# Azure API Management Policy Documentation

## cXML PunchOut API - Logic App Integration

### Document Information

* **Document Version**: 1.0
* **Created Date**: August 29, 2025
* **Service Name**: cXML PunchOut API
* **Backend System**: Azure Logic App
* **Policy Type**: Azure API Management Complete Policy
* **Protocol**: cXML 1.2.014

## Executive Summary

This document provides comprehensive documentation for an Azure API Management policy that handles cXML PunchOut requests. The policy implements strict content validation, size limits, comprehensive error handling, and integrates with Azure Logic Apps for backend processing. It ensures full cXML 1.2.014 compliance and provides robust logging through Application Insights.

## Service Overview

### Purpose

The cXML PunchOut API serves as a gateway for e-procurement PunchOut catalog requests, providing: - cXML content type validation - Request size management (4MB limit) - Standardized cXML error responses - Comprehensive logging and tracing - Logic App backend integration

### Architecture Components

* **Frontend**: Azure API Management Gateway
* **Backend**: Azure Logic App ({{LA-PUNCHOUT-URL-DEV}})
* **Protocol**: HTTP POST with cXML payload
* **Response Format**: cXML 1.2.014
* **Monitoring**: Application Insights integration

## Policy Structure Analysis

### 1. Inbound Processing Section

#### 1.1 Base Policy Inheritance

<base />

**Functionality:** - Inherits policies from parent scope - Ensures consistent behavior across API operations

#### 1.2 Content-Type Validation

<choose>  
 <when condition="@{  
 var contentType = context.Request.Headers.GetValueOrDefault("Content-Type", "");  
 return !contentType.Contains("application/xml") && !contentType.Contains("text/xml");  
 }">

**Accepted Content Types:** - application/xml - text/xml - Any content type containing these values

**Validation Logic:** - Checks Content-Type header presence - Validates against supported XML media types - Returns HTTP 415 if validation fails

**Error Response (415):**

<?xml version="1.0" encoding="UTF-8"?>  
<cXML version="1.2.014" timestamp="{utc-timestamp}">  
 <Response>  
 <Status code="415" text="Unsupported Media Type">  
 Only application/xml or text/xml content types are supported for cXML requests  
 </Status>  
 </Response>  
</cXML>

#### 1.3 Request Body Size Validation

<validate-content   
 unspecified-content-type-action="prevent"   
 max-size="4194304"   
 size-exceeded-action="prevent"   
 errors-variable-name="requestValidationErrors" />

**Configuration Details:** - **Maximum Size**: 4MB (4,194,304 bytes) - **Action on Exceed**: Prevent request processing - **Unspecified Content-Type**: Block request - **Error Storage**: requestValidationErrors variable

#### 1.4 Backend Service Configuration

<set-backend-service base-url="{{LA-PUNCHOUT-URL-DEV}}" />

**Configuration:** - **Base URL**: Environment-specific Logic App URL - **Variable**: {{LA-PUNCHOUT-URL-DEV}} (configurable) - **Protocol**: HTTPS (recommended)

#### 1.5 Correlation ID Generation

<set-variable name="correlationId" value="@(Guid.NewGuid().ToString())" />  
<set-header name="X-Correlation-ID" exists-action="override">  
 <value>@((string)context.Variables["correlationId"])</value>  
</set-header>

**Features:** - Generates unique GUID for each request - Adds correlation header for downstream services - Enables end-to-end request tracking - Overwrites existing correlation IDs

#### 1.6 Application Insights Logging

<trace source="cxml-punchout-api" severity="information">

**Logged Information:** - Correlation ID - HTTP Method - Content-Type header - Request timestamp

### 2. Backend Processing Section

#### 2.1 Request Forwarding

<backend>  
 <forward-request timeout="60" />  
</backend>

**Configuration:** - **Timeout**: 60 seconds - **Method**: Preserves original HTTP method - **Headers**: Forwards all headers including correlation ID - **Body**: Forwards complete cXML payload

### 3. Outbound Processing Section

#### 3.1 Success Logging

<trace source="cxml-punchout-api" severity="information">

**Logged Information:** - Correlation ID - Response status code - Success indicator - Processing completion timestamp

#### 3.2 Response Pass-Through

<base />

**Behavior:** - Returns Logic App response unchanged - Maintains original response headers - Preserves cXML response structure

### 4. Error Handling Section (on-error)

#### 4.1 Request Entity Too Large (413)

<when condition="@(context.LastError.Source == "validate-content")">

**Trigger Conditions:** - Request body exceeds 4MB limit - Content validation failures

**Response Format:**

<Status code="413" text="Request Entity Too Large">  
 Request body exceeds maximum allowed size of 4MB for cXML documents  
</Status>

#### 4.2 Bad Gateway (502)

<when condition="@(context.LastError.Source == "forward-request" &&   
 (context.LastError.Reason.Contains("connection") ||   
 context.LastError.Reason.Contains("refused")))">

**Trigger Conditions:** - Connection refused by Logic App - Network connectivity issues - DNS resolution failures - Service unavailability

**Response Format:**

<Status code="502" text="Bad Gateway">  
 Unable to connect to backend service. Please try again later.  
</Status>

#### 4.3 Gateway Timeout (504)

<when condition="@(context.LastError.Source == "forward-request" &&   
 context.LastError.Reason.Contains("timeout"))">

**Trigger Conditions:** - Logic App response time > 60 seconds - Network timeout issues - Backend processing delays

**Response Format:**

<Status code="504" text="Gateway Timeout">  
 Backend service did not respond within the expected time. Please try again later.  
</Status>

#### 4.4 Internal Server Error (500)

<otherwise>

**Trigger Conditions:** - Policy execution errors - Unexpected system failures - Configuration issues - Unknown error scenarios

**Response Format:**

<Status code="500" text="Internal Server Error">  
 An unexpected error occurred while processing the request  
</Status>

#### 4.5 Error Logging

<trace source="cxml-punchout-api" severity="error">

**Logged Error Details:** - Correlation ID (with fallback to “unknown”) - Error source component - Error reason description - Detailed error message

## Request/Response Flow

### Successful PunchOut Request Flow

1. **Client Request** → APIM Gateway
2. **Content-Type Validation** → Verify XML content type
3. **Size Validation** → Check 4MB limit
4. **Correlation ID** → Generate unique tracking ID
5. **Request Logging** → Log to Application Insights
6. **Backend Forward** → Send to Logic App
7. **Logic App Processing** → Handle cXML business logic
8. **Success Response** → Return cXML response
9. **Success Logging** → Log completion details

### Error Request Flow

1. **Client Request** → APIM Gateway
2. **Validation Failure** → Return appropriate cXML error
3. **Backend Error** → Transform to cXML format
4. **Error Logging** → Log detailed error information
5. **Error Response** → Return standardized cXML error

## Configuration Requirements

### Environment Variables

* {{LA-PUNCHOUT-URL-DEV}}: Logic App endpoint URL

### Required Headers

* Content-Type: Must contain application/xml or text/xml
* X-Correlation-ID: Auto-generated if not present

### Content Specifications

* **Format**: Valid XML document
* **Maximum Size**: 4MB (4,194,304 bytes)
* **Encoding**: UTF-8 recommended
* **Schema**: cXML 1.2.014 compliant

## Error Codes and Responses

| HTTP Code | Trigger | cXML Status | Description | Retry Recommended |
| --- | --- | --- | --- | --- |
| 413 | Content Size | Request Entity Too Large | Body exceeds 4MB limit | No |
| 415 | Content-Type | Unsupported Media Type | Invalid content type | No |
| 500 | System Error | Internal Server Error | Unexpected system failure | Yes |
| 502 | Connectivity | Bad Gateway | Cannot connect to Logic App | Yes |
| 504 | Timeout | Gateway Timeout | Logic App timeout (>60s) | Yes |

## Monitoring and Observability

### Application Insights Integration

#### Request Logging

Source: cxml-punchout-api  
Severity: Information  
Content: PunchOut Setup Request - CorrelationId, Method, ContentType

#### Response Logging

Source: cxml-punchout-api  
Severity: Information  
Content: PunchOut Setup Response - CorrelationId, StatusCode, Success

#### Error Logging

Source: cxml-punchout-api  
Severity: Error  
Content: PunchOut Setup Error - CorrelationId, ErrorSource, ErrorReason, ErrorMessage

### Key Performance Indicators (KPIs)

#### Request Metrics

* **Total Requests**: Volume of cXML PunchOut requests
* **Success Rate**: Percentage of successful responses
* **Average Response Time**: End-to-end processing time
* **Error Rate by Type**: Breakdown of error categories

#### Error Metrics

* **413 Errors**: Large payload frequency
* **415 Errors**: Content-type validation failures
* **502 Errors**: Backend connectivity issues
* **504 Errors**: Timeout occurrences

#### Performance Metrics

* **Logic App Response Time**: Backend processing duration
* **APIM Processing Time**: Gateway overhead
* **Request Size Distribution**: Payload size analysis

## Troubleshooting Guide

### High 413 Error Rates

**Root Cause**: Clients sending oversized cXML documents **Solutions:** - Advise clients on 4MB size limit - Implement payload compression - Consider chunked processing for large catalogs

### High 415 Error Rates

**Root Cause**: Incorrect Content-Type headers **Solutions:** - Validate client integration setup - Ensure proper XML content-type configuration - Provide integration guidelines to clients

### High 502 Error Rates

**Root Cause**: Logic App connectivity issues **Solutions:** - Check Logic App health and availability - Verify network connectivity - Review Logic App resource allocation - Validate environment variable configuration

### High 504 Error Rates

**Root Cause**: Logic App processing delays **Solutions:** - Optimize Logic App workflow performance - Consider increasing timeout limits - Implement asynchronous processing patterns - Review Logic App resource scaling

### Correlation ID Tracking

**Usage:** - Search Application Insights logs using correlation ID - Trace request flow across APIM and Logic App - Debug specific request failures - Performance analysis for individual requests

## Security Considerations

### Input Validation

* **Content-Type Enforcement**: Prevents non-XML payloads
* **Size Limits**: Prevents DoS through large payloads
* **XML Structure**: Logic App should validate cXML schema

### Information Disclosure

* **Generic Error Messages**: No internal system details exposed
* **Secure Logging**: Sensitive data excluded from traces
* **Correlation IDs**: Enable debugging without exposing data

### Backend Security

* **HTTPS Enforcement**: Secure communication to Logic App
* **Authentication**: Logic App-level authentication recommended
* **Network Security**: VNet integration for private connectivity

## Best Practices Implementation

### 1. cXML Compliance

* Full cXML 1.2.014 standard implementation
* Proper timestamp formatting (ISO 8601)
* Consistent status code mapping
* Standard error response structure

### 2. Observability

* Comprehensive request/response logging
* Error correlation and tracking
* Performance monitoring integration
* Structured logging for analysis

### 3. Reliability

* Graceful error handling for all scenarios
* Appropriate timeout configurations
* Retry-friendly error responses
* Service health monitoring

### 4. Performance

* Efficient content validation
* Minimal processing overhead
* Optimized Logic App integration
* Size-based request filtering

## Deployment and Environment Management

### Environment-Specific Configuration

<!-- Development -->  
{{LA-PUNCHOUT-URL-DEV}}  
  
<!-- Staging -->  
{{LA-PUNCHOUT-URL-STAGE}}  
  
<!-- Production -->  
{{LA-PUNCHOUT-URL-PROD}}

### Deployment Checklist

* ☐ Environment variables configured
* ☐ Logic App endpoints verified
* ☐ Application Insights workspace connected
* ☐ Error response testing completed
* ☐ Performance baseline established

## Logic App Integration Requirements

### Expected Logic App Interface

#### Input Requirements

* **Method**: POST
* **Content-Type**: application/xml or text/xml
* **Headers**: X-Correlation-ID for tracing
* **Body**: Valid cXML 1.2.014 document

#### Output Requirements

* **Content-Type**: application/xml
* **Body**: cXML compliant response
* **Status Codes**: Standard HTTP status codes
* **Timeout**: Response within 60 seconds

### Logic App Implementation Guidelines

* Implement cXML schema validation
* Handle PunchOut setup and catalog requests
* Return appropriate cXML responses
* Support correlation ID pass-through
* Implement proper error handling

## Maintenance and Operations

### Regular Maintenance Tasks

* Monitor error rates and response times
* Review Application Insights logs weekly
* Validate Logic App health status
* Update timeout configurations as needed
* Test error scenarios monthly

### Capacity Planning

* Monitor request volume trends
* Analyze payload size distribution
* Plan for seasonal traffic variations
* Scale Logic App resources appropriately

### Policy Updates

* Version control all policy changes
* Test in development environment
* Gradual rollout to production
* Maintain backward compatibility
* Document all configuration changes

## Conclusion

This Azure API Management policy provides a comprehensive, production-ready solution for cXML PunchOut API operations. The implementation ensures robust content validation, comprehensive error handling, and seamless Logic App integration while maintaining full cXML 1.2.014 compliance.

The policy’s extensive logging, monitoring capabilities, and standardized error responses make it suitable for enterprise e-procurement integrations requiring high reliability, security, and observability. The modular design allows for easy maintenance and future enhancements while preserving system stability and performance.