



# Push Notifications

Sending alerts to your app

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## PUSH NOTIFICATIONS

- Server-initiated communication
- Enables key background scenarios
- Preserves battery life and user experience
- Prevents polling for updates

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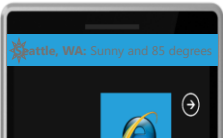

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## NOTIFICATION TYPES



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# Push Notification Service

Windows Phone

Microsoft.Phone.Notification  
Push client service

Your Web Service  
Custom Web Service

Existing Web Services

Microsoft Services  
Windows Phone Notification Service  
Windows Azure

Built-in support for efficient, battery-aware mobile push notifications

Managed APIs for notification-driven interaction with existing Web 2.0 sites

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# PUSH NOTIFICATIONS: DATA FLOW

```
graph TD
    Event((Event)) --> App[App]
    App -- "Send URI to server" --> Service[Your service]
    Service -- "Send push data to URI" --> PushService[Push service]
    PushService -- "Send push data to client" --> PushClient[Push client]
    PushClient -- "Data to tile" --> Tile[Tile]
    PushClient -- "Data to toast" --> Toast[Toast]
    PushClient -- "Open tile" --> App
    PushClient -- "Open toast" --> App
```

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# Push Client Architecture

The architecture is divided into several layers:

- Application:** App UI and logic, Microsoft.Phone.Notification, Silverlight, XNA, HTML/JavaScript, CLR.
- App Model:** App management, Download Manager.
- UI Model:** Shell frame, Session manager, Direct3D, Compositor.
- Cloud Integration:** Xbox LIVE, Live Tiles service, Push client service.
- Kernel:** Networking, Wi-Fi, Radio, Compass, Light, Proximity, Hardware BSP.
- Hardware Foundation:** Hardware BSP.

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## Three Kinds of Notifications

- Raw
  - Notification message content is application-specific
  - Delivered directly to app only if it is running
- Toast
  - Specific XML schema
  - Content delivered to app if it is running
  - If app is not running, system displays Toast popup using notification message content
- Tile
  - Specific XML schema
  - Never delivered to app
  - If user has pinned app tile to Start screen, system updates it using notification message content

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## Server Sends Notification

```
1. // The URI that the Push Notification Service returns to the phone app when it creates a channel.
2. string subscriptionUri = "notificationChannel.URI";
3. HttpWebRequest sendNotificationRequest = (HttpWebRequest)WebRequest.Create(subscriptionUri);
4. request.Method = "POST"; // HTTP POST is the only allowed method to send the notification.

5. // The optional custom header X-MessageID uniquely identifies a notification message.
6. sendNotificationRequest.Headers.Add("X-MessageID", "<UUID>");
7. // Sets the web request content length.
8. sendNotificationRequest.ContentLength = notificationMessage.Length;

9. // Sets the notification payload to send.
10. byte[] notificationMessage = new byte[] { <payload> };
11. using (Stream requestStream = sendNotificationRequest.GetRequestStream())
12. {
13.     requestStream.Write(notificationMessage, 0, notificationMessage.Length);
14. }

15. // Sends the notification and gets the response.
16. HttpWebResponse response = (HttpWebResponse)sendNotificationRequest.GetResponse();
17. string notificationStatus = response.Headers["X-NotificationStatus"];
18. string notificationChannelStatus = response.Headers["X-SubscriptionStatus"];
19. string deviceConnectionStatus = response.Headers["X-DeviceConnectionStatus"];
```

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## Raw Message Content

```
1. // Message Content is application-specific - only gets delivered to running app
2. // For example use XML to format data
3. private static byte[] prepareRawPayload(string location, string temperature, string weatherType)
4. {
5.     MemoryStream stream = new MemoryStream();
6.     XmlWriterSettings settings =
7.         new XmlWriterSettings() { Indent = true, Encoding = Encoding.UTF8 };
8.     XmlWriter writer = XmlWriter.Create(stream, settings);

9.     writer.WriteStartDocument();
10.    writer.WriteStartElement("WeatherUpdate");

11.    writer.WriteStartElement("Location");
12.    writer.WriteStringValue(location);
13.    writer.WriteEndElement();
14.    ...
15.    writer.WriteEndElement();
16.    writer.WriteEndDocument();
17.    writer.Close();

18.    byte[] payload = stream.ToArray();
19.    return payload;
```

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## Toast Message Content

```
1. string toastMessage = "Content-Type: text/xml\r\nX-WindowsPhone-Target:
toast\r\n\r\n" +
2. "<?xml version='1.0' encoding='utf-8'?" +
3. "<wp:Notification xmlns:wp='\"WPNotification\">" +
4. "  <wp:Toast>" +
5. "    <wp:Text1><string>/wp:Text1>" +
6. "    <wp:Text2><string>/wp:Text2>" +
7. "  </wp:Toast>" +
8. "</wp:Notification>";
```

- Used by system to display Toast message if app not running
- If app is running, ShellToastNotificationReceived event fires
  - <Text1> and <Text2> values in event args as Dictionary<string, string>



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## Tile Message Content

```
1. string tileMessage = "<?xml version='1.0' encoding='utf-8'?" +
2. "<wp:Notification xmlns:wp='\"WPNotification\">" +
3. "  <wp:Tile>" +
4. "    <wp:BackgroundImage><background image path>/wp:BackgroundImage>" +
5. "    <wp:Count><count>/wp:Count>" +
6. "    <wp:Title><title>/wp:Title>" +
7. "  </wp:Tile>" +
8. "</wp:Notification>";
```

- Never delivered to app
- <background image path>, <count> and <title> are in a string format.
- If <background image path> references a remote resource, the maximum allowed size of the tile image is 80 KB, with a maximum download time of 1 minute.

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## Push Notifications

# Demo

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## Lab 3 – Complete After Session

Using Push Notifications

- <http://channel9.msdn.com/learn/courses/WP7TrainingKit/WP7Silverlight/UsingPushNotificationsLab//>
- Complete both exercises

Post your questions in the BTL Forum – if you have any questions or need support while doing your labs

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## Review

Push Notifications allow unsolicited messages to be sent to phones  
Push notifications drain the battery quickly  
In a Raw Notification message you can send any app-specific data  
Toast and Tile messages must conform to a specific format  
When a Tile update message is received, system starts the app  
Push Notification Service is a cloud service operated by Microsoft

☐ : True    ☐ : False

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Phone

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