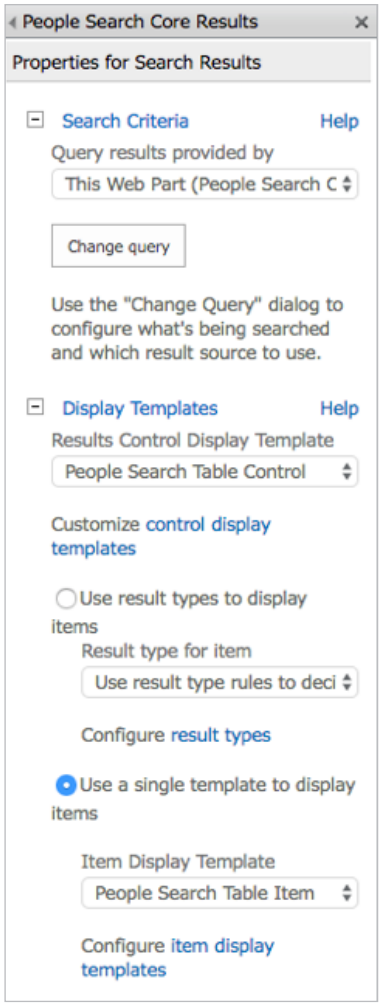
  - Department

  - Office

Your organization will undoubtedly have a few other fields you want to add, you may one to remove one or two of these.

STEP 4

Change to custom display template



Now that you have uploaded your custom display template files. In the employee directory page, you need to configure the web part to use these instead of the defaults.

1. Go to your Employee-Directory.aspx page.
2. Click the cog in the top right then Edit Page.
3. Hover over the "People Search Core Results" Web Part and click Edit Web Part.
4. Expand the "Display Templates" option in the web part properties. And select "People Search Table Control" option rather than "Default result".
5. Then click "Use a single template to display items". And select "People Search Table Item".

Further Enhancements For Employee Directory

Sorting and refiners

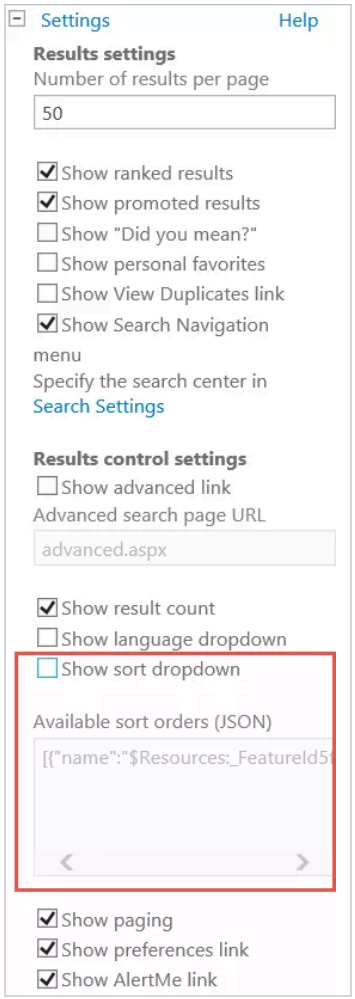
The next step is to add some of the slicing and dicing capabilities. We couldn't do that before we set up the RefinableString00 aka LastnameSortable property. If we had tried to use the Lastname property, we'd just get errors in the page I know this from experience). Errors that tell us precious little about what the actual problem is. Correlation ID!

In a company with 100 employees, clicking on once of the letters are the top of the page will probably narrow things down well enough that you'll see everyone with that letter at the start of their last name on one page. If you have many more employees, you may end up with too many people to see very easily. And since we're limited to 50 results in the Search Results Web Part, you may need to page and/or scroll a lot, depending on what properties you've decided to show for each person (one line vs. two lines or more, for example).

There are a couple of out of the box capabilities we can use to sort or filter our results a bit more. Because we're using search to drive the directory, we have all of the native search capabilities that SharePoint gives us. Let's take a look at adding some sorting and improving the refiners.

Sorting

In the Web Part Properties for the Search Results Web Part, there is a checkbox labelled "Show sort dropdown". It's in the Settings section (which is full of other options as well).



By checking the box and adding some of our own JSON into the field below it, we can control what sort options are available. The JSON should be an array of sort options taking this form:

```
1    {
2      "name": "Last name (A-Z)",
3      "sorts": [{
4        "p": "LastName",
5        "d": 0
6      }]
7    }
```

The values break down like this:

- name—The text value you'll see in the dropdown
- sorts—The parameters for the sort that apply when the option is selected

  - p—The managed property to sort on

  - d—[0 | 1] If 0, the assort is ascending, if 1 it is descending.

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Here's a pretty basic set of sorting options that should at least get you started. I'm giving you four pretty basic sort options:

- First name (A-Z)
- First name (Z-A)
- Last name (A-Z)
- Last name (Z-A)

```
[{"name":"First name (A-Z)","sorts":[{"p":"FirstName","d":0}]},{"name":"First name (Z-A)","sorts":[{"p":"FirstName","d":1}]},{"name":"Last name (A-Z)","sorts":[{"p":"LastName","d":0}]},{"name":"Last name (Z-A)","sorts":[{"p":"LastName","d":1}]}]
```

You should be able to take this and enhance it for your own needs.

Refiners

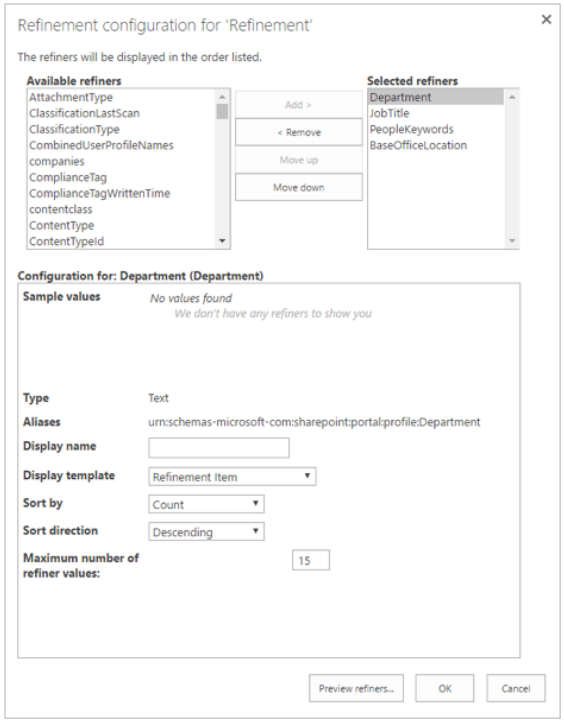
Next, we probably want to adjust the refiners a bit. Out of the box, the Refiners Web Part will display properties that look to a machine like useful ones, but they may not be the most useful in your organization. You may want to show refiners that are part of the search results already or you may want to show refiners that aren't visible in the results.

Changing which refiners you see and in what order works like this:

- Edit the page
- Put the Refinement Web Part into Edit Mode
- Click on Choose refiners
- Change the settings
- Save it

The key action here is to add or subtract from the Selected refiners in the Choose refiners dialog. For each refiner, you can change the settings on the bottom of the page. Note that refiners use Display Templates as well. I'm not going to go into building Refinement Display Templates, but you can see them in _catalog/_masterpage/Display Templates/Filters.

In my case, I've got refiners for Department, JobTitle, PeopleKeywords, and BaseOfficeLocation. You will probably want some others which work for you.



You should see the impact of these changes immediately upon saving the page. Assuming that the properties you have selected have been indexed, that is.

Excluding service accounts

The user profile store in SharePoint has several service accounts added to it from different Microsoft services running in SharePoint Online. These shouldn't show for the employee directory results.

In order to remove these accounts you can add the following to your Query Text that you modified in previous steps:

-accountname:spo* -PreferredName:"Foreign Principal"

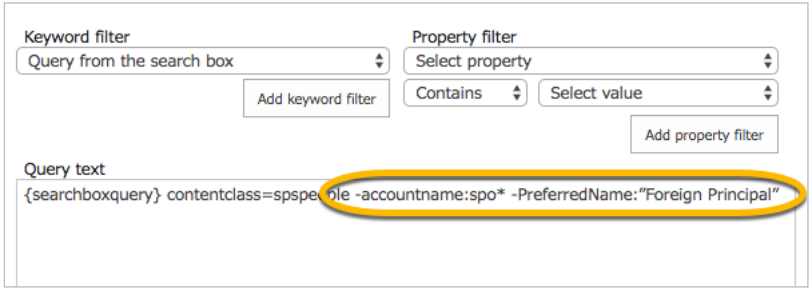
This will remove all accounts with an accountname starting with spo. If you think this will also remove some of your regular accounts you can do a more granular one:

-accountname:spofrm -accountname:spoapp -accountname:spocrawler -accountname:spocrwl -PreferredName:"Foreign Principal"

And we just have to hope that Microsoft don't add more outside of this naming schema.

One thing to note is that you cannot edit the default "Local People Results" result source to make this a global exclusion. You can however create a query rule to append this to every query – but that might break other query rules so I would not recommend this.

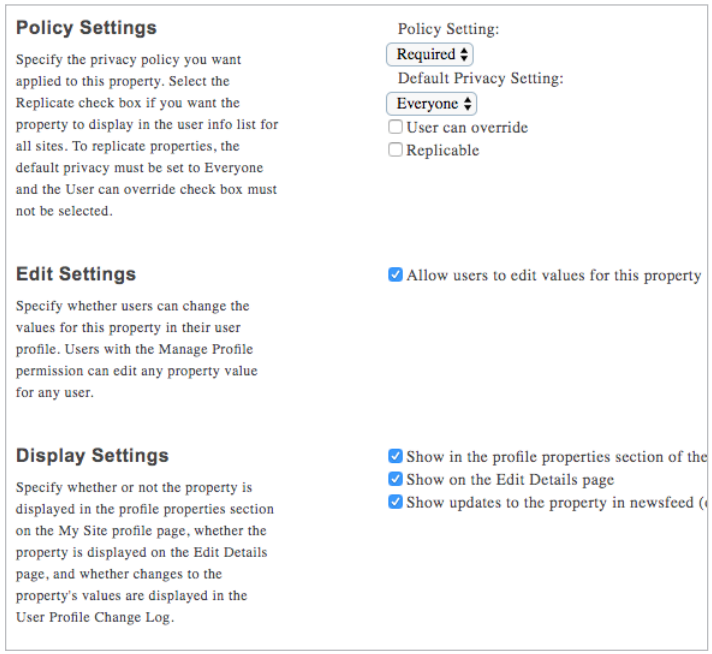
This means you might not be able to fix SharePoint Home, but it works anywhere you have a search web part or can control the query being sent over.



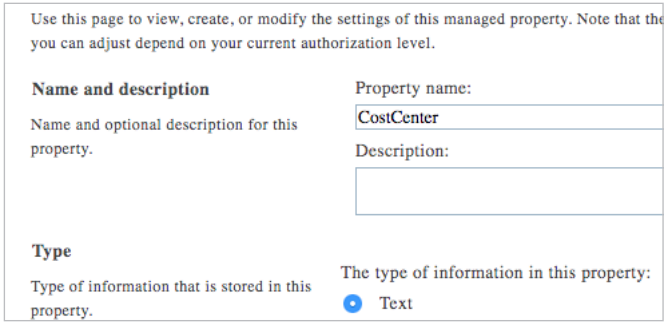
Including additional User Profile Properties

It will be common to display additional properties in the display template from the user profiles. Many companies create additional user profile properties, such as "Cost Center" that they will want to show and search by.

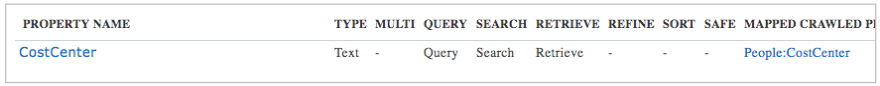
1. Create the User Profile property in the SharePoint admin center. Ensure that this property is editable by users so they can provide the value from the Delve profile edit form.



2. Create a New Managed Property into the Search | Manage Search Schema section of the SharePoint Admin center. Call the managed property the same as the user profile property itself.

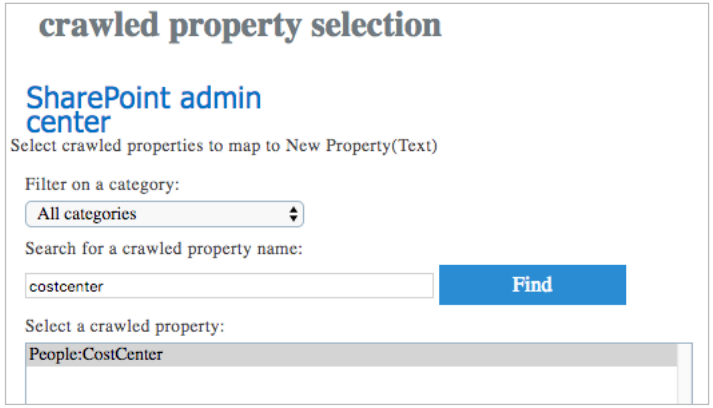


3. Ensure that you check that it is Searchable, Queryable and Retrievable. You can verify this in the main Managed Properties screen as below. On premises, If you want to refine on Cost Center choose Refinable and follow the steps above in the section on Sorting and Refiners. For SharePoint Online you would perform these same steps but edit a RefinableString## field instead.



PROPERTY NAME	TYPE	MULTI	QUERY	SEARCH	RETRIEVE	REFINE	SORT	SAFE	MAPPED CRAWLED PI
CostCenter	Text	-	Query	Search	Retrieve	-	-	-	People:CostCenter

4. You will need to map it in the Mappings to crawled properties, by clicking the Add a Mapping button. The UI is unstable and its recommended to do a search first for the user profile property, and selecting it and clicking OK for it to actually save the setting.



5. You will need to modify your Display Template too. Obviously you'll need to add a line where you want to render it on the item display template.

<th><td class="ms-vb2">_#= ctx.CurrentItem.CostCenter =#_</td></th>

6. You will also need to add the property to the mso:ManagedPropertyMapping element of the item display template file too.

,'CostCenter':'CostCenter'

7. You'll have to upload this change to the item display template to the library you uploaded it before.
8. For this to take effect. You will need to reindex the user profiles. The easiest way to do this is use Mikael Svenson's powershell script. https://github.com/wobba/SPO-Trigger-Reindex This requires a Windows machine with PowerShell on it, with the SharePoint CSOM SDK installed.

```
PS C:\Users\jerem\Downloads\SPO-Trigger-Reindex-master> .\reindex-users.ps1 https://m0nstersinc-admin.sharepoint.com -us
ername admin@m0nstersinc.onmicrosoft.com -password

Security warning
Run only scripts that you trust. While scripts from the internet can be useful, this script can potentially harm your
computer. If you trust this script, use the Unblock-File cmdlet to allow the script to run without this warning
message. Do you want to run C:\Users\jerem\Downloads\SPO-Trigger-Reindex-master\reindex-users.ps1?
[D] Do not run  [R] Run once  [S] Suspend  [?] Help (default is "D"): R
Check your browser to get the store app
Connected to SharePoint Online site: 'https://m0nstersinc-admin.sharepoint.com'
Iterating 5 profiles
i:0#.f|membership|admin@m0nstersinc.onmicrosoft.com Saved: 1/16/2018 2:55:01 PM Indexed:
        Re-setting Department to Human Resources
i:0#.f|membership|nthake@m0nstersinc.onmicrosoft.com Saved: 1/12/2018 5:13:46 PM Indexed:
        Re-setting Department to Marketing
i:0#.f|membership|dant@m0nstersinc.onmicrosoft.com Saved: 1/12/2018 5:14:36 PM Indexed:
        Re-setting Department to Sales
ylo001\_spocrwl_19283 Saved: 10/3/2017 10:55:14 PM Indexed:
        Re-setting Department to
ylo001\_spofrm_19289 Saved: 12/8/2017 9:55:54 AM Indexed:
        Re-setting Department to
```

Improving the people name query rule

One of the default query rules in SharePoint 2013 and SharePoint Online (SPO) is called People Name in SharePoint Search. What the query rules does, is that it adds people results when a user's query matches the full name of a person. So, if you do a search for "Mikael Svenson" on the "Everything" search tab, you might get a people result that looks like this:

However, if you search for "Mikael" or "Svenson" by themselves the query rule will not trigger, and no people results will be displayed. It will only show people based on exact name matches and in large companies memorizing the full name of every employee can be difficult.

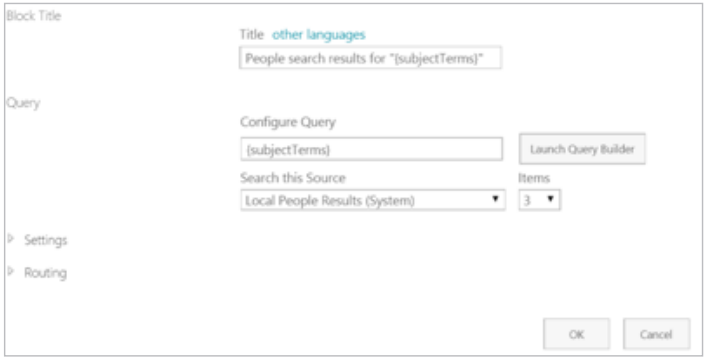
Using the full name makes this query rule a hidden gem that never reaches the surface. What most employees do is click on the People search vertical and make a follow-up search from there. Then they usually find the information they were looking for related to a colleague/person.

It is a known fact that many people are lazy and get irritated when they have to spend a lot of time finding the information they need. So why not give them a technological shortcut to their final destination by extending the people search logic for the Everything search vertical to allow partial name matches as follows:

1. Go to your Enterprise Search Center (as an administrator) – Site Settings – Search Query Rules
2. Select Local SharePoint Results (System) and click on New Query Rule
3. Give your new query rule a name, e.g. "People Search on Everything tab"

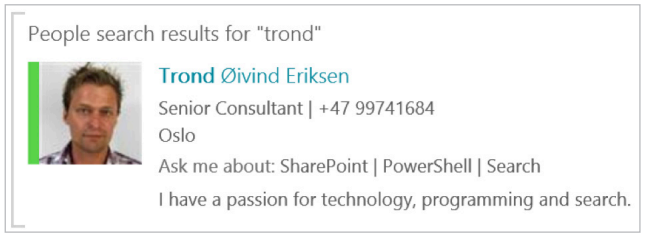
4. Under Query Conditions click Remove Condition.

5. Click on Add Result Block and edit the following fields:



Expand Settings and add a "More" link and your custom display template (based on Item_Person.html). You can use something like "./employee-directory.aspx?k={subjectTerms}"

6. Deactivate the default query rule People Name In SharePoint Search in order to avoid duplicates: If you now go to the Everything search tab and search for "Trond", you will get a people match like in the screenshot below. Voila!



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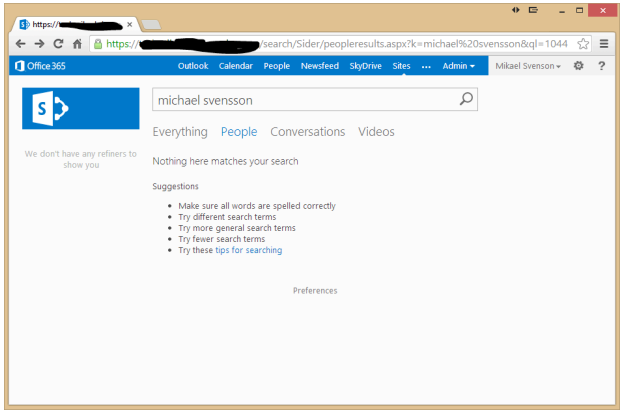
Make your people search more "fuzzy"

Mikael Svenson has a great tip about adding fuzzy logic to People Search. If your users primary language setting in SharePoint is a minority language, this post is for you. If your primary language is one of the languages in the list further down, keep on reading as well to broaden your horizon.

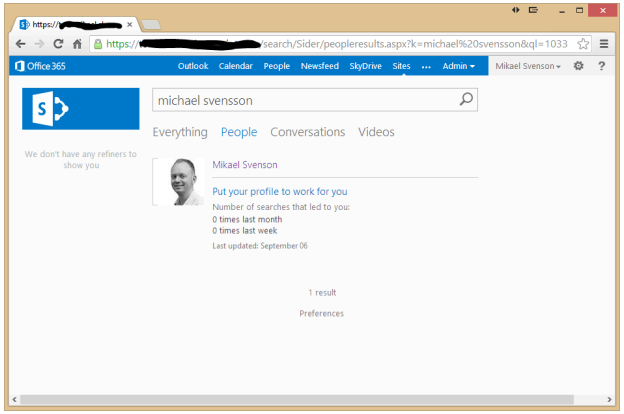
Finding people is one of the most used search features in SharePoint, and spelling names is inherently hard as people choose just about all possible ways to spell their name.

As an example; my name is Mikael Svenson, where it's more common to spell Mikael with ch instead of a k (Michael) and Svenson is most commonly spelled with two s' in the middle (Svensson). This means a search for "Michael Svensson" should also match "Mikael Svenson". This is where fuzzy name matching comes in.

Search in Norwegian – yields zero results - ql=1044



Search in English – returns a match - ql=1033



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Looking at the linguistic feature table over at TechNet you see the languages supporting fuzzy name matching are:

- Dutch 1043/2067
- English 1033
- French 1036
- German 1031
- Italian 1040
- Japanese 1041
- Polish 1045
- Portuguese 1046 / 2070
- Russian 1049 (not working) / 2073
- Spanish 1034 (not working) 3082 / 9226

Seems most of the above languages work on my test case, but I'm not sure how the logic differs on each one. What I do know is that the English one is pretty good and works, while the Norwegian one is non-existent. This means if I use Norwegian versions of SharePoint and my operating system, my queries are most likely to be executed in a Norwegian context which disables fuzzy name matches.

The question you might ask yourself is: "How does SharePoint decide the language to use when executing a query on a search center result page?". After some digging around I found the logic to be as follows in sorted order:

1. Use a fallback language if present
2. Use query language URL parameter if present (more on this later)
3. Use the users preferred language if present (https://<tenant>-my.sharepoint.com/_layouts/15/editprofile.aspx?UserSettingsProvider=dfb95e82-8132-404b-b693-25418fdac9b6)
4. Use the browser language

The solution for me was setting the fallback language to English or 1033 in the result web part on the people search page. By default this property is not set.

What is the fallback language?

The fallback language name is a misnomer as it is in fact a language override parameter, and it's a property of the DataProviderScriptWebPart. If you export the People Search Core Result web part from the peopleresults.aspx page you find the property well hidden in a JSON object in the web part's DataProviderJSON property.

The property is by default –1, which means it's not set. By changing the value to 1033, all queries will now be executed in an English context.

In order to get activate the change you can upload your changed .webpart file to the web part gallery and replace the web part on the people result page.

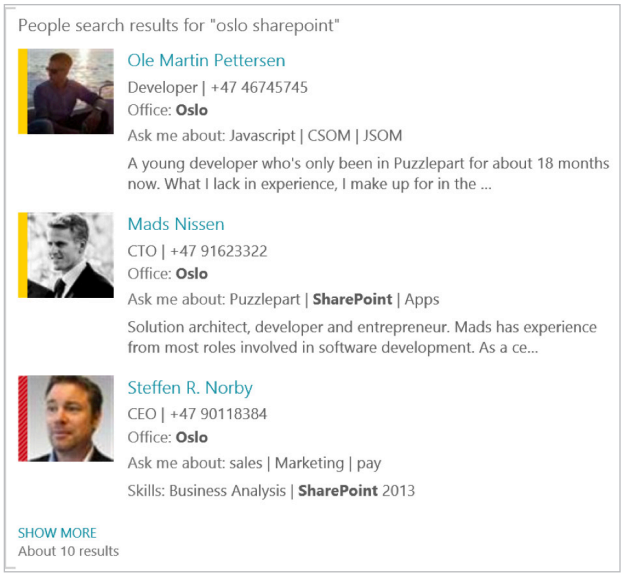
```
<property name="DataProviderJSON" type="string">
{"QueryGroupName":"Default","QueryPropertiesTemplateUrl":"sitesearch://webroot","Ignor
eQueryPropertiesTemplateUrl":false,"SourceID":"B09A7990-05EA-4AF9-81EF-EDFAB16C4E31","
SourceName":null,"SourceLevel":null,"CollapseSpecification":"","QueryTemplate":"{searc
hboxquery}","FallbackSort":null,"FallbackSortJson":"null","RankRules":null,"RankRulesJ
son":"null","AsynchronousResultRetrieval":false,"SendContentBeforeQuery":true,"BatchCl
ientQuery":true,"FallbackLanguage":-1,"FallbackRankingModelID":"D9BFB1A1-9036-4627-83B
2-BBD9983AC8A1","EnableStemming":true,"EnablePhonetic":true,"EnableNicknames":true,"En
ableInterleaving":true,"EnableQueryRules":true,"EnableOrderingHitHighlightedProperty":
true,"HitHighlightedMultivaluePropertyLimit":5,"IgnoreContextualScope":false,"ScopeRes
ultsToCurrentSite":false,"TrimDuplicates":false,"Properties":{},"PropertiesJson":"{}",
"ClientType":"PeopleResultsQuery","UpdateAjaxNavigate":true,"SummaryLength":180,"Desir
edSnippetLength":90,"PersonalizedQuery":true,"FallbackRefinementFilters":null,"IgnoreS
taleServerQuery":true,"RenderTemplateId":"","AlternateErrorMessage":null,"Title":""}
</property>
```

Hit-highlighted properties (JSON) section

Configure the Search Results web part, expand Display Templates, and add the following fields to the Hit-highlighted properties (JSON) section:

```
"AboutMe", "AcountName","BaseOfficeLocation",
"Department","Interests","JobTitle","Memberships", "PastProjects",
"PreferredName", "Responsibilities", "Schools", "Skills", "WorkEmail",
"YomiDisplayName"
```

The effect of adding the new hit-highlighted properties are visualized in the figure below. The screenshot on the right shows the people search results after a user has performed a search for SharePoint competency in the Oslo office.



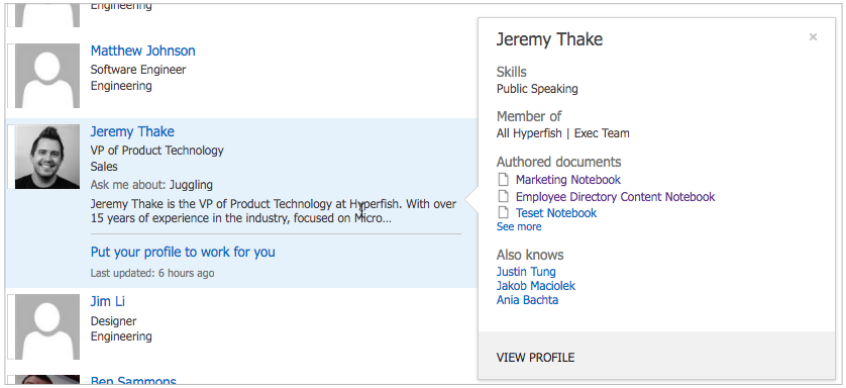
Additional Display Templates

There are other Display Templates you could use for each people item result. Using the one including in the zip which is a simple table is one approach.

The out of the box Item_Person.html display template is more sophisticated as it has Skype for Business presence and the profile photo built into it.

It also has a hover pop up that shows more information which can be changed with in the Item_Person_HoverPanel.html file.

Copying these files and mofifying them to show the properties you wish to will give you greater control to customize your directory. Then all you need to do is change the people search results web part to use the new copied display template.



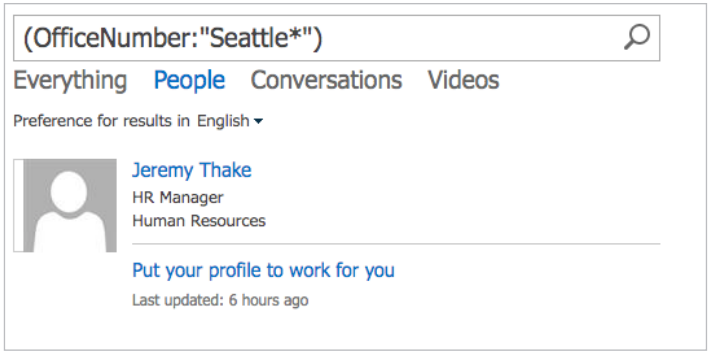
Advanced Search Filters

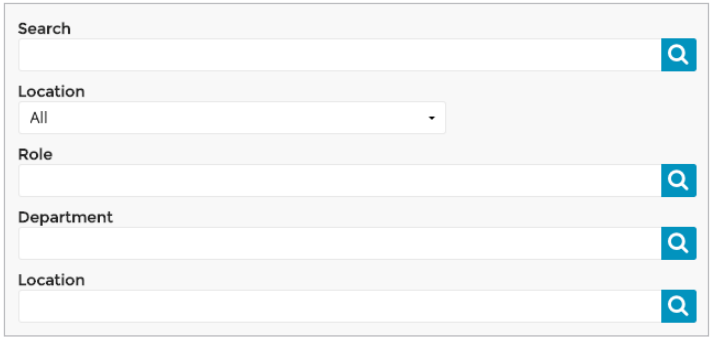
With a little extra work, you can have more than one search box. This allows you to do advanced search filters. You will need to add this to the seach page using standard HTML form elements.

On submitting the search form, the page redirect would have to build a query string that SharePoint supports. As an example

```
?k=(OfficeNumber:"Seattle*")
```

The SharePoint People Search Result Web Part would automatically read the query with that specific filter.





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Fixing the Lastname Sortable issues

For some unfathomable reason, **SharePoint Server** out of the box the LastName property is not "Sortable", nor is it "Refinable". The FirstName is "sortable", but to me it's a lot less likely that you'd want to sort or filter on FirstName than LastName.

If you go to the Search Schema settings (Admin / SharePoint / search / Manage Search Schema), you'll see that this is the case.

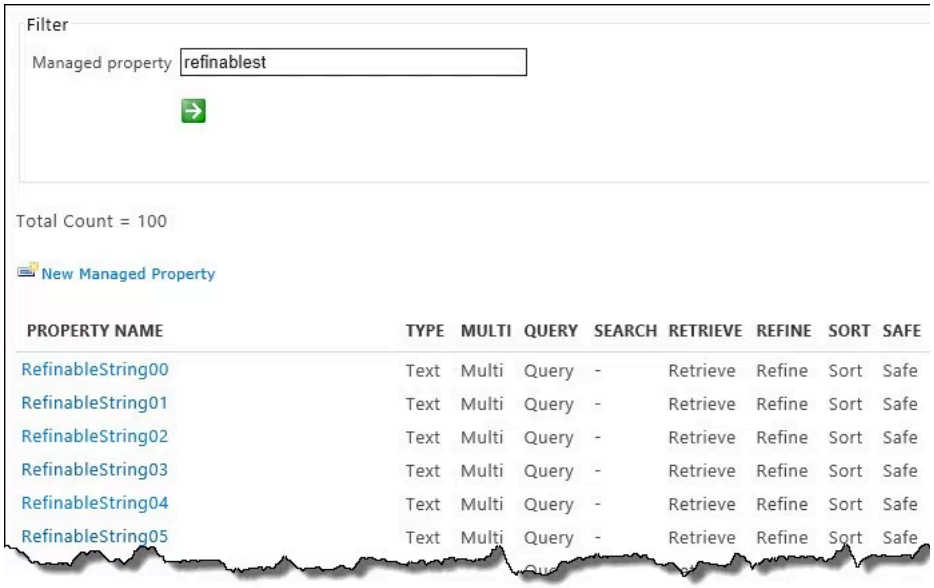
PROPERTY NAME	TYPE	MULTI	QUERY	SEARCH	RETRIEVE	REFINE	SORT
AccountName	Text	-	Query	Search	Retrieve	-	-
FirstName	Text	Multi	Query	-	Retrieve	-	Sort
LastName	Text	-	Query	-	Retrieve	-	-

In SharePoint Server, you can actually go into the LastName property and make it sortable directly.

Trevor Seward (@NaupliusTrevor) pointed out that it is bad practice to change the search settings in the Shared Service Application on SharePoint Server. As it is incompatible with the Office 365 search settings.

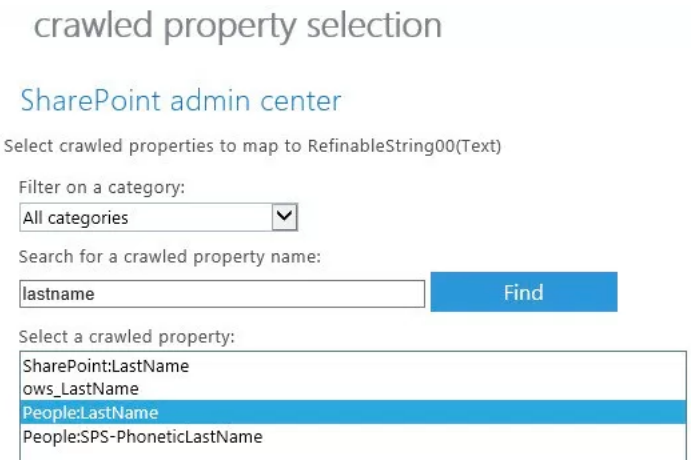
Unfortunately you cannot edit the LastName property within the site level search settings, where the employee directory page lives.

There is a very big set of dummy properties named RefinableString00, RefinableString01, etc. There are 100 of these String properties. There are also sets for Date (20), Decimal (10), Double (10), and Int (50). If you need any more of any of these, you're stuck, so use them wisely.

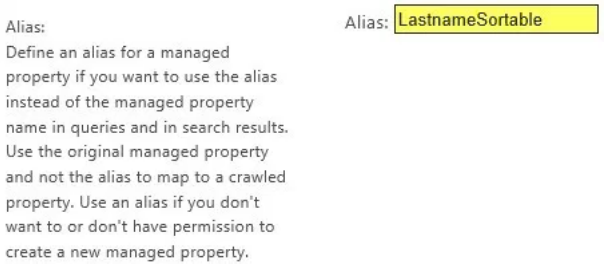


Because the Lastname is a a string-valued property, we're going to use one of the RefinableString dummy properties. What we do is map the RefinableString property to a crawled property. Here I've chosen RefinableString00 because I haven't used it yet. Here are the steps to set up the mapping:

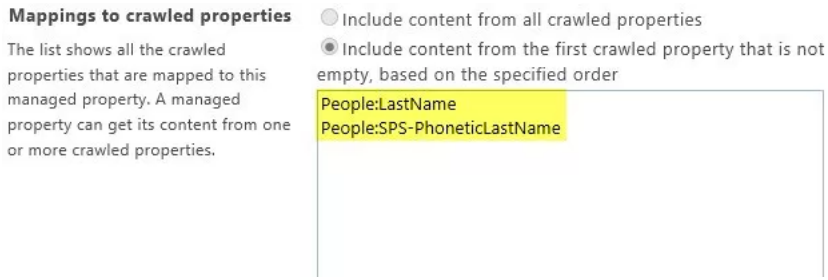
- Click on the RefinableString00 property in the search schema listing
- Scroll down to the section for Mappings to crawled properties
- Click on the Add a Mapping link
- Find People:LastName by typing "Lastname" in the search box and clicking "Find"



Select the People:LastName property and click OK
You can only map to one Crawled Property, even though the UI will allow you to select several. As much as I wanted to include People:SPS-PhoneticLastName to match the LastName Managed Property, I couldn't. I had to settle for just People:LastName, (which should be fine).



Scroll to the Alias setting and give the property a name you'll recognize. I've used LastnameSortable.



Save the RefineablerString00 property by clicking OK

Now you still have a property named RefinableString00, but it has an alias of LastnameSortable (if you used the same name as I did) and it is mapped to the People:LastName property, meaning that RefinableString00 will get the same values as People:LastName.

New Managed Property

PROPERTY NAME	TYPE	MULTI	QUERY	SEARCH	RETRIEVE	REFINE	SORT	SAFE	MAPPED CRAWLED PROPERTIES	ALIASES
RefinableString00	Text	Multi	Query	-	Retrieve	Refine	Sort	Safe	People:LastName	LastnameSortable

Perfect, right? Now we can just use that LastnameSortable property in our slicing and dicing tools and we'll be all set!

On Office365, we have no control over search crawling. We can't just fire off a crawl to update the index like we can on premises. (In either case, we have to be admins, but that's not the difference here.)

A User Profile will only be re-indexed if a value in that profile changes. For example, if I change my MobilePhone or a new value syncs over from Active Directory, then the next crawl will pick up that change and the value will be available in the search index. We've mapped the People:LastName property to the RefinableString00 property, but since no User Profiles were changed in the process, it makes no difference. We can't just push the re-index button on Office365.

The only way to change every User Profile so that it will be indexed is to run the Powershell script that "touches" every profile. This is down and dirty stuff, folks, and not for the squeamish. You might want to enlist your local Admin Superhero to help you with this part.

TIP: MVP Mikael Svenson has a PowerShell script available at https://github.com/wobba/SPO-Trigger-Reindex which helps with this, or if you are a UI person take a look at SharePoint Online Search Toolbox by Puzzlepart, a SharePoint Add-in available from the Office Store.

Future Proof Solutions

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A common method to modify the visualization of search results, which additionally is the easiest way to get security trimmed information across site collections, is to implement a Display Template. In the steps above we recommend copying existing Display Template's HTML files and then those files would be uploaded into the Master Page gallery and a server based process would convert them into JavaScript.

If you're a developer type, and comfortable working with JavaScript, it's preferable to create these JavaScript based display template files yourself which gives you fine grained control over the outcome. That said, it is just JavaScript so no matter what technique you use to render the content the goal should be to separate your concerns as much as possible, this allows you to somewhat future-proof your solutions. What I mean specifically is that the "brains" that make the display template render and retrieve its metadata can be isolated from how that metadata is then rendered.

If you look at the minimal display template that was shared by Elio Struyf, you can see that Control_Minimal.js and Item_Minimal.js have one thing in common and that's that the HTML and binding of the results metadata is done using a string replace. Incredibly low tech and simple.

https://www.eliostruyf.com/starter-javascript-display-templates-for-your-projects/

With that said it would be straight forward to create that html markup within these JavaScript files, that we could externalize them by utilizing a simple JavaScript templating engine. Ideally, we would want this engine to be compatible across a wide range of browsers and versions so that our solution will migrate with us and when the display template container is no longer viable, we can reuse our templates by changing the data binding (e.g. SPFx). For this we propose using handlebars.js

References

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Hyperfish Podcast

Marc Anderson, Microsoft MVP and President at Sympraxis Consulting, speaks to Jeremy Thake on the Hyperfish podcast about his contributions to this guide. Marc discusses:

- The collaboration process on the guide and employee directory solution
- Why organizations want and need an employee directory solution above the default Microsoft People Search capabilities such as in SharePoint, Teams, and Delve.
- What has been included in the Guide and why

https://hubs.ly/H09P9ZK0

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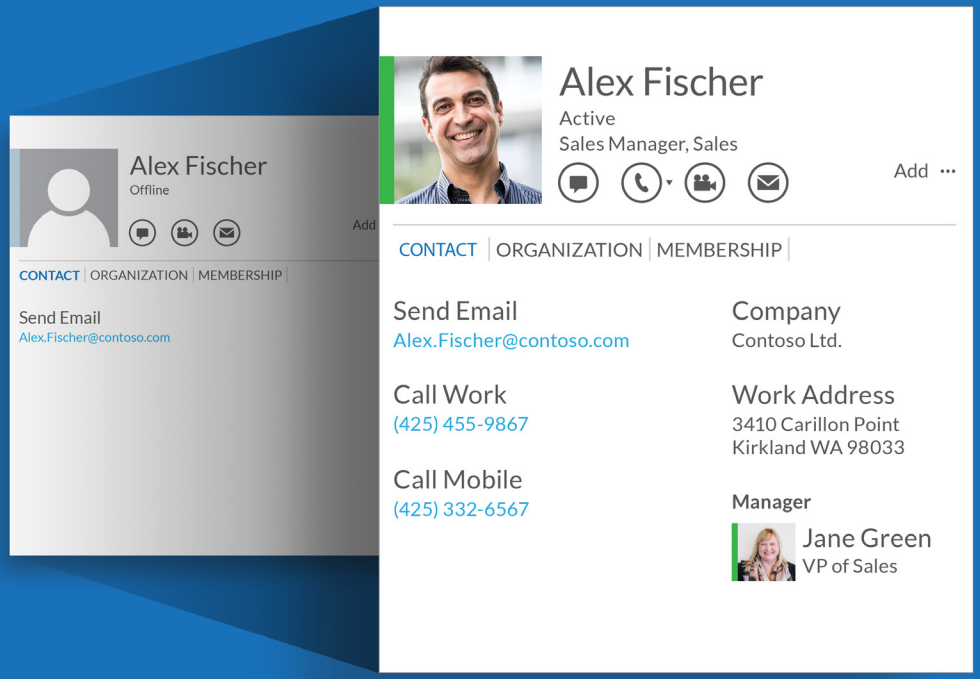
About Hyperfish



Hyperfish helps bring your company and employee directory to life by ensuring directory and profile information is always complete and up-to-date. Hyperfish improves IT Service Delivery, increases employee engagement, and helps unlock the value of your technology investments.

Hyperfish uses AI and Bot technology to automate the collection of profile information. The secure service supports on-premises, hybrid, and online environments.

You can experience Hyperfish for free with Hyperfish Lite to automatically collect and manage profile photos in Office 365.

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