

Program.cs file:

```
using Microsoft.Identity.Client;
using Newtonsoft.Json.Linq;
using RestSharp;
using System;
using System.Collections.Generic;
using System.IO;
using System.Threading;
using System.Threading.Tasks;

namespace BusinessCentralAPI
{
    class Program
    {
        static string m_PublicToken = string.Empty;
        static string m_ServiceToken = string.Empty;
        static string m_Token = string.Empty;
        static bool m_UsePublicToken = false;
        static string m_PressAnyKey = "Press any key to continue. Esc to cancel.";
        static bool m_Verbose = Properties.Settings.Default.Verbose;

        static void Main(string[] args)
        {
            var packageCode = "INNOVIATEST";
            var packageName = "Innovia Test";

            //0
            DeleteConfigPackage(packageCode);

            // 1
            InsertConfigPackage(packageCode, packageName);

            // 2 Information only.
            // This app will filter the config packages by packageCode
            // for steps 3 through 5 and use the ConfigPackageId found to use in the urls
            GetConfigPackage(packageCode);

            // 3
            var path = Properties.Settings.Default.RapidStartFilePath;
            UploadConfigPackage(packageCode, path);
            // 4
            ImportConfigPackage(packageCode);
            var sleep = !CheckConfigStatus(packageCode);
            TimeSpan interval = new TimeSpan(0, 0, Properties.Settings.Default.SleepInterval);

            int i = 0;
            while (sleep)
            {
                sleep = !CheckConfigStatus(packageCode);
                if (sleep)
                {
                    i += 1;
                    sleep = i < Properties.Settings.Default.MaximumSleeps;
                }
                Thread.Sleep(interval);
            }
            // 5
            ApplyConfigPackage(packageCode);
            CheckConfigStatus(packageCode);

            //Check token use for non-automation APIs.
            ModifyCustomer("Innovia Test");

            Console.Read();
        }
    }
}
```

```

private static string GetServiceToken()
{
    var scopes = new string[] { $"{Properties.Settings.Default.ApiBaseUrl}/.default" };
    SetConfidentialTokenAsync(scopes).GetAwaiter().GetResult();
    return m_ServiceToken;
}

private static async Task SetConfidentialTokenAsync(string[] scopes)
{
    //AuthenticationConfig config = AuthenticationConfig.ReadFromJsonFile("appsettings.json");

    // You can run this sample using ClientSecret or Certificate. The code will differ only when
instantiating the IConfidentialClientApplication

    // Even if this is a console application here, a daemon application is a confidential client
application

    m_ServiceToken = string.Empty;

    IConfidentialClientApplication app;

    app = ConfidentialClientApplicationBuilder.Create(Properties.Settings.Default.ClientId)
        .WithClientSecret(Properties.Settings.Default.ClientSecret)
        .WithAuthority(new Uri(String.Format("https://login.microsoftonline.com/{0}",
Properties.Settings.Default.TenantId)))
        .WithRedirectUri(Properties.Settings.Default.RedirectUrl)
        .Build();

    AuthenticationResult result = null;
    try
    {
        result = await app.AcquireTokenForClient(scopes)
            .ExecuteAsync();
        Console.ForegroundColor = ConsoleColor.Green;
        Console.WriteLine("Token acquired");
        Console.ResetColor();
    }
    catch (MsalServiceException ex) when (ex.Message.Contains("AADSTS70011"))
    {
        // Invalid scope. The scope has to be of the form "https://resourceurl/.default"
        // Mitigation: change the scope to be as expected
        Console.ForegroundColor = ConsoleColor.Red;
        Console.WriteLine("Scope provided is not supported");
        Console.ResetColor();
    }

    if (result != null)
    {
        m_ServiceToken = result.AccessToken;
    }
}

public static string GetAccessToken()
{
    if (m_Token != string.Empty)
        return m_Token;
    if (!m_UsePublicToken)
    {
        m_Token = GetServiceToken();
    }
    else
    {
        m_Token = GetAccessTokenPublic();
    }
    return m_Token;
}

public static string GetAccessTokenPublic()
{

```

```

        if (m_PublicToken != string.Empty)
        {
            return m_PublicToken;
        }

        var tenantId = Properties.Settings.Default.TenantId;
        var clientId = Properties.Settings.Default.ClientId; ;
        var authorityUri = String.Format("https://login.microsoftonline.com/{0}/oauth2/v2.0/token",
tenantId);
        var redirectUri = "https://login.microsoftonline.com/common/oauth2/nativeclient";
        var scopes = new List<string> { "https://api.businesscentral.dynamics.com/.default" };

        var publicClient = Microsoft.Identity.Client.PublicClientApplicationBuilder
            .Create(clientId)
            .WithAuthority(new Uri(authorityUri))
            .WithRedirectUri(redirectUri)
            .Build();

        var accessTokenRequest = publicClient.AcquireTokenInteractive(scopes);
        var accessToken = accessTokenRequest.ExecuteAsync().Result.AccessToken;

        m_PublicToken = accessToken;
        if (!string.IsNullOrEmpty(m_PublicToken))
        {
            Console.ForegroundColor = ConsoleColor.Green;
            Console.WriteLine("Token acquired");
            Console.ResetColor();
        }
        return accessToken;
    }

    static public string GetFileEtag(string jsonString)
    {
        var parsed = JObject.Parse(jsonString);

        if (!parsed.ContainsKey("file"))
            return string.Empty;

        var file = parsed.SelectToken("file").Value<JArray>();

        return GetEtagFromJsonObject(((JObject)file[0]).ToString());
    }

    static public string GetEtagFromJsonObject(string jsonString)
    {
        var newJson = jsonString.Replace("@odata.etag", "etag");
        var parsed = JObject.Parse(newJson);

        if (!parsed.ContainsKey("etag"))
            return string.Empty;

        var etag = parsed.SelectToken("etag").Value<string>();
        if (string.IsNullOrEmpty(etag))
            return string.Empty;

        return etag;
    }

    static void GetConfigPackage(string code)
    {
        try
        {
            string apiUrl =
                $"{Properties.Settings.Default.ApiBaseUrl}/v2.0/{Properties.Settings.Default.EnvironmentName}/api/microsof
                t/automation/v2.0/companies({Properties.Settings.Default.CompanyId})/configurationPackages?${filter}=code eq
                '{code}'";

            var apiCaller = new ProtectedApiCallHelper();

```

```

        ProtectedApiClientHelper.ApiCallDisplayOnly(apiUrl, Method.GET, "application/json", null,
null, GetAccessToken(), true);
    }
    catch (Exception ex)
    {
        Console.ForegroundColor = ConsoleColor.Red;
        Console.WriteLine(ex.Message);
        Console.ResetColor();
    }

    Console.WriteLine();
    Console.WriteLine(m_PressAnyKey);
    Console.WriteLine();
    var keyInfo = Console.ReadKey(true);
    var key = keyInfo.Key;
    if (key.ToString().ToLower() == "escape")
        Environment.Exit(0);
}

static string GetConfigPackageId(string code)
{
    try
    {
        string apiUrl =
"${Properties.Settings.Default.ApiBaseUrl}/v2.0/{Properties.Settings.Default.EnvironmentName}/api/microsof
t/automation/v2.0/companies({Properties.Settings.Default.CompanyId})/configurationPackages?${filter=code eq
'{code}'";
        var result = ProtectedApiClientHelper.ApiCallReturnJson(apiUrl, Method.GET,
"application/json", null, null, GetAccessToken(), m_Verbose);

        if (!result.ContainsKey("value"))
            return string.Empty;

        var value = result.SelectToken("value").Value<JArray>();
        if (value.Count == 0)
            return string.Empty;

        var configJson = (JObject)value[0];

        if (!configJson.ContainsKey("id"))
            return string.Empty;

        var id = configJson.SelectToken("id").Value<string>();
        if (string.IsNullOrEmpty(id))
            return string.Empty;

        return id;
    }
    catch (Exception ex)
    {
        Console.ForegroundColor = ConsoleColor.Red;
        Console.WriteLine(ex.Message);
        Console.ResetColor();
    }
    return string.Empty;
}

static string GetConfigImportStatus(JObject json)
{
    try
    {
        if (!json.ContainsKey("importStatus"))
            return string.Empty;

        var status = json.SelectToken("importStatus").Value<string>();
        if (string.IsNullOrEmpty(status))
            return string.Empty;

        return status;
    }
}

```

```

        catch (Exception ex)
        {
            Console.ForegroundColor = ConsoleColor.Red;
            Console.WriteLine(ex.Message);
            Console.ResetColor();
        }
        return string.Empty;
    }

    static string GetConfigApplyStatus(JObject json)
    {
        try
        {
            if (!json.ContainsKey("applyStatus"))
                return string.Empty;

            var status = json.SelectToken("applyStatus").Value<string>();
            if (string.IsNullOrEmpty(status))
                return string.Empty;

            return status;
        }
        catch (Exception ex)
        {
            Console.ForegroundColor = ConsoleColor.Red;
            Console.WriteLine(ex.Message);
            Console.ResetColor();
        }
        return string.Empty;
    }

    static void InsertConfigPackage(string code, string packageName)
    {
        try
        {
            string apiUrl =
                $"{Properties.Settings.Default.ApiBaseUrl}/v2.0/{Properties.Settings.Default.EnvironmentName}/api/microsoft/automation/v2.0/companies({Properties.Settings.Default.CompanyId})/configurationPackages";
            JObject insertJson = new JObject();
            insertJson.Add("code", code);
            ProtectedApiCallHelper.ApiCallDisplayOnly(apiUrl, Method.POST, "application/json",
insertJson, null, GetAccessToken(), m_Verbose);
        }
        catch (Exception ex)
        {
            Console.ForegroundColor = ConsoleColor.Red;
            Console.WriteLine(ex.Message);
            Console.ResetColor();
        }

        Console.WriteLine();
        Console.WriteLine(m_PressAnyKey);
        Console.WriteLine();
        var keyInfo = Console.ReadKey(true);
        var key = keyInfo.Key;
        if (key.ToString().ToLower() == "escape")
            Environment.Exit(0);
    }

    static void UploadConfigPackage(string code, string filePath)
    {
        try
        {
            if (CheckConfigStatus(code))
            {
                var configPackageId = GetConfigPackageId(code);
                var etag = "*"; //GetFileEtag(ProtectedApiCallHelper.ApiCallReturnJson(etagApiUrl,
Method.GET, "application/json", null, null, GetAccessToken(), m_Verbose).ToString());
            }
        }
    }

```

```

        //alternate etag logic
        //var etagApiUrl =
        $"{Properties.Settings.Default.ApiBaseUrl}/v2.0/{Properties.Settings.Default.EnvironmentName}/api/microsof
t/automation/v2.0/companies({Properties.Settings.Default.CompanyId})/configurationPackages({configPackageI
d})?expand=file";
        //var etag = GetFileEtag(ProtectedApiCallHelper.ApiCallReturnJson(etagApiUrl,
Method.GET, "application/json", null, null, GetAccessToken(), m_Verbose).ToString());

        //FileStream fsSource = new FileStream(filePath, FileMode.Open, FileAccess.Read);
        // Read the source file into a byte array.
        byte[] bytes = File.ReadAllBytes(filePath);

        var apiUrl =
        $"{Properties.Settings.Default.ApiBaseUrl}/v2.0/{Properties.Settings.Default.EnvironmentName}/api/microsof
t/automation/v2.0/companies({Properties.Settings.Default.CompanyId})/configurationPackages({configPackageI
d})/file('{code}')/content";

        ProtectedApiCallHelper.ApiCallDisplayOnly(apiUrl, Method.PATCH, "application/octet-
stream", bytes, etag, GetAccessToken(), true);
    }
    else
    {
        Console.WriteLine("Previous Import or Apply still processing.");
    }
}
catch (Exception ex)
{
    Console.ForegroundColor = ConsoleColor.Red;
    Console.WriteLine(ex.Message);
    Console.ResetColor();
}
Console.WriteLine();
Console.WriteLine(m_PressAnyKey);
Console.WriteLine();
var keyInfo = Console.ReadKey(true);
var key = keyInfo.Key;
if (key.ToString().ToLower() == "escape")
    Environment.Exit(0);
}

private static bool CheckConfigStatus(string code)
{
    var configPackageId = GetConfigPackageId(code);
    string apiUrl =
    $"{Properties.Settings.Default.ApiBaseUrl}/v2.0/{Properties.Settings.Default.EnvironmentName}/api/microsof
t/automation/v2.0/companies({Properties.Settings.Default.CompanyId})/configurationPackages({configPackageI
d})";
    var result = ProtectedApiCallHelper.ApiCallReturnJson(apiUrl, Method.GET, "application/json",
null, null, GetAccessToken(), m_Verbose);

    var importStatus = GetConfigImportStatus(result);
    if (m_Verbose)
    {
        Console.ForegroundColor = ConsoleColor.DarkYellow;
        Console.WriteLine($"Import Status: {importStatus}");
        Console.ResetColor();
    }
    if (importStatus != "Completed" & importStatus != "No")
    {
        return false;
    }

    var applyStatus = GetConfigApplyStatus(result);
    if (m_Verbose)
    {
        Console.ForegroundColor = ConsoleColor.DarkYellow;
        Console.WriteLine($"Apply Status: {applyStatus}");
        Console.ResetColor();
    }
}

```

```

        if (applyStatus != "Completed" & applyStatus != "No")
        {
            return false;
        }
        return true;
    }
    private static void ImportConfigPackage(string code)
    {
        try
        {
            if (CheckConfigStatus(code))
            {
                var configPackageId = GetConfigPackageId(code);
                var apiUrl =
                    $"{Properties.Settings.Default.ApiBaseUrl}/v2.0/{Properties.Settings.Default.EnvironmentName}/api/microsof
                    t/automation/v2.0/companies({Properties.Settings.Default.CompanyId})/configurationPackages({configPackageI
                    d})/Microsoft.NAV.import";
                ProtectedApiCallHelper.ApiCallDisplayOnly(apiUrl, Method.POST, null, null, null,
                GetAccessToken(), true);
            }
            else
            {
                Console.WriteLine("Previous Import or Apply still processing.");
            }
        }
        catch (Exception ex)
        {
            Console.ForegroundColor = ConsoleColor.Red;
            Console.WriteLine(ex.Message);
            Console.ResetColor();
        }

        Console.WriteLine();
        Console.WriteLine(m_PressAnyKey);
        Console.WriteLine();
        var keyInfo = Console.ReadKey(true);
        var key = keyInfo.Key;
        if (key.ToString().ToLower() == "escape")
            Environment.Exit(0);
    }
    private static void ApplyConfigPackage(string code)
    {
        try
        {
            if (CheckConfigStatus(code))
            {
                var configPackageId = GetConfigPackageId(code);
                var apiUrl =
                    $"{Properties.Settings.Default.ApiBaseUrl}/v2.0/{Properties.Settings.Default.EnvironmentName}/api/microsof
                    t/automation/v2.0/companies({Properties.Settings.Default.CompanyId})/configurationPackages({configPackageI
                    d})/Microsoft.NAV.apply";
                ProtectedApiCallHelper.ApiCallDisplayOnly(apiUrl, Method.POST, null, null, null,
                GetAccessToken(), true);
            }
            else
            {
                Console.WriteLine("Previous Import or Apply still processing.");
            }
        }
        catch (Exception ex)
        {
            Console.ForegroundColor = ConsoleColor.Red;
            Console.WriteLine(ex.Message);
            Console.ResetColor();
        }

        Console.WriteLine();
        Console.WriteLine(m_PressAnyKey);
        Console.WriteLine();
    }

```

```

        var keyInfo = Console.ReadKey(true);
        var key = keyInfo.Key;
        if (key.ToString().ToLower() == "escape")
            Environment.Exit(0);
    }

    private static void DeleteConfigPackage(string code)
    {
        var configPackageId = GetConfigPackageId(code);
        if (!string.IsNullOrEmpty(configPackageId))
        {
            var apiUrl =
                $"{Properties.Settings.Default.ApiBaseUrl}/v2.0/{Properties.Settings.Default.EnvironmentName}/api/microsoft/automation/v2.0/companies({Properties.Settings.Default.CompanyId})/configurationPackages({configPackageId})";
            try
            {
                ProtectedApiCallHelper.ApiCallDisplayOnly(apiUrl, Method.DELETE, null, null, null,
                    GetAccessToken(), m_Verbose);
            }
            catch (Exception e)
            {
                Console.WriteLine(e.Message);
            }
        }
    }

    private static string GetCustomerId(string name)
    {
        var apiUrl =
            $"{Properties.Settings.Default.ApiBaseUrl}/v2.0/{Properties.Settings.Default.EnvironmentName}/api/v2.0/companies({Properties.Settings.Default.CompanyId})/customers?${filter=displayName eq '{name}';";
        var result = ProtectedApiCallHelper.ApiCallReturnJson(apiUrl, Method.GET, "application/json",
            null, null, GetAccessToken(), m_Verbose);

        if (!result.ContainsKey("value"))
            return string.Empty;

        var value = result.SelectToken("value").Value<JArray>();
        if (value.Count == 0)
            return string.Empty;

        var configJson = (JObject)value[0];

        if (!configJson.ContainsKey("id"))
            return string.Empty;

        var id = configJson.SelectToken("id").Value<string>();
        if (string.IsNullOrEmpty(id))
            return string.Empty;

        return id;
    }

    private static void ModifyCustomer(string name)
    {
        var customerId = GetCustomerId(name);
        var apiUrl =
            $"{Properties.Settings.Default.ApiBaseUrl}/v2.0/{Properties.Settings.Default.EnvironmentName}/api/v2.0/companies({Properties.Settings.Default.CompanyId})/customers({customerId})";
        var etag = "*";

        JObject patchJson = new JObject();
        patchJson.Add("addressLine1", "New Address 1234");
        try
        {
            ProtectedApiCallHelper.ApiCallDisplayOnly(apiUrl, Method.PATCH, "application/json",
                patchJson, etag, GetAccessToken(), true);
        }
    }

```



```

        catch (Exception e)
        {
            Console.ForegroundColor = ConsoleColor.Red;
            Console.WriteLine(e.Message);
            Console.ResetColor();
        }

        Console.WriteLine();
        Console.WriteLine(m_PressAnyKey);
        Console.WriteLine();
        var keyInfo = Console.ReadKey(true);
        var key = keyInfo.Key;
        if (key.ToString().ToLower() == "escape")
            Environment.Exit(0);
    }
}

```

ProtectedAPICallHelper.cs:

```

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  OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE
  SOFTWARE.
*/

using Newtonsoft.Json;
using Newtonsoft.Json.Linq;
using RestSharp;
using System;
using System.Linq;
using System.Net.Http;
using System.Net.Http.Headers;
using System.Threading.Tasks;

namespace BusinessCentralAPI
{
    /// <summary>
    /// Helper class to call a protected API and process its result
    /// </summary>
    ///
    public class ProtectedApiCallHelper
    {
        public string ResponseContent { get; set; }
        public JObject ResponseJson { get; set; }
        /// <summary>

```

```

/// Constructor
/// </summary>
/// <param name="httpClient">HttpClient used to call the protected API</param>
public ProtectedApiCallHelper()
{
}

public async Task CallWebApiAndProcessResultASync(string webApiUrl, Method method, string
bodyContentType, Object body, string etag, string accessToken, bool writeJsonToConsole, Action<JObject>
processResult)
{
    if (!string.IsNullOrEmpty(accessToken))
    {
        var client = new RestClient(webApiUrl);
        client.Timeout = -1;

        var request = new RestRequest(method);
        request.AddHeader("Authorization", "Bearer " + accessToken);
        if (method == Method.PATCH & !string.IsNullOrEmpty(etag))
        {
            request.AddHeader("If-Match", etag);
        }
        if (!string.IsNullOrEmpty(bodyContentType))
        {
            request.AddHeader("Content-Type", bodyContentType);
            if (body != null)
            {
                request.AddParameter(bodyContentType, body, ParameterType.RequestBody);
            }
        }

        System.Threading.CancellationToken cancellationToken =
default(System.Threading.CancellationToken);
        IRestResponse response = await client.ExecuteAsync(request, method, cancellationToken);

        ResponseContent = response.Content;
        ResponseJson = JsonConvert.DeserializeObject(ResponseContent) as JObject;

        if (response.IsSuccessful)
        {
            if (writeJsonToConsole)
            {
                Console.WriteLine();
                Console.WriteLine($"{method.ToString()}: {webApiUrl}");
                if (bodyContentType != null & body != null & writeJsonToConsole)
                {
                    if (bodyContentType.ToLower() == "application/json")
                    {
                        if (body.GetType() == typeof(JObject))
                        {
                            var json = (JObject)body;
                            Display(json);
                            Console.ResetColor();
                        }
                    }
                }
                Console.ForegroundColor = ConsoleColor.Green;
                Console.WriteLine("Successful");
                if (!string.IsNullOrEmpty(ResponseContent))
                {
                    Console.WriteLine();
                    processResult(ResponseJson);
                    Console.WriteLine();
                }
            }
        }
        else
        {
            Console.WriteLine();

```

```

        Console.WriteLine($"{method.ToString(): {webApiUrl}");
        if (bodyContentType != null)
        {
            if (bodyContentType.ToLower() == "application/json" & writeJsonToConsole)
            {
                Display((JObject)body);
                Console.ResetColor();
            }
        }
        Console.ForegroundColor = ConsoleColor.Red;
        Console.WriteLine($"Failed to call the Web Api: {response.StatusCode}");
        // Note that if you got reponse.Code == 403 and reponse.content.code ==
"Authorization_RequestDenied"
        // this is because the tenant admin as not granted consent for the application to call
the Web API
        Console.WriteLine($"Content: {ResponseContent}");
        Console.WriteLine();
    }
    Console.ResetColor();
}
}

public static async Task ApiCallAsync(string ApiUrl, Method method, string bodyContentType, Object
body, string etag, string accessToken, bool writeJsonToConsole, ProtectedApiCallHelper apiCaller)
{
    if (!string.IsNullOrEmpty(accessToken))
    {
        await apiCaller.CallWebApiAndProcessResultAsync(ApiUrl, method, bodyContentType, body,
etag, accessToken, writeJsonToConsole, Display);
    }
}

public static void ApiCallDisplayOnly(string ApiUrl, Method method, string bodyContentType, Object
body, string etag, string accessToken, bool writeJsonToConsole)
{
    if (!string.IsNullOrEmpty(accessToken))
    {
        var apiCaller = new ProtectedApiCallHelper();
        ProtectedApiCallHelper.ApiCallAsync(ApiUrl, method, bodyContentType, body, etag,
accessToken, writeJsonToConsole, apiCaller).GetAwaiter().GetResult();
    }
}

public static JObject ApiCallReturnJson(string ApiUrl, Method method, string bodyContentType,
Object body, string etag, string accessToken, bool writeJsonToConsole)
{
    if (!string.IsNullOrEmpty(accessToken))
    {
        var apiCaller = new ProtectedApiCallHelper();
        ProtectedApiCallHelper.ApiCallAsync(ApiUrl, method, bodyContentType, body, etag,
accessToken, writeJsonToConsole, apiCaller).GetAwaiter().GetResult();
        return apiCaller.ResponseJson;
    }
    return new JObject();
}

public static string ApiCallReturnString(string ApiUrl, Method method, string bodyContentType,
Object body, string etag, string accessToken, bool writeJsonToConsole)
{
    if (!string.IsNullOrEmpty(accessToken))
    {
        var apiCaller = new ProtectedApiCallHelper();
        ProtectedApiCallHelper.ApiCallAsync(ApiUrl, method, bodyContentType, body, etag,
accessToken, writeJsonToConsole, apiCaller).GetAwaiter().GetResult();
        return apiCaller.ResponseContent;
    }
    return string.Empty;
}
}

```

```
public static void Display(JObject result)
{
    Console.ForegroundColor = ConsoleColor.Blue;
    if (result == null)
        return;
    foreach (JProperty child in result.Properties().Where(p => !p.Name.StartsWith("@")))
    {
        Console.WriteLine($"{child.Name} = {child.Value}");
    }
}
}
```