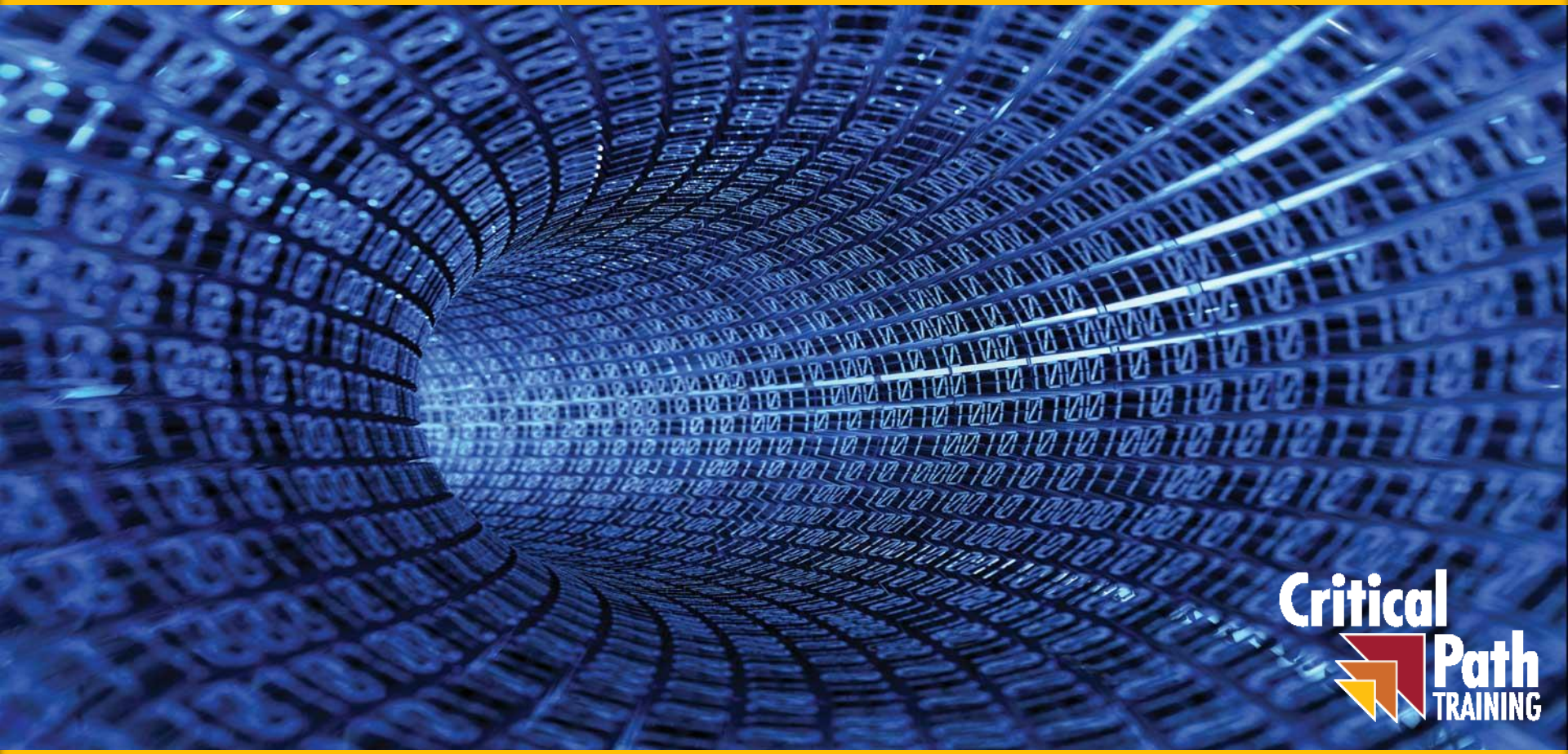
Developing Webhooks for SharePoint Online



Agenda

- What are WebHooks?
- How to register WebHooks
- Receiving notifications
- Developing and debugging

What are SharePoint Webhooks?

- A Webhook is “a way to be notified of a done change”
- Push model instead of a pull model
  - No synchronous (“-ing”) event support, keep on using RER’s for that
- Follows a universal model widely used in the industry (e.g. WordPress, GitHub, MailChimp, etc.)
- Works with changes to SP List Items (and Libraries)
- Robust – changelog-based with retry logic
- Also available for OneDrive & Outlook

Why Not Use Remote Event Receivers?

- WebHooks have a retry mechanism with an incremental back-off strategy
- WebHooks are lightweight for building service endpoints
  - The payload is small
  - Notifications are batched in the response to the GetChanges() call
- WebHooks are secure, no event information is passed in the notification
- WebHooks are easier to consume by non-SharePoint developers
  - Office Devs have an opportunity to learn a new standard
- No WCF endpoints; regular HTTPS services are sufficient

Webhook-enabled list item event types

- Supported asynchronous list item events in SharePoint:
  - ItemAdded
  - ItemUpdated
  - ItemDeleted
  - ItemCheckedOut
  - ItemCheckedIn
  - ItemUncheckedOut
  - ItemAttachmentAdded
  - ItemAttachmentDeleted
  - ItemFileMoved
  - ItemVersionDeleted
  - ItemFileConverted

- Synchronous events are not supported by WebHooks

Required Permissions To Register Webhooks

- Microsoft Azure Active Directory (AD) applications
  - Set the following Azure AD application permissions:

Application	Permission
SharePoint Online	Read and write items and lists in all site collections.

- SharePoint add-in
  - Set the following SharePoint permissions

Scope	Permission Rights
List	Manage

How To Register Webhooks- Step 1

- Send a subscription request to SharePoint
  - https://dev.office.com/sharepoint/docs/apis/WebHooks/lists/create-subscription

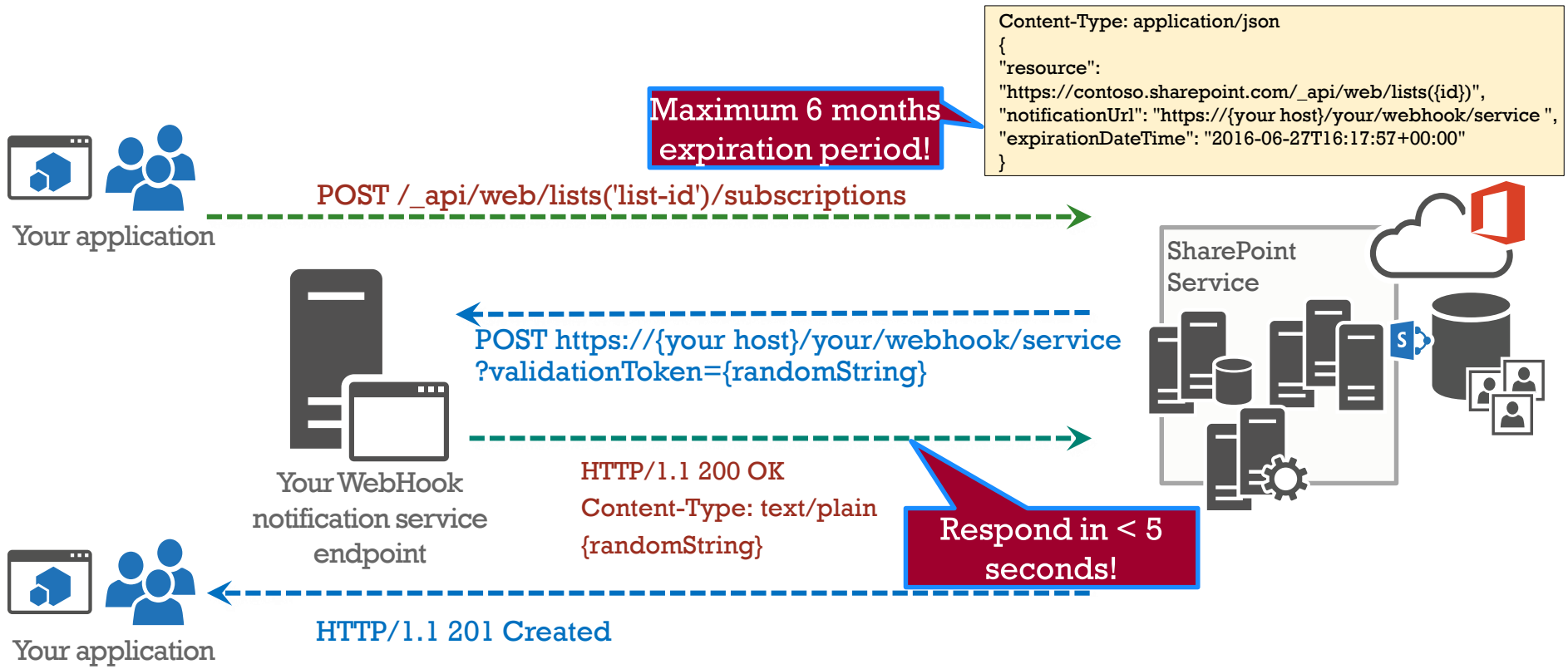
```
POST /_api/web/lists('list-id')/subscriptions
```

Name	Type	Description
resource	string	The URL of the list to receive notifications from. Ex: https://tenancy.sharepoint.com/_api/web/lists({id})
notificationUrl	string	The service URL to send notifications to. Ex: https://your.web.site/your/webhook/service/handlerequest
expirationDateTime	date	The date the notification will expire and be deleted. Ex: 2016-10-04T16:30:00+00:00
client-clientState	string	Optional. Opaque string passed back to the client on all notifications. You can use this for validating notifications, or tagging different subscriptions.

How To Register Webhooks – Step 2

- Receive the response from SharePoint
- The response contains a validation token
- Respond to validation request & return the validation token
  - Must be done in < 5 seconds
- Receive the subscription ID
  - Store the subscription ID

Subscribe to a Webhook



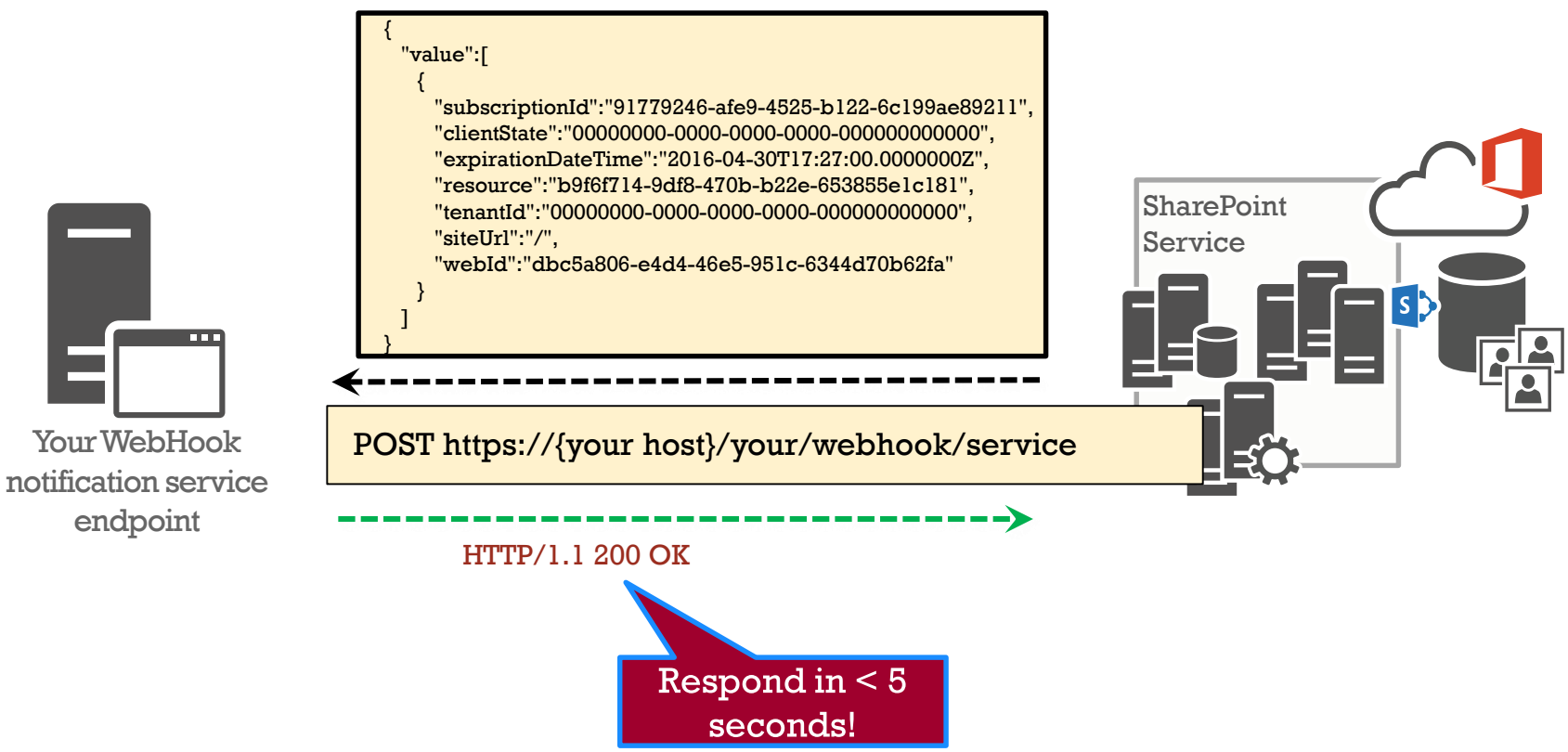
Receiving Notifications

- SharePoint detects changes in lists subscribed to
- SharePoint calls the subscription's service endpoint and sends the following information:

Property	Description
subscriptionId	The ID of the webhook subscription. If you want to update the webhook subscription, for example you prolong the webhook expiration, then you need this ID.
resource	The ID of the list for which the change happened.
siteUrl	The server relative URL of the site holding the resource for which the change happened.

- SharePoint only sends notifications that changes happened
  - Your service endpoint must reply in less than 5 seconds

Event notification in action



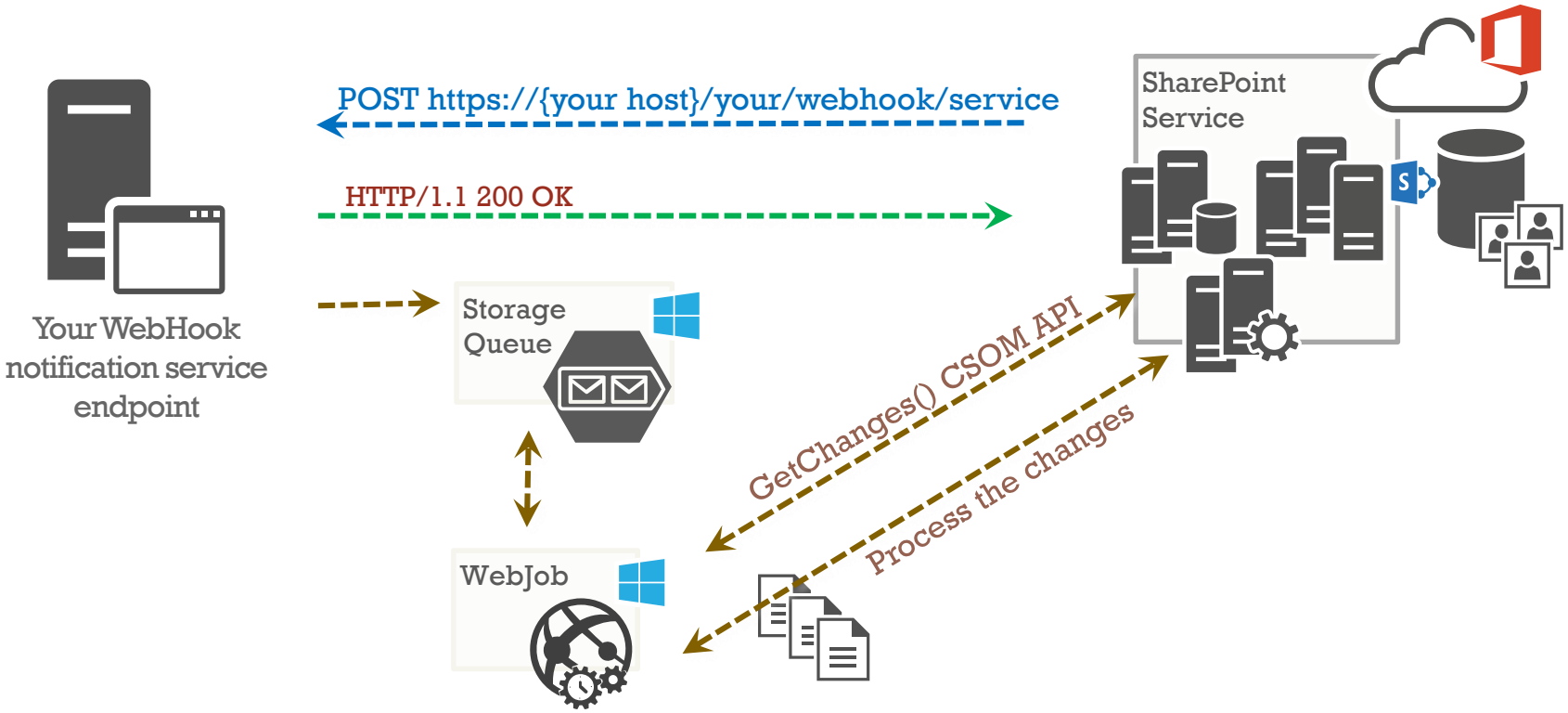
Getting Changes

- SharePoint only sends notifications that changes happened
  - You must use an asynchronous approach to determine what changed and still reply in less than 5 seconds
- Use the GetChanges() CSOM API to return what changed
  - Pass a changeToken to SharePoint to avoid getting the same changes more than once
  - changeTokens tell SharePoint at what point you want to receive changes from
  - Your service endpoint should store and persist changeTokens

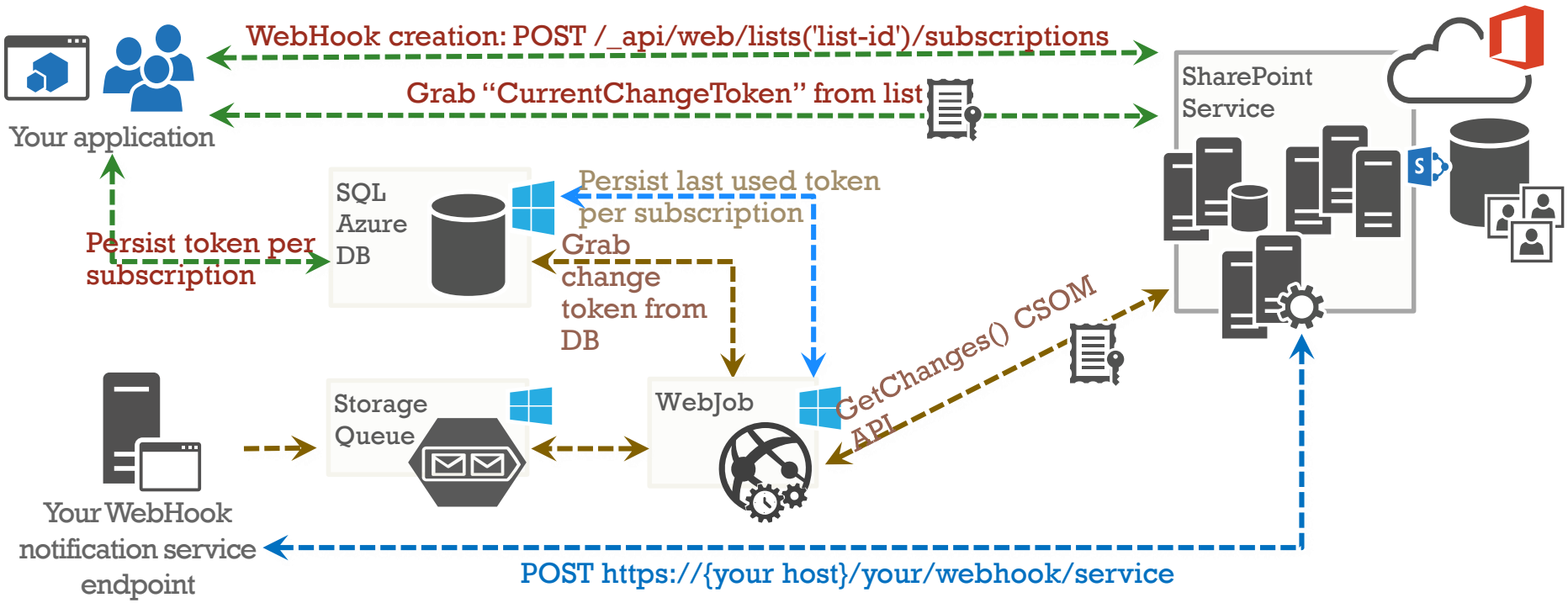
How SharePoint processes change notifications

- SharePoint does not call subscribed notification services in real-time
- When changes occur in SharePoint lists, SharePoint queues the WebHook callout
  - The queue is read once each minute
- SharePoint batches WebHook callout requests for each subscription
  - If 5000 changes occur in a batch operation only 1 WebHook call out is made
  - When you call GetChanges SharePoint will return 5000 change events

Processing a notification event



GetChanges() pattern



Handling Expired Webhook Subscriptions

- Webhook subscriptions expire in 6 months
- If there are no changes to a SharePoint list for 6 months
  - No webhook notifications are fired
  - Webhook subscriptions are deleted automatically by SharePoint
- Basic model (fragile)
  - When notifications are received, check the subscription lifetime
  - If the subscription is about to expire, extend the lifetime of the subscription
- Complex model (reliable)
  - Create a job that runs at least once every 6 months to read subscription IDs from a persisted storage location, then extend each subscription using the IDs

Required Permissions to Update WebHooks

- Microsoft Azure Active Directory (AD) applications
  - Set the following Azure AD application permissions:

Application	Permission
Office 365 SharePoint Online	Read and write items and lists in all site collections.

- SharePoint add-in
  - Subscription can only be updated by entity that created it.
  - Set the following SharePoint Add-in permissions (or higher):

Scope	Permission Rights
List	Manage

Renewing a webhook subscription

- Send an update request to SharePoint
  - https://dev.office.com/sharepoint/docs/apis/WebHooks/lists/update-subscription

```
PATCH /_api/web/lists('list-id')/subscriptions('id')/
```

Name	Type	Description
notificationUrl	string	The service URL to send notifications to. Ex: https://your.web.site/your/webhook/service/handlerequest
expirationDateTime	date	The date the notification will expire and be deleted. Ex: 2016-10-04T16:30:00+00:00
client-clientState	string	Optional. Opaque string passed back to the client on all notifications. You can use this for validating notifications, or tagging different subscriptions.

Webhook retry mechanism

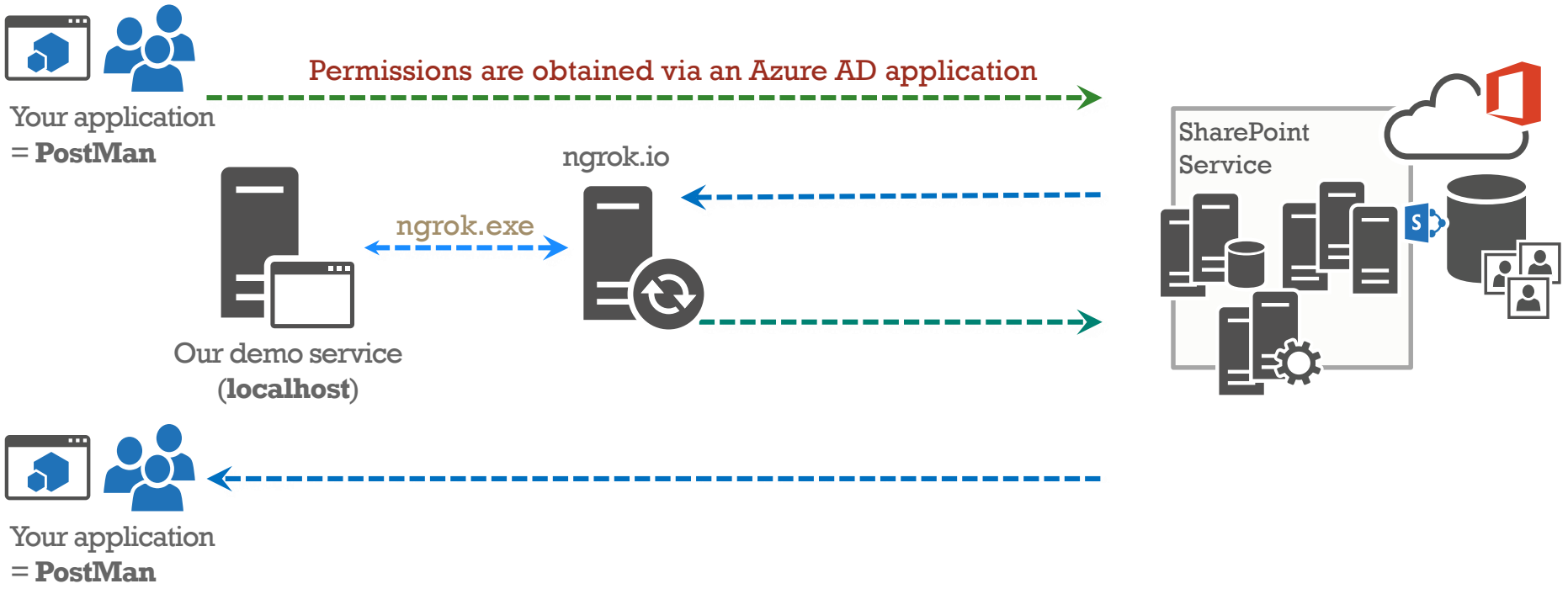
- Built-in retry mechanism
- If a response is not received in less than 5 seconds..
  - SharePoint retries a few times
  - Exponentially backs off
  - Ultimately discards the message

Developing and debugging WebHooks

- Connect remote debugger to your service and web job running in Azure
- Use ngrok (https://ngrok.com/) as an alternative to create a tunnel to your service running on localhost
  - Specify ngrok as your service endpoint and notifications will be routed to your local debug environment

Demo setup

Postman: https://www.getpostman.com/
Ngrok: https://ngrok.com/download



Summary

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- How to register WebHooks
- Receiving notifications
- Developing and debugging

Reference

- WebHooks on Office Dev Center
  - https://dev.office.com/sharepoint/docs/apis/webhooks/overview-sharepoint-webhooks
- Reference Implementation Deployment Guide
  - https://github.com/SharePoint/sp-dev-samples/blob/master/Samples/WebHooks.List.AzureAD/Deployment%20guide.md
- Video Walkthrough

  https://www.youtube.com/watch?v=P4a1_EWokwM
- Community walkthrough (by Prian)
  - http://www.c-sharpcorner.com/article/sharepoint-webhooks-as-event-receivers-for-sharepoint-online/