

Help Sales Reps Sync Contacts and Events with Lightning Sync

Salesforce, Spring '17





CONTENTS

Lightning Sync for Microsoft® Exchange
Lightning Sync System Requirements for Microsoft® Exchange
Lightning Sync Considerations
Guidelines for Syncing Events
See the Big Picture for Setting Up Lightning Sync for Microsoft® Exchange
Manage Lightning Sync Users 17 Fix Sync Issues for Lightning Sync Users 18 Check Lightning Sync Users' Sync Statuses 18 Build and Run a Lightning Sync Error Report 18 Reset Sync for Lightning Sync Users 19 Test Your Connection Between Your Email and Calendar Server and Salesforce 20 Lightning Sync for Microsoft® Exchange Statuses 20
Index 29

LIGHTNING SYNC FOR MICROSOFT® EXCHANGE

Help your sales reps keep their contacts and events in sync between your Microsoft® Exchange server and Salesforce without asking them to install and maintain software.

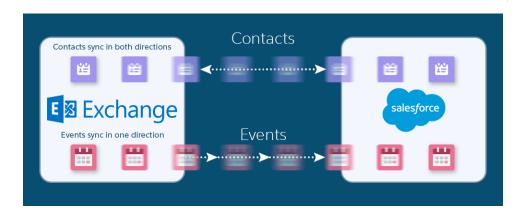
When you set up users' contacts and events to sync between your company's Microsoft® Exchange server and Salesforce, you help your users increase their productivity. That's because there's no need for users to duplicate their work between the two systems. In addition, Lightning Sync offers users with compatible computing environments the flexibility to sync items whether working from their desks or from their mobile devices.

You define your users' Lightning Sync experience by selecting sync settings for users in Salesforce. You can set up users to sync contacts between Exchange and Salesforce in both directions, or just one. You can also set up users to sync events in one direction, from Exchange to Salesforce.

EDITIONS

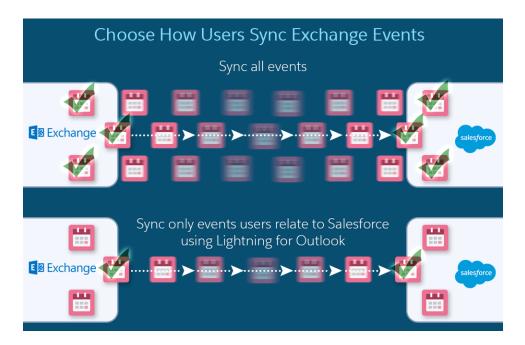
Available to manage from: both Salesforce Classic and Lightning Experience

Available in: **Professional**, **Enterprise**, **Performance**, **Unlimited**, and **Developer** Editions



You can also decide how users' Exchange events sync to Salesforce. Set up users to sync all their events, or only the events they select.

Users select which Exchange events sync to Salesforce using Lightning for Outlook, a Microsoft integration feature that lets users experience Salesforce directly from Microsoft Outlook.



You can select more settings to define your users' sync experiences. For example, set up Lightning Sync to sync events your users mark as private. Or, to automatically remove events in Salesforce that your users delete from their calendars.

Lightning Sync for Microsoft Exchange Limitations

Currently, Lightning Sync doesn't:

- Sync events from Salesforce to Exchange
- Sync recurring events
- Delete syncing contacts in one action

Get Started with Lightning Sync for Microsoft Exchange

SEE ALSO:

Lightning Sync Setup Guide (for Users)

Salesforce Experience in Microsoft Email Success Community

LIGHTNING SYNC SYSTEM REQUIREMENTS FOR MICROSOFT® EXCHANGE

Confirm that your Microsoft® Exchange-based server meets these system requirements before you set up your sales reps to sync contacts and events with Lightning Sync.

To connect to Salesforce using	Your company must be running either	With these settings enabled
An Exchange service account	 Office 365° Enterprise Editions with Exchange Online Exchange Server 2016 Exchange Server 2013 Service Pack 1 	 Exchange Web Services (EWS) on an SSL connection Exchange Autodiscover Service Basic authentication on both your Exchange server and your Autodiscover service Encryption protocol TLS 1.1 or later
OAuth 2.0 for Exchange	Office 365® Enterprise Editions with Exchange Online	No additional settings are required to connect using OAuth 2.0

EDITIONS

Available to manage from: both Salesforce Classic and Lightning Experience

LIGHTNING SYNC CONSIDERATIONS

Before you roll out Lightning Sync to your sales reps, familiarize yourself with these considerations.

Considerations for Syncing Events

Before you roll out Lightning Sync to your sales reps, familiarize yourself with these considerations for syncing events. That way, your rollout generates no surprises.

Considerations for Companies With Multiple Salesforce Organizations

If your company uses Lightning Sync in multiple Salesforce organizations, make sure the data in those organizations remains separate by being mindful about how you set up your Lightning Sync configurations.

EDITIONS

Available to manage from: both Salesforce Classic and Lightning Experience

Available in: **Professional**, **Enterprise**, **Performance**, **Unlimited**, and **Developer** Editions

Considerations for Syncing Events

Before you roll out Lightning Sync to your sales reps, familiarize yourself with these considerations for syncing events. That way, your rollout generates no surprises.

Lightning Sync can sync your sales reps' events from their Microsoft® Exchange-based calendars or Google Calendars to Salesforce. You decided whether reps sync events by setting up the feature from Lightning Sync configurations in Salesforce Setup.

Keep in mind that there's potential for Lightning Sync to overwrite event data unless you're considerate about how you roll out the feature to your reps.

First, does one of these scenarios describe your rollout?

- You're migrating reps from Salesforce for Outlook
- Your reps edit their events records in Salesforce
- Your reps already have access to Lightning for Outlook (previously known as Salesforce App for Outlook)

For example, say that your rep maintains meeting notes in Salesforce event records. But the matching event in that rep's calendar doesn't include those notes. During the first sync, Lightning Sync overwrites the event in Salesforce with the one from the calendar.

You can prevent reps' events from being overwritten by following our guidelines for syncing events.

Guidelines for Syncing Events

Before you roll out Lightning Sync, address these guidelines to avoid overwriting event data during certain sync scenarios.

EDITIONS

Available to manage from: both Salesforce Classic and Lightning Experience

Guidelines for Syncing Events

Before you roll out Lightning Sync, address these guidelines to avoid overwriting event data during certain sync scenarios.

If you fall into one of the sync scenarios outlined in Considerations for Syncing Events, follow these guidelines when you set up your reps for Lightning Sync.

- In Lightning Sync configurations, don't change the default setting, TODAY, for the event sync
 filter. That way, edits that your reps made to past events in Salesforce are excluded from the
 initial sync.
- Tell reps to edit event fields that sync (like date, time, subject, or description) in their calendars, and not in Salesforce. That way, Lightning Sync doesn't overwrite those edits in Salesforce. (Reps can continue to use Salesforce features that don't involve editing their Salesforce event fields, however, like relating events to Salesforce records.)

EDITIONS

Available to manage from: both Salesforce Classic and Lightning Experience

Available in: **Professional**, **Enterprise**, **Performance**, **Unlimited**, and **Developer** Editions

Considerations for Companies With Multiple Salesforce Organizations

If your company uses Lightning Sync in multiple Salesforce organizations, make sure the data in those organizations remains separate by being mindful about how you set up your Lightning Sync configurations.

You're using multiple organizations if you either:

- Test new features in a sandbox organization before setting up the feature in your live organization.
- Maintain separate Salesforce organizations for different divisions of your company.

To prevent Lightning Sync from syncing contacts and events between your Salesforce organizations, don't add the same user to Lightning Sync configurations in more than one organization.

We don't recommend marking a Lightning Sync configuration as inactive to prevent data from syncing between your Salesforce organizations. While marking a configuration as inactive prevents it from syncing a user's data, you risk forgetting that user is included in multiple Lightning Sync configurations, and marking the configuration as active later.

(3)

Example: You're testing Lightning Sync features in your sandbox organization, so you add user Marianne Schumacher to an Lightning Sync configuration in the sandbox organization. After you're satisfied with how you've set up Lightning Sync features for Marianne, you're ready to add her to a Lightning Sync configuration in your live organization.

Before you add Marianne to a Lightning Sync configuration in your live organization, remove her from the configuration in your sandbox organization. Otherwise, Lightning Sync can sync contacts and events between Marianne's email application, the sandbox organization, and the live organization, saving test and live data to all three data sources.

EDITIONS

Available to manage from: both Salesforce Classic and Lightning Experience

SEE THE BIG PICTURE FOR SETTING UP LIGHTNING SYNC FOR MICROSOFT® EXCHANGE

Set up Lightning Sync so your users can sync contacts and events between your company's Microsoft® Exchange server and Salesforce. You complete several steps to prepare the systems to communicate, both on your Exchange server and in Salesforce.

Complete these steps to set up Lightning Sync for Microsoft Exchange.

- Choose and Configure Your Preferred Method for Connecting to Microsoft[®] Exchange
 Choose whether you'd like to connect Microsoft Exchange to Salesforce using an Exchange
 service account, or OAuth 2.0, and then set up that connection. Connecting using OAuth 2.0
 requires a Microsoft Office 365 account.
- 2. Run the Lightning Sync Connection Test for Microsoft® Exchange Users
 Run the Lightning Sync connection test to confirm whether you and your IT pros have set up
 Lightning Sync successfully. Or, run the connection test if Lightning Sync was syncing your reps'
 items successfully, but suddenly stops.
- 3. Tell Sales Reps How to Prevent Certain Microsoft® Outlook Calendar Events from Syncing to Salesforce

Tell your Lightning Sync users how to manage which of their Outlook calendar events sync with Salesforce. We recommend that sales reps prepare events that they don't want to sync before you kick off the sync process. However, reps can manage which events sync at anytime.

4. Define Sync Settings for Sales Reps Using Lightning Sync

After sales reps prepare their Exchange events to sync with Salesforce, you can define sync settings for groups of reps in Lightning Sync configurations. This step kicks off the sync process for your reps.

5. Tell Sales Reps How to Sync Microsoft® Contacts with Salesforce

Tell your Lightning Sync for Microsoft Exchange users that it's time to manage the Microsoft contacts that users want to sync with Salesforce

SEE ALSO:

Salesforce Experience in Microsoft Email Success Community

EDITIONS

Available to manage from: both Salesforce Classic and Lightning Experience

Available in: **Professional**, **Enterprise**, **Performance**, **Unlimited**, and **Developer** Editions

USER PERMISSIONS

To prepare your Exchange server to communicate with Salesforce:

Administrative access to your company's Microsoft® Exchange server

Choose and Configure Your Preferred Method for Connecting to Microsoft® Exchange

Choose whether you'd like to connect Microsoft Exchange to Salesforce using an Exchange service account, or OAuth 2.0, and then set up that connection. Connecting using OAuth 2.0 requires a Microsoft Office 365 account.

Connect Salesforce and Microsoft® Exchange Using an Exchange Service Account

To connect Salesforce to your company's Microsoft Exchange server using a service account, you and your Exchange administrator have to complete several steps, both from Salesforce and from your Exchange server.

Connect Salesforce and Microsoft® Exchange Using OAuth 2.0

Give Salesforce access to Microsoft Exchange Online using OAuth 2.0. To complete setup, you need a Microsoft Office 365° account and help from your Office 365 global administrator to provide credentials for your company's account.

EDITIONS

Available to manage from: both Salesforce Classic and Lightning Experience

Available in: **Professional**, **Enterprise**, **Performance**, **Unlimited**, and **Developer** Editions

Connect Salesforce and Microsoft® Exchange Using an Exchange Service Account

To connect Salesforce to your company's Microsoft Exchange server using a service account, you and your Exchange administrator have to complete several steps, both from Salesforce and from your Exchange server.

Prepare Your Microsoft® Exchange Server for Lightning Sync

The first step in setting up Lightning Sync is to enable several settings on your Exchange server, including Exchange Web Services, Exchange Autodiscover Service, and Basic authentication.

Set Up a Microsoft® Exchange Service Account to Communicate with Lightning Sync

After you've enabled the right settings on your Exchange server, create an Exchange service account with impersonation rights for the mailbox of each Lightning Sync user.

Run the Microsoft® Remote Connectivity Analyzer with Lightning Sync Parameters

Run the Remote Connectivity Analyzer—the free web-based tool provided by Microsoft—to confirm whether you and your Exchange administrator have set up Lightning Sync for Microsoft Exchange successfully. Or, run the Remote Connectivity Analyzer if Lightning Sync for Microsoft Exchange was syncing your reps' items successfully, but suddenly stops. Use the parameters provided to run the test for Lightning Sync.

Set Up Salesforce to Communicate with Microsoft® Exchange Using a Service Account

After running the Remote Connectivity Analyzer, log in to Salesforce to enable Lightning Sync for Microsoft Exchange and provide your service account credentials.

EDITIONS

Available to manage from: both Salesforce Classic and Lightning Experience

Available in: **Professional**, **Enterprise**, **Performance**, **Unlimited**, and **Developer** Editions

USER PERMISSIONS

To set up a service account to communicate with Lightning Sync:

 Administrative access to your company's Exchange server

To access and edit Lightning Sync Setup

"Customize Application"

Prepare Your Microsoft® Exchange Server for Lightning Sync

The first step in setting up Lightning Sync is to enable several settings on your Exchange server, including Exchange Web Services, Exchange Autodiscover Service, and Basic authentication.

These instructions vary depending on the version of Microsoft® Exchange your company uses. For more support, visit Microsoft's support website, search for the keywords mentioned here, and follow the instructions intended for your Exchange version.

Complete the following steps on your Exchange server.

- 1. Enable Exchange Web Services (EWS) on an SSL connection.
 - Make sure your Exchange server has a signed certificate from one of the Salesforce-approved Certificate Authorities.
 - If your organization has configured a firewall, allow an inbound connection to your Exchange client access server on port 443.
- **2.** Enable Exchange Autodiscover Service.
- **3.** Enable Basic authentication on both your Exchange server and your Autodiscover service. If you need to run additional authentication methods (such as Microsoft NTLM), there is no need to disable those methods; you can run Lightning Sync without conflict.

Set Up a Microsoft® Exchange Service Account to Communicate with Lightning Sync

After you've enabled the right settings on your Exchange server, create an Exchange service account with impersonation rights for the mailbox of each Lightning Sync user.

Before setting up an Exchange Service account, make sure you've enabled the appropriate Exchange server settings to set up Lightning Sync.

To set up an Exchange service account, work with your Exchange admin to complete these steps on your Exchange server.

Watch a Demo:

- Set Up a Microsoft® Exchange Service Account to Sync with Salesforce (for administrators using Office 365™ Admin Center)
- Set Up a Microsoft[®] Exchange Service Account to Sync with Salesforce (for administrators using command shell)
- Note: For more support, visit Microsoft[®]'s support website, search for the keywords mentioned here, and follow the instructions intended for your Exchange version.
- **1.** Create an Exchange user with a mailbox that acts as the service account. You use this email address later to configure Exchange impersonation for the service account.
- 2. Using Exchange Management Shell, enter the commands that enable service account impersonation for your version of Exchange. If you receive a pipeline error message, wait a few minutes and reenter the command to let your server process the requests.
 - If you're using Exchange 2013:
 - **a.** Enable the Active Directory extended permission for ms-Exch-EPI-Impersonation on all Client Access servers.

Get-ExchangeServer | where {\$_IsClientAccessServer -eq \$TRUE} | ForEach-Object {Add-ADPermission -Identity \$_.distinguishedname -User (Get-User -Identity **<EnterExchangeSyncServiceAccountEmailAddress>** | select-object).identity -extendedRight ms-Exch-EPI-Impersonation}

EDITIONS

Available to manage from: both Salesforce Classic and Lightning Experience

Available in: **Professional**, **Enterprise**, **Performance**, **Unlimited**, and **Developer** Editions

EDITIONS

Available to manage from: both Salesforce Classic and Lightning Experience

Available in: **Professional**, **Enterprise**, **Performance**, **Unlimited**, and **Developer** Editions

USER PERMISSIONS

To set up a service account to communicate with Lightning Sync:

Administrative access to your company's Exchange server

b. Enable the Active Directory extended rights for ms-Exch-EPI-May-Impersonate to let your service account impersonate all accounts on your Exchange server. Set a filter later that lets you limit the users the service account syncs with Salesforce.

Get-MailboxDatabase | ForEach-Object {Add-ADPermission -Identity \$_.distinguishedname
 -User <*EnterExchangeSyncServiceAccountAddress> -ExtendedRights
ms-Exch-EPI-May-Impersonate}

- If you're using Exchange Online offered by Microsoft Office 365[™]:
- **a.** Enable customization on your Exchange server.

Enable-OrganizationCustomization

- **3.** Using Exchange Management Shell, enter these commands to configure your service account to impersonate the group of users who'll sync with Lightning Sync.
 - a. Create a management scope to define a filter that groups the Exchange users who sync with Lightning Sync. For example, if you want only sales reps to sync, and their Exchange mailboxes all have the same value Sales for the filterable property Department, enter Department -eq 'Sales' in place of <ChooseRecipientFilter>.

```
New-ManagementScope -Name:<ChooseExchangeSyncScopeName>
-RecipientRestrictionFilter:{<ChooseRecipientFilter>}
```

b. Create a management role assignment that restricts the service account to impersonate only the users you defined in the management scope.

Run the Microsoft® Remote Connectivity Analyzer with Lightning Sync Parameters

Run the Remote Connectivity Analyzer—the free web-based tool provided by Microsoft—to confirm whether you and your Exchange administrator have set up Lightning Sync for Microsoft Exchange successfully. Or, run the Remote Connectivity Analyzer if Lightning Sync for Microsoft Exchange was syncing your reps' items successfully, but suddenly stops. Use the parameters provided to run the test for Lightning Sync.

Before you run the Remote Connectivity Analyzer, make sure that you've selected your preferred connection method so that Exchange and Salesforce can communicate. Wait a few minutes after completing those tasks to let your Exchange server process the changes you've made. Otherwise, the Remote Connectivity Analyzer can show a failed test summary, even though you've configured setup correctly.

The Remote Connectivity Analyzer checks several points of connectivity between your Salesforce organization and your Exchange server. When the test is complete, Microsoft provides a summary describing your connection status.



Note: The Microsoft Remote Connectivity Test and the Lightning Sync Connection Test check general connectivity between your email server and your Salesforce organization. If you want to test connectivity for only one (or a few) of your reps, check their sync statuses from Lightning Sync Status in Setup.

1. Visit Microsoft's website and search for the Remote Connectivity Analyzer.

EDITIONS

Available to manage from: both Salesforce Classic and Lightning Experience

Available in: **Professional**, **Enterprise**, **Performance**, **Unlimited**, and **Developer** Editions

USER PERMISSIONS

To get the necessary parameters to run the test:

 Administrative access to your company's Microsoft[®] Exchange server

- 2. On the Exchange Server tab, select Service Account Access (Developers).
- 3. Click Next.
- **4.** Complete the test fields:

For this test field	Type this parameter
Target mailbox email address	The email address of a sales rep you've set up to be impersonated by your Lightning Sync service account
Service Account User Name (Domain\User Name or UPN)	The service account domain\user name or UPN you've set up for Lightning Sync
Service Account Password	The service account password you've set up for Lightning Sync

- 5. Select Use Autodiscover to detect server settings.
- **6.** Select Test predefined folder.
- **7.** Choose Contacts if you'd like to test sync connectivity for this user's contacts, or Calendar for this user's events.
- 8. Check Use Exchange Impersonation.
- **9.** In the Impersonated User field, type the same Exchange email address you specified for Target mailbox email address.
- 10. For Impersonated user identifier, select SMTP Address.
- **11.** Check the I understand that I must use the credentials of a working account... acknowledgment.
- **12.** Type the analyzer verification code and click **verify**.
- **13.** At the top of the page, click **Perform Test**.

Running the test usually takes less than 30 seconds. When the test is complete, the analyzer displays a summary evaluating the sync connectivity for the Exchange user you've specified.

- **14.** Take action based on the test results.
 - If the test summary displays "Connectivity Test Successful" or "Connectivity Test Successful with Warnings," it's likely that you've set up your service account correctly, and you're ready to provide your service account credentials to Salesforce.
 - If the test summary displays "Connectivity Test Failed," review the test details to troubleshoot setup issues. If the test continues to fail, verify that you've completed the previous setup steps correctly and then contact Salesforce Customer Support for help.

Set Up Salesforce to Communicate with Microsoft® Exchange Using a Service Account

After running the Remote Connectivity Analyzer, log in to Salesforce to enable Lightning Sync for Microsoft Exchange and provide your service account credentials.

- 1. From Salesforce Setup, enter *Lightning Sync Setup* in the Quick Find box, then select **Lightning Sync Setup**.
- 2. Under Enable Lightning Sync, click Edit.
- 3. Check Enable Lightning Sync and click Save.
- **4.** Enter the service account user name you created in Exchange, including your company's domain and top-level domain. For example, if you work for AW Computing, and the service account mailbox you've created is svcacct@awcomputing.com, enter your user name in either of these formats:
 - svcacct@awcomputing.com
 - awcomputing.com\svcacct

Some network configurations require one format rather than the other. If your first attempt to get Salesforce and Exchange to communicate is unsuccessful, try the other format.

- **5.** Enter your service account password.
- 6. If your sales reps' email domains are different than your service account domain, enter the additional domains in a comma-separated list. For example, if your service account is svcacct@awcomputing.com, but your reps' email addresses are in the domain awcomputing.net, enter awcomputing.net as an additional domain so Lightning Sync can recognize it.
- 7. Click Save.

EDITIONS

Available to manage from: both Salesforce Classic and Lightning Experience

Available in: **Professional**, **Enterprise**, **Performance**, **Unlimited**, and **Developer** Editions

USER PERMISSIONS

To access Lightning Sync setup in Salesforce:

"View Setup and Configuration"

Connect Salesforce and Microsoft® Exchange Using OAuth 2.0

Give Salesforce access to Microsoft Exchange Online using OAuth 2.0. To complete setup, you need a Microsoft Office 365° account and help from your Office 365 global administrator to provide credentials for your company's account.

- 1. From Setup, enter *Lightning Sync Setup* in the Quick Find box, then select **Lightning Sync Setup**.
- 2. Enable Lightning Sync.
- 3. Select OAuth 2.0 for Microsoft Exchange as your preferred connection method.
- **4.** Under Accept and Enable Access to Your Server, have your Office 365 global administrator log in to your Office 365 account.
- **5.** When the Microsoft Azure[™] login page opens, accept Lightning Sync access to your account by following the prompts until you're directed back to Salesforce.
- **6.** From Salesforce, under Accept and Enable Access to Your Server, enable OAuth 2.0.

EDITIONS

Available to manage from: both Salesforce Classic and Lightning Experience

Available in: **Professional**, **Enterprise**, **Performance**, **Unlimited**, and **Developer** Editions

USER PERMISSIONS

To access and edit Lightning Sync Setup

"Customize Application"

To prepare Exchange Online to communicate with Salesforce:

 Global administrator access to your company's Office 365 account

Run the Lightning Sync Connection Test for Microsoft® Exchange Users

Run the Lightning Sync connection test to confirm whether you and your IT pros have set up Lightning Sync successfully. Or, run the connection test if Lightning Sync was syncing your reps' items successfully, but suddenly stops.

After taking the necessary steps to prepare your Microsoft Exchange server and Salesforce to sync, you're ready to run the Lightning Sync connection test.

The Lightning Sync connection test checks several points of connectivity between Salesforce and your email server. When the test is complete, it provides a summary describing your connection status.

Lightning Sync for Microsoft® Exchange users should run both the Lightning Sync connection test and the Microsoft Remote Connectivity Analyzer to test connectivity. The tests differ slightly, so running both gives you more information about your connection status. Lightning Sync for Google users need only run the Lightning Sync connection test.

The Microsoft Remote Connectivity Test and the Lightning Sync Connection Test check general connectivity between your email server and your Salesforce organization. If you want to test connectivity for only one (or a few) of your reps, check their sync statuses from Lightning Sync Status in Setup.

EDITIONS

Available to manage from: both Salesforce Classic and Lightning Experience

Available in: **Professional**, **Enterprise**, **Performance**, **Unlimited**, and **Developer** Editions

USER PERMISSIONS

To run the connection test:

"Customize Application"

- 1. From Setup, enter Lightning Sync Setup in the Quick Find box, then select Lightning Sync Setup.
- 2. From the Connection Test section, provide the email address for one of the reps you've set up to sync on your email server.

3. Click Test.

Lightning Sync checks the connection between Salesforce and your email server and summarizes your connection status.

Tell Sales Reps How to Prevent Certain Microsoft® Outlook Calendar Events from Syncing to Salesforce

Tell your Lightning Sync users how to manage which of their Outlook calendar events sync with Salesforce. We recommend that sales reps prepare events that they don't want to sync before you kick off the sync process. However, reps can manage which events sync at anytime.

Sales reps can prevent some of their calendar events —like personal events—from syncing to Salesforce.

Later in the setup process, you have to define reps' sync settings in Lightning Sync configurations. If you define sync settings for events, all events from a rep's default calendar sync to Salesforce—unless you tell reps to manage those events now.

Reps can prevent personal events from syncing from their calendars to Salesforce in different ways.

- Reps can create a separate calendar in their calendar application to track personal events.
 (Lightning Sync is designed to sync only a reps' default calendar to Salesforce.)
- When you define sync settings in Lightning Sync configurations, you choose whether you want to sync reps' private events. If you
 opt not to sync private events, reps can prevent events from syncing by assigning the private option to events from their calendar
 applications.

If users don't manage their personal events before syncing begins, users can still remove those events from Salesforce by deleting personal events Salesforce manually.

EDITIONS

Available to manage from: both Salesforce Classic and Lightning Experience

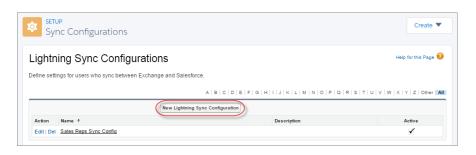
Define Sync Settings for Sales Reps Using Lightning Sync

After sales reps prepare their Exchange events to sync with Salesforce, you can define sync settings for groups of reps in Lightning Sync configurations. This step kicks off the sync process for your reps.

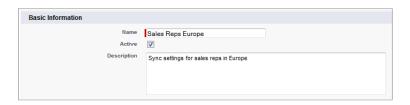
Before you begin, make sure that you understand how to avoid syncing data between Salesforce organizations. Syncing data between Salesforceorganizations is possible if you test Lightning Sync before rolling it out to reps, or your company uses multiple Salesforce orgs.

Defining sync settings lets you control which of your users can sync contacts and events. You can also control which direction your users sync, and create filters to limit certain records from syncing.

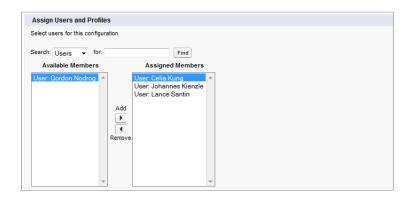
- 1. From Salesforce Setup, enter *Sync Configurations* in the Quick Find box, then select **Sync Configurations**.
- 2. Click New Lightning Sync Configuration.



3. Enter the name of the configuration. For example, if you're creating a configuration for users in a particular region, enter a unique name for it, and then select Active.



4. Assign users and profiles to this configuration.



EDITIONS

Available to manage from: both Salesforce Classic and Lightning Experience

Available in: **Professional**, **Enterprise**, **Performance**, **Unlimited**, and **Developer** Editions

USER PERMISSIONS

To access Lightning Sync setup in Salesforce:

"View Setup and Configuration"

To create, edit, or delete Lightning Sync configurations:

"Manage Exchange Configurations"

AND

"Manage Users"

5. Indicate the sync direction for your users' contacts.



- 6. To change field mappings between Salesforce and Exchange contacts, click Edit Field Mappings.
- 7. Indicate whether you'd like to sync your users' events from Exchange to Salesforce.



- **8.** Indicate whether you want all Exchange events to sync to Salesforce, or only the events your users select. If you set up users to select events, events users relate to Salesforce from Lightning for Outlook begin to sync between the two systems. To finish setting up that option, you're required to enable Lightning for Outlook, and your users are required to complete Lightning for Outlook setup.
- 9. To change field mappings between Salesforce and Exchange events, click Edit Field Mappings.

10. Click Save.

- **11.** Set filters to specify the contacts users can sync from Salesforce to Exchange. You are required to set filters based on your users' record ownership. Choose whether you want to:
 - Limit contacts that users sync to only what users own, choose **Selected Contacts**, and then select **User's Records**. Make sure that you select both of these settings together, or no contacts sync for users in this configuration.
 - Let users sync all contacts they can see in Salesforce, choose **All Contacts**.



Set more sync filters, if you wish. For example, to prevent contacts from outside your users' territories from syncing, create sync filters for specific fields on users' contact records. Contact filters don't apply to contacts syncing from Exchange to Salesforce.



- 12. Select Sync private events to sync events your users have marked private either in Salesforce or their calendars.
- **13.** Select Automatically remove deleted Exchange events from Salesforce to let reps delete Exchange events and Salesforce events in one action.
- **14.** Select Automatically relate Google events to Salesforce records to let Lightning Sync review reps' calendars and intelligently relate important events to the appropriate Salesforce contacts or leads automatically.
- **15.** Specify the specific events users can sync from Exchange to Salesforce. Enter a filter in the Greater or equal to field. Doing so limits the events users can sync to these time frames.
 - TODAY—Syncs events that end on or after today. The start time is 12:00 a.m. Learn more on page 4 about why this selection is recommended in certain scenarios.
 - LAST MONTH—Syncs events that ended on or after the first day of last month.
 - LAST N DAYS—Syncs events that ended on or after a specified number of days ago, such as LAST 30 DAYS. You can sync events that ended up to 180 days ago.

16. Click Save.

Contact and event syncing has begun for users in this Lightning Sync configuration.

SEE ALSO:

Considerations for Companies With Multiple Salesforce Organizations
How Lightning Sync Manages Sync Conflicts with Salesforce for Outlook

Tell Sales Reps How to Sync Microsoft® Contacts with Salesforce

Tell your Lightning Sync for Microsoft Exchange users that it's time to manage the Microsoft contacts that users want to sync with Salesforce.

If you've set up sales reps to sync contacts from only Salesforce to Microsoft Exchange, you can skip this step: Reps' contacts and events are already syncing.

Reps set up to sync contacts from Exchange to Salesforce or sync both ways can kick off sync by choosing which Microsoft contacts sync to Salesforce.

After you define reps' sync settings by adding them to active Lightning Sync configurations, Lightning Sync creates a folder called Salesforce_Sync within each reps' email account. Lightning Sync nests Salesforce_Sync within reps' Contacts directories.

Reps choose which contacts sync by moving those contacts into the Salesforce_Sync folder. When reps can see and access the Salesforce_Sync folder in their email application, they can start moving contacts into it.

EDITIONS

Available to manage from: both Salesforce Classic and Lightning Experience

MANAGE LIGHTNING SYNC USERS

After you've set up Lightning Sync, manage how your sales reps experience the feature and assist users in troubleshooting problems.

Fix Sync Issues for Lightning Sync Users

If an Lightning Sync user has trouble syncing between your email server and Salesforce, you can troubleshoot sync issues by checking your users' sync statuses or running a Lightning Sync error report. If you find a sync issue that a user can't overcome, then you can reset that user's sync process for them.

EDITIONS

Available to manage from: both Salesforce Classic and Lightning Experience

Available in: **Professional**, **Enterprise**, **Performance**, **Unlimited**, and **Developer** Editions

Fix Sync Issues for Lightning Sync Users

If an Lightning Sync user has trouble syncing between your email server and Salesforce, you can troubleshoot sync issues by checking your users' sync statuses or running a Lightning Sync error report. If you find a sync issue that a user can't overcome, then you can reset that user's sync process for them.

Check Lightning Sync Users' Sync Statuses

If your users can't sync, you can check their sync statuses—and the sync status of your Lightning Sync setup—to troubleshoot the problem.

Build and Run a Lightning Sync Error Report

If your Lightning Sync users can't sync, you can build and run an error report to discover what's causing sync to fail in your organization, and for which users. The report details provide suggestions to help you troubleshoot sync issues.

Reset Sync for Lightning Sync Users

If a sales rep has trouble syncing between your email server and Salesforce, you can reset that rep's sync process. Resetting sync clears out and then restores the connections between a rep's email and calendar applications and Salesforce records. Resetting the sync process doesn't affect information stored in those records.

Test Your Connection Between Your Email and Calendar Server and Salesforce

Lightning Sync for Microsoft® Exchange users should run both the Lightning Sync connection test and the Microsoft Remote Connectivity Analyzer to test connectivity. The tests differ slightly, so running both gives you more information about your connection status. Lightning Sync for Google users need only run the Lightning Sync connection test.

Lightning Sync for Microsoft® Exchange Statuses

Understanding Lightning Sync for Microsoft Exchange statuses helps you assess and address Lightning Sync errors that appear on the Lightning Sync status page in Salesforce.

EDITIONS

Available to manage from: both Salesforce Classic and Lightning Experience

Check Lightning Sync Users' Sync Statuses

If your users can't sync, you can check their sync statuses—and the sync status of your Lightning Sync setup—to troubleshoot the problem.

- 1. From Setup, enter *Lightning Sync Status* in the Quick Find box, then select **Lightning Sync Status**.
- **2.** Type the name of the user whose sync status you'd like to check, and click **Check Status**. The sync status for that user is displayed.

In some cases, you may need to reset sync for a user.

If you need help interpreting sync statuses, or need recommendations on correcting sync issues, check out Lightning Sync for Microsoft® Exchange Statuses.

EDITIONS

Available to manage from: both Salesforce Classic and Lightning Experience

Available in: **Professional**, **Enterprise**, **Performance**, **Unlimited**, and **Developer** Editions

USER PERMISSIONS

To access Lightning Sync statuses:

"View Setup and Configuration"

Build and Run a Lightning Sync Error Report

If your Lightning Sync users can't sync, you can build and run an error report to discover what's causing sync to fail in your organization, and for which users. The report details provide suggestions to help you troubleshoot sync issues.

First, you create a custom report type using a Lightning Sync Error Report custom object we've set up for you in Salesforce. Then create a Lightning Sync error report. Finally, run your report to help your users fix those pesky sync errors they're experiencing.

- 1. Create a custom report type. Set the Primary Object to Lightning SyncError.
- **2.** Create your Lightning Sync error report. From the Reports tab, click **New Report**. Set the Report Type to the Lightning Sync report type you created in step 1, and click **Create**.
- 3. Save and run your Lightning Sync error report. From the unsaved report, click Save, complete the required fields, and click Save and Run Report.
 Salesforce generates a list of errors sync errors found in your organization, or displays "Grand Totals (0 records)" if the report couldn't identify any sync errors.

If the report couldn't identify any errors, but users still can't sync, contact Salesforce.

EDITIONS

Available to manage from: both Salesforce Classic and Lightning Experience

Available in: **Professional**, **Enterprise**, **Performance**, **Unlimited**, and **Developer** Editions

USER PERMISSIONS

To create or update custom report types:

 "Manage Custom Report Types"

To create, edit, and delete reports:

 "Create and Customize Reports"

AND

"Report Builder"

Reset Sync for Lightning Sync Users

If a sales rep has trouble syncing between your email server and Salesforce, you can reset that rep's sync process. Resetting sync clears out and then restores the connections between a rep's email and calendar applications and Salesforce records. Resetting the sync process doesn't affect information stored in those records.

- 1. If set up to sync contacts using Lightning Sync for Microsoft Exchange, make sure that the rep's Salesforce_Sync folder contains only contacts the rep wants to sync with Salesforce. Lightning Sync for Google users can ignore this step.
- 2. If set up to sync events, make sure that events that the rep doesn't want to sync are managed from the rep's calendar application.
- **3.** From Salesforce Setup, enter *Lightning Sync Status* in the Quick Find box, then select **Lightning Sync Status**.
- **4.** Type a rep's name, and click **Reset Sync**. During the next sync cycle, Lightning Sync:
 - Syncs all contacts between the rep's Salesforce_Sync folder (Microsoft Exchange) or Salesforce Sync group (Google Contacts) and Salesforce. Lightning Sync excludes contacts that fall outside of the filters you set in the rep's sync configuration.
 - Syncs all events from the rep's calendar application to Salesforce. Lightning Sync excludes events that fall outside of the filters you set in the rep's sync configuration, or events that the rep prevented from syncing.

EDITIONS

Available to manage from: both Salesforce Classic and Lightning Experience

Test Your Connection Between Your Email and Calendar Server and Salesforce

Lightning Sync for Microsoft® Exchange users should run both the Lightning Sync connection test and the Microsoft Remote Connectivity Analyzer to test connectivity. The tests differ slightly, so running both gives you more information about your connection status. Lightning Sync for Google users need only run the Lightning Sync connection test.

Test your connection status to confirm whether you and your IT pros have set up Lightning Sync successfully. Or, run the connection tests if Lightning Sync was syncing successfully, but syncing suddenly stops for all reps in your Salesforce organization.



Note: The Microsoft Remote Connectivity Test and the Lightning Sync Connection Test check general connectivity between your email server and your Salesforce organization. If you want to test connectivity for only one (or a few) of your reps, check their sync statuses from Lightning Sync Status in Setup.

- Run the Microsoft® Remote Connectivity Analyzer with Lightning Sync Parameters
- Run the Lightning Sync Connection Test for Microsoft® Exchange Users

•

EDITIONS

Available to manage from: both Salesforce Classic and Lightning Experience

Available in: **Professional**, **Enterprise**, **Performance**, **Unlimited**, and **Developer** Editions

USER PERMISSIONS

To get the necessary parameters to run the Microsoft Remote Connectivity Analyzer:

 Administrative access to your company's Microsoft[®] Exchange server

To run the Lightning Sync connection test:

"Customize Application"

#lightning_sync_admin_google_connectivity_test_sfdc__lightning_sync_admin_google_connectivity_test_sfdc

Lightning Sync for Microsoft® Exchange Statuses

Understanding Lightning Sync for Microsoft Exchange statuses helps you assess and address Lightning Sync errors that appear on the Lightning Sync status page in Salesforce.

System Statuses

Table 1: Configuration Setup Statuses

If	Provides this status	This status means that
Microsoft Exchange service account provided:	Your Service Account User Name	You've saved your service account credentials in Salesforce, and Lightning Sync has recognized a valid service account. This status doesn't necessarily mean that the service account is set up to sync using Lightning Sync. If

EDITIONS

Available in: Salesforce Classic

If	Provides this status	This status means that
		you continue to have sync errors, we recommend that you use Microsoft®'s Remote Connectivity Analyzer tool to test your connection and troubleshoot setup issues.
	None	Lightning Sync couldn't save your service account credentials. Verify that you've provided the correct service account ID and password and that you've set up a valid service account in Microsoft Exchange.
Lightning for Outlook enabled:	Yes	You've enabled Lightning for Outlook in Setup. If you've set up sales reps to select which Microsoft events sync to Salesforce, reps select events using Lightning for Outlook.
	No	You haven't enabled Lightning for Outlook in Setup. If you've set up sales reps to select which Microsoft events sync to Salesforce, reps can't select events until you've enabled Lightning for Outlook.
Salesforce recognizes Microsoft Exchange service account:		Lightning Sync recognizes the service account that you provided. This status doesn't necessarily mean that the service account is set up to sync using Lightning Sync. If you continue to see sync errors, we recommend that you use Microsoft [®] 's Remote Connectivity Analyzer tool to test your connection and troubleshoot setup issues.
	×	Lightning Sync couldn't recognize the service account that you provided. Check to make sure that you've set up a valid service account in Microsoft Exchange.
Users with linked Microsoft Exchange and Salesforce email addresses:	The expected number of Lightning Sync users	All of your users' Microsoft Exchange email addresses have mapped correctly to the corresponding Salesforce email addresses.
	An unexpected number of Lightning Sync users	Some of your users' Microsoft Exchange email addresses have not mapped correctly to the corresponding Salesforce email addresses. Compare your users' addresses in Exchange and Salesforce to verify that they match.

If	Provides this status	This status means that
	0	None of your users' Microsoft Exchange email addresses has mapped to its corresponding Salesforce email addresses. Contact Salesforce Customer Support.

Table 2: Contacts Statuses

If	Provides this status	This status means that
Last sync activity:	A contact sync time within the last few minutes	Your organization last synced contacts with Lightning Sync on this date, at this time. In general, Lightning Sync is syncing records as expected. If you see this status and individual users still report that contacts are not syncing as expected, check your Exchange server or Lightning Sync configurations for settings related to those particular users.
	A contact sync time within a few hours	Your organization last synced contacts on this date, at this time. It's possible you recently set up Lightning Sync, because the initial contacts sync might take up to several hours to complete. If you haven't initiated contacts sync for your organization for the first time, this status might indicate a problem with contacts sync in your organization. Monitor the last sync activity over the next 24 hours to see if syncing resumes.
	A contact sync time on a past date	Your organization last synced contacts on this date, at this time. If your organization doesn't sync again within 24 hours, verify that you provided the correct Exchange service account credentials, that Salesforce recognized your service account, and that you've used Microsoft's Remote Connectivity Analyzer to verify that your Exchange server can communicate with Lightning Sync. If the analyzer shows that your connection is working, contact Salesforce Customer Support.
Records synced in last 60 minutes:	The number of contacts that were synced in your organization in the last 60 minutes	Within the last 60 minutes, your organization last synced this number of contacts.

If	Provides this status	This status means that
	0	Your organization hasn't synced any contacts within the last 60 minutes. Monitor record sync activity over the next 24 hours to see if sync resumes. If sync doesn't resume, use Microsoft's Remote Connectivity Analyzer to verify that your Exchange server can communicate with Lightning Sync. If the analyzer shows that your connection is working, contact Salesforce Customer Support.
Records synced in last 24 hours:	The number of contacts that were synced in your organization over the last 24 hours	Within the last 24 hours, your organization synced this number of contacts.
	0	Your organization hasn't synced any contacts within the last 60 minutes. Use Microsoft's Remote Connectivity Analyzer to verify that your Exchange server can communicate with Lightning Sync. If the analyzer shows that your connection is working, contact Salesforce Customer Support.

Table 3: Events Statuses

If	Provides this status	This status means that
Last sync activity:	An event sync time within the last few minutes	Your organization last synced events with Lightning Sync on this date, at this time. In general, Lightning Sync is syncing records as expected. If you see this status and individual users still report that events are not syncing as expected, check your Exchange server or Lightning Sync configurations for settings related to those particular users.
	An event sync time within a few hours	Your organization last synced events on this date, at this time. You might have recently set up Lightning Sync, because the initial events sync might take up to several hours to complete. If you haven't initiated events sync for your organization for the first time, this status might indicate a problem with events sync in your organization. Monitor the last sync activity over the next 24 hours to see if syncing resumes.

If	Provides this status	This status means that
	An event sync time on a past date	Your organization last synced events on this date, at this time. If your organization doesn't sync again within 24 hours or longer, verify that you provided the correct Exchange service account credentials, that Salesforce recognized your service account, and that you've used Microsoft's Remote Connectivity Analyzer to verify that your Exchange server can communicate with Lightning Sync. If the analyzer shows that your connection is working, contact Salesforce Customer Support.
Records synced in last 60 minutes:	The number of events that were synced in your organization in the last 60 minutes	Within the last 60 minutes, your organization last synced this number of events.
	0	Your organization hasn't synced any events within the last 60 minutes. Monitor record sync activity over the next 24 hours to see if syncing resumes. If syncing doesn't resume, use Microsoft's Remote Connectivity Analyzer to verify that your Exchange server can communicate with Lightning Sync. If the analyzer shows that your connection is working, contact Salesforce Customer Support.
Records synced in last 24 hours:	The number of contacts that were synced in your organization in the last 24 hours	Within the last 24 hours, your organization synced this number of contacts.
	0	Your organization hasn't synced any events within the last 60 minutes. Use Microsoft's Remote Connectivity Analyzer to verify that your Exchange server can communicate with Lightning Sync. If the analyzer shows that your connection is working, contact Salesforce Customer Support.

User Statuses

Table 4: Configuration Setup Statuses

	J	
If	Provides this status	This status means that
User assigned to active Exchange configuration:	✓	This user is set up to sync in an active Lightning Sync configuration.

If	Provides this status	This status means that
	×	This user isn't set up to sync in an active Lightning Sync configuration.
User mailbox is running on supported version of Microsoft Exchange:	✓	Lightning Sync supports this user's version of Microsoft Exchange.
	×	Lightning Sync doesn't support this user's version of Microsoft Exchange.
User recognized by Exchange service account:	✓	This user is represented by the service account that you've set up in Exchange, and Lightning Sync can communicate with your Exchange service account.
	×	This user isn't represented by the service account that you've set up in Exchange, or Lightning Sync can't communicate with the Exchange service account that you provided. Check your Exchange service account setup to verify that you've set up a valid service account and that it accurately represents this user.
User's reset sync status:	Marked for reset	You've reset this user for sync, but the reset hasn't started. Your reset request is in the system queue and will be completed when the system is available.
	Reset in progress	The reset sync process is in progress. When reset is complete, "User's reset sync status" is no longer displayed on this page.
User set up Lightning for Outlook:	Yes	This sales reps has set up Lightning for Outlook. If you've set up reps to select which Microsoft events sync to Salesforce, reps select events using Lightning for Outlook.
	No	This sales rep hasn't set up Lightning for Outlook. If you've set up reps to select which Microsoft events sync to Salesforce, reps can't select events until they've set up Lightning for Outlook.

Table 5: Contacts Statuses

If	Provides this status	This status means that
Salesforce_Sync folder found:	✓	The Salesforce_Sync folder was found in this user's email account under the Contacts directory.

If	Provides this status	This status means that
	×	Lightning Sync can't find the Salesforce_Sync folder on your Exchange server or can't create it automatically for this user. You can create the folder Salesforce_Sync for this user as a subdirectory under the Contacts directory in this user's email account.
Salesforce and Exchange email addresses linked:	✓	This user's Microsoft Exchange email address has mapped to the user's Salesforce email address correctly.
	×	This user's Microsoft Exchange email address hasn't mapped to the user's Salesforce email address correctly. Reset sync for this user.
Salesforce to Exchange sync status:	Not started	This user's contacts hasn't started syncing from Salesforce to Exchange.
	Initial sync in progress	This user's contacts are syncing from Salesforce to Exchange for the first time. This initial sync might take several hours.
	Initial sync completed	This user's contacts have completed syncing from Salesforce to Exchange for the first time.
	Sync in progress	This user's contacts are syncing from Salesforce to Exchange right now.
	In sync	This user's contacts have completed syncing from Salesforce to Exchange.
	Exchange configuration not set to sync	This user isn't set up to sync contacts from Salesforce to Exchange in an active Lightning Sync configuration.
Exchange to Salesforce sync status:	Not started	This user's contacts have not started syncing from Exchange to Salesforce yet.
	Initial sync in progress	This user's contacts are syncing from Exchange to Salesforce for the first time. This initial sync might take several hours.
	Initial sync completed	This user's contacts have completed syncing from Exchange to Salesforce for the first time.
	Sync in progress	This user's contacts are syncing from Exchange to Salesforce.
	In sync	This user's contacts have completed syncing from Exchange Salesforce.

If	Provides this status	This status means that
	Exchange configuration not set to sync	This user isn't set up to sync contacts from Exchange to Salesforce in an active Lightning Sync configuration.
Records in sync	The number of contacts that are syncing for this user	This user has this number of contacts syncing between Exchange and Salesforce. If this user's contacts are syncing as expected, this number matches the number of contacts in this user's Salesforce_Sync folder.

Table 6: Event Statuses

If	Provides this status	This status means that
Calendar folder found:	✓	The calendar folder was found in this user's email account.
	×	Lightning Sync can't find the user's calendar folder on your Exchange server.
Salesforce and Exchange email addresses linked:	✓	This user's Microsoft Exchange email address has mapped to the user's Salesforce email address correctly.
	×	This user's Microsoft Exchange email address hasn't mapped to the user's Salesforce email address correctly. Reset sync for this user.
Salesforce to Exchange sync status:	Not started	This user's events haven't started syncing from Salesforce to Exchange.
	Initial sync in progress	This user's events are syncing from Salesforce to Exchange for the first time. This initial sync might take several hours.
	Initial sync completed	This user's events have completed syncing from Salesforce to Exchange for the first time.
	Sync in progress	This user's events are syncing from Salesforce to Exchange right now.
	In sync	This user's events have completed syncing from Salesforce to Exchange.
	Exchange configuration not set to sync	This user isn't set up to sync events from Salesforce to Exchange in an active Lightning Sync configuration.
Exchange to Salesforce sync status:	Not started	This user's events haven't started syncing from Exchange to Salesforce.

If	Provides this status	This status means that
	Initial sync in progress	This user's events are syncing from Exchange to Salesforce for the first time. This initial sync might take several hours.
	Initial sync completed	This user's events have completed syncing from Exchange to Salesforce for the first time.
	Sync in progress	This user's events are syncing from Exchange to Salesforce.
	In sync	This user's events have completed syncing from Exchange Salesforce.
	Exchange configuration not set to sync	This user isn't set up to sync events from Exchange to Salesforce in an active Lightning Sync configuration.
Records in sync	The number of events that are syncing for this user	This user has this number of events syncing from Exchange to Salesforce. If this user reports difficulty syncing only some events, verify that the user is set up to sync events as expected in the user's Lightning Sync configuration and that the user didn't assign the private option to the event. Also remember that at this time, Lightning Sync doesn't sync recurring events or invitees on events.

INDEX

C	Lightning Sync (continued)
Contacts	set up, Salesforce settings 11
Microsoft® Exchange, syncing with Salesforce 1	set up, service account 8 setup, Microsoft® Exchange connection methods 7
E	setup, Microsoft® Exchange OAuth 2.0 12 setup, Microsoft® Exchange service account 7
Events Microsoft® Exchange, syncing with Salesforce 1	sync errors 20 sync settings, define 14 sync statuses 20
Lightning Sync check sync status 18 Connection test, Microsoft Exchange 12 Considerations 4 data between multiple Salesforce organizations, preventing contamination between 5	sync, contacts and events between Microsoft® Exchange and Salesforce 1 system requirements, Lightning Sync for Microsoft® Exchange 3 Test Connection 20
Guidelines 5 manage users 17 Microsoft® Connectivity Analyzer test parameters 9 Microsoft® Remote Connectivity Analyzer 20 multiple Salesforce organizations, guidelines for companies with 5 reset sync 19 run error report 18 set up, Microsoft® Exchange 6 set up, Microsoft® Exchange server settings 8 set up, prepare users' Microsoft Contacts 16 set up, prepare users' Microsoft Outlook events 13	Syncing contacts between Microsoft® Exchange and Salesforce 1, 3, 6-8, 11-12, 14, 16, 18-19 errors 5, 20 events between Google and Salesforce 18-19 events between Google Calendar™ and Salesforce 4-5 events between Microsoft® Exchange and Salesforce 1, 3-8, 11-14, 18-19 troubleshooting 9, 12, 20 T Troubleshooting 20