# California ISO

## Congestion Revenue Rights (CRR) Upgrade Project

### Customer Partnership Group

**July 25th, 2024**

10:00 a.m.—11:00 a.m. (Pacific Time)

<table>
<thead>
<tr>
<th>Web Conference Information</th>
<th>Conference Call Information</th>
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<tbody>
<tr>
<td>Web Address: <a href="https://caiso.webex.com/caiso/j.php?MTID=m4c62047c8ca3c36c50e2d1182518f8f9">https://caiso.webex.com/caiso/j.php?MTID=m4c62047c8ca3c36c50e2d1182518f8f9</a></td>
<td>1-844-621-3956 United States Toll Free</td>
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<tr>
<td>Audio connection instructions will be available after connecting to the web conference. When prompted, select &quot;Call me&quot; and enter the phone number you will use during the call. You will be called by the conference shortly.</td>
<td>+1-650-479-3208 United States Toll</td>
</tr>
<tr>
<td>Calls and webinars are recorded for stakeholder convenience, allowing those who are unable to attend to listen to the recordings after the meetings. The recordings will be publicly available on the ISO web page for a limited time following the meetings. The recordings, and any related transcriptions, should not be reprinted without the ISO’s permission.</td>
<td>Access code: 248 7236 5119 password: CRRCPG</td>
</tr>
</tbody>
</table>

**Audio connection instructions will be available after connecting to the web conference. When prompted, select "Call me" and enter the phone number you will use during the call. You will be called by the conference shortly.**

**Access code: 248 7236 5119 password: CRRCPG**

Instructions for raising your hand to ask a question

• If you are connected to audio through your computer or used the “call me” option, select the raise hand icon located on the top right above the chat window. Note: #2 only works if you dialed into the meeting.
  – Please remember to state your name and affiliation before making your comment.
  – You may also send your questions via chat to Yelena Kopylov-Alford or to all panelists.
<table>
<thead>
<tr>
<th>Time (PST)</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>10:00 – 10:05</td>
<td>Welcome</td>
</tr>
<tr>
<td>10:05 – 10:15</td>
<td>CRR Upgrade Project timeline Update</td>
</tr>
<tr>
<td>10:15 – 10:35</td>
<td>B2B Spec Updates</td>
</tr>
<tr>
<td>10:35 – 10:45</td>
<td>Market Sim plan</td>
</tr>
<tr>
<td>10:45 – 11:00</td>
<td>Questions and Next steps</td>
</tr>
</tbody>
</table>
CRR System Upgrade – Project Update & Timeline

Updated July 2024

- Functional Site Acceptance Testing, B2B integration and security testing continues
- Connectivity Testing – 1 week after above testing, starting in late October, just before Market SIM
- Training – 1 week before Market SIM in late October
- Market SIM - 2 week structured, then 3 week unstructured starting in early November
- 2025 Annual Cycle, carried out in 2024, will occur on the current Production CRR application
- Cutover to new CRR application - 2025 March Monthly Allocation and Auction Market, carried out in February 2025
B2B Spec Updates

- YAML file name/version updated
  - Version Numbering Format: `MAJOR.MINOR.MINI` – `caiso_crr_auction_v1.0.0.yaml`

- Multiple versions of YAML/HTML/JSON Schemas are now available on Developer Site

- Mock services updated

- Documentation: fixed typos or edited description/summary for different elements

- Made **summary** a very high level preview of what the endpoint achieves and the **description** explains it a bit further

- Other spec edits
B2B Spec Updates - Details

- **operationId** changed for some endpoints
  - CRR Load Migration: getLoadMigrationTransfers to getLoadMigrationCRRs
  - CRR Market Status: getMarketStatus to getMarketInfo
- Changed delete portfolio endpoint/path (URI) implementation
  - CRR Auction: removed path params ({marketName}/{portfolioName}) and replaced with headers
- Added a **required** element
  - CRR Load Migration: schemas: > PostDASRsummaryset: > effectiveDate
- Added new enum value
  - CRR Market Data: components: > parameters: > PublicMarketDownloadType: > **SET_ASIDE**
- Standardized error class
  - CRR Messages: ApiException to CRRServiceException
- Renamed response schema object
  - CRR Nomination: PortfolioStatus to Portfolio
- Adjusted RegEx for some string elements or added new regex
  - CRR Nomination: NewNomination:/NewPortfolio:/Nomination:/PortfolioStatus: > pattern
  - CRR Nomination: + portfolioIdentifier: > portfolioName:/marketName: > pattern
JSON Schema Updates

- JSON file/version updated
- Documentation: fixed typos in different elements description
- Added `PublicMarket/CRRSetAside_v1.draft-07.schema.json`
- Some elements changed from required to optional
  - `CRRInterface_v1.draft-07.schema.json`: OperatingPositiveLimit and OperatingNegativeLimit
  - `CRRLineAndTransformer_v1.draft-07.schema.json`: OperatingEmergencyRating & OperatingNormalRating
  - `CRRSEQResult_v1.draft-07.schema.json`: TotalSEQ
- Fixed typos
  - Multiple JSON schemas: maxlenth to maxLength
- Added new enum value
  - `CRRSourceSink_v1.draft-07.schema.json`: added `CONTRACT` to NodeType enum
- JSON Schema Refactored
  - `CRROutage_v1.draft.-07.schema.json`: multiple changes
Market Sim plan

Calendar layout of proposed CRR monthly and Annual Market Sim plan
## Market Sim 2024

<table>
<thead>
<tr>
<th>MONDAY</th>
<th>TUESDAY</th>
<th>WEDNESDAY</th>
<th>THURSDAY</th>
<th>FRIDAY</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>week 1</strong></td>
<td><strong>week 2</strong></td>
<td><strong>Allocation Monthly Participants</strong></td>
<td><strong>Auction Monthly Participants</strong></td>
<td><strong>Miscellaneous Monthly process</strong></td>
</tr>
<tr>
<td>T-2w - Connectivity Prior to Market Sim - Kickoff and Overview</td>
<td>Reserved for CRR team data processing and participant responses</td>
<td>• Submit Nominations for Tier 1 Monthly Market (dummy MEQ)</td>
<td>• Submit Auction Portfolios Monthly Auction Market</td>
<td>• Submit Auction Portfolios for Participant requested scenarios</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Windows Close on Wednesday</td>
<td>○ Buy Bids, Sell Offers</td>
<td>○ View results from Week 1 submissions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Submit Historical/Forecast Load</td>
<td>○ Credit - provide $10mil to all MPs for testing</td>
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<tr>
<td></td>
<td></td>
<td>• Download Nomination Cap data</td>
<td>• Re-submit for any processes or scenarios which had issues previously</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>• Download Allocation Market Results</td>
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<td>Market Sim Webex</td>
<td>Market Sim Webex</td>
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<tr>
<td><strong>Miscellaneous Monthly process</strong></td>
<td>Reserved for Q&amp;A sessions, issue reporting, etc.</td>
<td><strong>Environment Patching</strong></td>
<td><strong>Environment Patching</strong></td>
<td><strong>Environment Patching</strong></td>
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**Environment Patching**

Reserved for Q&A sessions, issue reporting, etc.

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Reserved for Q&A sessions, issue reporting, etc.
<table>
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<tr>
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<th>THURSDAY</th>
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<tbody>
<tr>
<td><strong>week 3</strong></td>
<td><strong>Unstructured Week 1</strong></td>
<td><strong>Unstructured</strong></td>
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<td><strong>Unstructured</strong></td>
<td><strong>Reserved for CRR team data processing and participant responses</strong></td>
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<td><strong>Environment Patching</strong></td>
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<td>Market Sim Webex</td>
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<tr>
<td><strong>week 4</strong></td>
<td><strong>Unstructured Week 2</strong></td>
<td><strong>Unstructured</strong></td>
<td><strong>Unstructured</strong></td>
<td><strong>Unstructured</strong></td>
<td><strong>Reserved for CRR team data processing and participant responses</strong></td>
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<td><strong>week 5</strong></td>
<td><strong>Unstructured Cont.</strong></td>
<td><strong>Unstructured Cont.</strong></td>
<td><strong>Unstructured Cont.</strong></td>
<td><strong>Unstructured Cont.</strong></td>
<td><strong>Reserved for CRR team data processing and participant responses</strong></td>
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<td><strong>Environment Patching</strong></td>
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<td>WEDNESDAY</td>
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<td><strong>week 6</strong></td>
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<tr>
<td>Resolve any defects found during market Sim / UAT</td>
<td>L&amp;P Testing</td>
<td>L&amp;P Testing</td>
<td>L&amp;P Testing</td>
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<td>Move to stage L&amp;P testing BU complete UAT</td>
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<td>BU UAT</td>
<td>BU UAT</td>
<td>L&amp;P Testing</td>
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<td>BU UAT</td>
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<td>BU UAT</td>
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<td>Buffer week</td>
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<td>Buffer week</td>
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<td>Buffer week</td>
<td>Buffer week</td>
<td>Buffer week</td>
<td>Buffer week</td>
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<td><strong>week 9</strong></td>
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<tr>
<td>Deploy to Production Initiate Data Migration plan from RI</td>
<td>19</td>
<td>20</td>
<td>21</td>
<td>22</td>
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<tr>
<td></td>
<td>Initiate Data Migration plan</td>
<td>Initiate Data Migration plan</td>
<td>Initiate Data Migration plan</td>
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<td><strong>week 10</strong></td>
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<td>[Add monthly cutover Plan]</td>
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<td>Market Sim /UAT</td>
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<td>Production</td>
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QUESTIONS?
Next Steps

• Next meeting is Thursday August 22\textsuperscript{nd}, 2024
• Discuss following topics
• Visit CPG webpage for more information: https://www.caiso.com/meetings-events/topics/congestion-revenue-rights-crr-settlement-upgrade-project-customer-partnership-group
REGISTRATION IS OPEN

2024 STAKEHOLDER SYMPOSIUM

Welcome reception - Oct. 29
at Kimpton Sawyer Hotel, Sacramento, CA

Symposium program - Oct. 30
SAFE Credit Union Convention Center
Sacramento, CA

Visit the event website: www.reg.eventmobi.com/2024stakeholdersymposium

SPONSORSHIP OPPORTUNITIES AVAILABLE
The objective of this educational forum is to provide stakeholders with an opportunity to learn more about the ISO’s interconnection process and recent changes affecting Cluster 15. If you plan to attend the meeting in person, please register by end of day Sept. 13, 2024.

The forum will include a series of presentations and discussions that outline the interconnection requirements for a new resource to be able to connect to the ISO grid. Presentations will cover a range of topics from submitting an interconnection request application to declaration of commercial operation. Transmission projects will not be addressed at this fair.

The following stakeholders are encouraged to participate:
• Individuals who have submitted an interconnection request application for Cluster 15
• New and existing interconnection customers
• Regulatory agencies
• Consultants
• Trade associations
• Participating Transmission Owners

Stakeholders are invited to submit questions in advance to be addressed during the meeting. Please send questions to isostakeholderaffairs@caiso.com. Stakeholders will also have an opportunity to ask questions after each topic is presented during the event.

The final agenda and presentations will be posted prior on the meetings webpage.
Energy Matters blog provides timely insights into ISO grid and market operations as well as other industry-related news.

https://www.caiso.com/about/news/energy-matters-blog
The California ISO has launched the Policy Initiatives Timeline to offer stakeholders a concise overview of ongoing policy initiatives. At a glance, it offers a snapshot view of key details such as the status of each initiative, projected timelines, and the current phase of the stakeholder engagement process. Updates to this timeline will be made weekly and posted on the policy initiatives landing page. For more information, stakeholders are encouraged to reach out to ISOStakeholderAffairs@caiso.com.
REFERENCE SLIDES
## CRR Service Endpoint Details

<table>
<thead>
<tr>
<th>#</th>
<th>Service</th>
<th>GET</th>
<th>POST</th>
<th>Likelihood that file submission may be greater than &gt; 1 MB filesize</th>
<th>CRR System (UI / API)</th>
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<tbody>
<tr>
<td>1</td>
<td>CRR Historical &amp; Forecasted Load</td>
<td>x</td>
<td>x</td>
<td>Yes</td>
<td>Phase 1: Use UI for submission for now, no API available</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Phase 2: API submission pattern - TBD</td>
</tr>
<tr>
<td>2</td>
<td>CRR Auction</td>
<td>x</td>
<td>x</td>
<td>Yes</td>
<td>Maximum 500 recs for any file submission to the system</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>20 bid segments per bid (business rule)</td>
</tr>
<tr>
<td>3</td>
<td>CRR Load Migration</td>
<td>x</td>
<td>x</td>
<td>No</td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>CRR Nomination</td>
<td>x</td>
<td>x</td>
<td>Yes</td>
<td>Maximum 500 recs for any file submission to the system</td>
</tr>
<tr>
<td>5</td>
<td>CRR Secondary Market</td>
<td>x</td>
<td>x</td>
<td>No</td>
<td>Maximum 500 recs for any file submission to the system</td>
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# CRR Service Endpoint Details

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<thead>
<tr>
<th>#</th>
<th>Service</th>
<th>GET</th>
<th>POST</th>
<th>Potential submission for &gt;1mb filesize</th>
<th>Comments</th>
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<tbody>
<tr>
<td>1</td>
<td>CRR App Status</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>CRR Market Data</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>CRR Market Status</td>
<td>x</td>
<td></td>
<td></td>
<td>Only retrieve data, no submission</td>
</tr>
<tr>
<td>4</td>
<td>CRR Messages</td>
<td>x</td>
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</tbody>
</table>
RECAP: CRR Upgrade Project - Overview

• The ISO has decided to upgrade the existing CRR system with a new system that adopts the latest technology stack aligned with the ISO’s technology standards, consolidates all CRR related functions, minimizes human errors, reduces processing time, eliminates manual workarounds, and positions the system to accommodate policy changes down the road.

• This on-going Customer Partnership Group (CPG) will provide an overview of the schedule, review of external BRS and answer questions. Subsequent meetings will include detailed review and discussion of business process changes impacting market participants.


• The goal of this CPG is to ensure customer readiness as this project deploys to Production in 2024.
RECAP: CRR Upgrade Project – Overview of changes

• Load submission process
  • At the time of load submission participant will be notified of any failed validation per sink location based on the exceedance load and allow to resubmit

• OBAALSE process
  • EQ load election will be submitted through the UI during the OBAALSE load submission

• Consolidate data publishing in MUI and/or OASIS
  – Calendar: change from webpost to OASIS
  – Model data: change from webpost to MUI, including both NDA and non NDA files
  – Market Result data: from webpost to MUI

• Modeling data
  – Powerflow case to be released in PSSE v30
  – ITC definition will be modeled as source and sink

• Features added to enable user performing additional tasks
  – MT_TOR: user to submit through UI, currently performed by CRR group

• Changes to Load Migration and Source and Sink processes

• User access
  – User will be provisioned to specific functions within the system, based on the application access request approval process

• Webservices interface for interacting with MUI
Market Sim - Overview

• Market participant training will complete prior to last week of connectivity, and one week before start of Market Sim
• 4 weeks connectivity
  – Week two CAISO will provide ability for allocation and auction API upload
  – No functionality will be available to test until the start of Market Sim
• 3 week structured scenario execution
• 2 week unstructured
• CAISO will request all interested CRR market participants sign up to participate in Market Sim
• All current user profiles will be migrated into Map-stage for Market Sim, new participants will need to request to be provisioned
• **Source and Sink list release**
  – Remove the existing 30 days ahead of allocation version
  – Will be released in v0, v1 and other updates within the active market period

• **Retired resource mapping**
  – Re-map the retired PNode to the closest electrically connected PNode that is also a biddable location in the CRR processes and has the same source/sink designation as the retired location
  – Baseloading CRR will be mapped based on the model used in the active market period to capture the most accurate topology
  – Mapping will be released for the corresponding market period

• **Source and Sink islanded by outage**
  – With baseloading CRR, sell offer allowed
  – No baseloading CRR, will not be biddable for the effective market
CAISO B2B Improvements – Goals & Current Status

• Goals
  • Enhance the developer experience working with CAISO Web API’s
  • Provide API’s in REST/JSON using OpenAPI 3.0 specification
  • Provide examples, mock services and tooling to generate client/server stubs and SDK
  • Provide tests for the API’s using Postman collections
  • Collaboration using Git and forums on developer.caiso.com
  • Simplify authentication using mutual TLS and X.509 certificates

• Update
    • PowerPoint presentation and webinar recording
    • Draft version of CRR Auction Service OpenAPI Specifications
    • Draft version of CRR business validate message bundle
CAISO B2B Improvements – SOAP vs REST

SOAP

POST /GetStock HTTP/1.1
Host: www.example.org
Content-Type: application/soap+xml

<?xml version="1.0"?>
<soap:Envelope
xmlns:soap="http://www.w3.org/2001/12/soap-envelope"
soap:encodingStyle="http://www.w3.org/2001/12/soap-encoding">
  <soap:Body xmlns:m="http://www.example.org/stock">
    <m:GetStockPrice>
      <m:StockName>IBM</m:StockName>
    </m:GetStockPrice>
  </soap:Body>
</soap:Envelope>

REST

GET http://example.org/stock/IBM

• SOAP (Simple Object Access Protocol) provides the following advantages when compared to REST:
  – Language, platform, and transport independent (REST requires use of HTTP)
  – Works well in distributed enterprise environments (REST assumes direct point-to-point communication)
  – Standardized
  – Provides significant pre-build extensibility in the form of the WS* standards
  – Built-in error handling
  – Automation when used with certain language products

• REST (Representational State Transfer) is easier to use for the most part and is more flexible. It has the following advantages when compared to SOAP:
  – Uses easy to understand standards like swagger and OpenAPI Specification 3.0
  – Smaller learning curve
  – Efficient (SOAP uses XML for all messages, REST mostly uses smaller message formats like JSON)
  – Fast (no extensive processing required)
  – Closer to other Web technologies in design philosophy
  – As one REST API tutorial put it: SOAP is like an envelope while REST is just a postcard

https://www.soapui.org/learn/api/soap-vs-rest-api/
# CAISO B2B Improvements – CRR Developer Forum


## RESTful services

<table>
<thead>
<tr>
<th>SERVICE</th>
<th>SPECIFICATION</th>
<th>DOCUMENTATION</th>
<th>STATUS</th>
<th>RELEASE</th>
<th>EFFECT</th>
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<tbody>
<tr>
<td>CRR Auction</td>
<td>crr_auction_1.0.0.yaml</td>
<td>crr_auction_1.0.0.html</td>
<td>NA</td>
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<tr>
<td>CRR Historical and Forecasted Load</td>
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<td>crr_historical_and_forecasted_load_1.0.0.html</td>
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</tr>
<tr>
<td>CRR Nomination</td>
<td>crr_nomination_1.0.0.yaml</td>
<td>crr_nomination_1.0.0.html</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>CRR Secondary Market</td>
<td>crr_secondary_market_1.0.0.yaml</td>
<td>crr_secondary_market_1.0.0.html</td>
<td>α</td>
<td>Spring 2020</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td>crr_secondary_market_0.0.0.yaml</td>
<td>crr_secondary_market_0.0.0.html</td>
<td>β</td>
<td>DRAFT</td>
<td>NA</td>
</tr>
<tr>
<td>CRR Tor Conversion</td>
<td>crr_tor_conversion_1.0.0.yaml</td>
<td>crr_tor_conversion_1.0.0.html</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
</tbody>
</table>
CAISO CRR API Mock Services

https://mapstage-apimock.caiso.com/mocks?appname=crr

Specifications:

- mock_caiso_crr_auction_v1.0.0.html
- mock_caiso_crr_historical_and_forecasted_load_v1.0.0.html
- mock_caiso_crr_market_data_v1.0.0.html
- mock_caiso_crr_market_status_v1.0.0.html
- mock_caiso_crr_message_v1.0.0.html
- mock_caiso_crr_nomination_v1.0.0.html
- mock_caiso_crr_secondary_market_v1.0.0.html
- mock_caiso_crr_for_conversion_v1.0.0.html
CAISO B2B Improvements – Example: CRR Auction API

```yaml
openapi: 3.0.0
servers:
  - url: https://virtserv.server.swaggerhub.com/RI-GM/caiso_crr_auction_v1.0.0_openapi/1.0.0
info:
  description: This includes all openapi services for CRR bids and offers
  version: "1.0.0"
  title: CRR Auction API
  contact:
    email: ishde-support@resource-innovations.com
    tags:
      - name: write
        description: require read/write access
      - name: read
        description: requires read only
paths:
  /auction/v1.0/portsfolio:
    get:
      tag:
        read
      summary: gets bids and offers for given market name
      operationId: getPortfolio
      description:
        By passing in the appropriate market name, the auction portfolio will be returned.
      parameters:
        
        - $ref: '#/components/parameters/MarketName'
        - $ref: '#/components/parameters/PortfolioName'
        - $ref: '#/components/parameters/ParticipantName'
      responses:
        '200':
          description: search results matching criteria
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/Portfolio'
```

CRR Auction API

API and SDK Documentation

Version: 1.0.0

This includes all openapi services for CRR bids and offers

**Read**

**getPortfolio**

- gets bids and offers for given market name, portfolio name, and logged in user

By passing in the appropriate market name, portfolio name, and participant name, the auction portfolio will be returned.

**Usage and SDK Samples**

<table>
<thead>
<tr>
<th>Language</th>
<th>Curl</th>
<th>Java</th>
<th>Android</th>
<th>Obj-C</th>
<th>JavaScript</th>
<th>C#</th>
<th>PHP</th>
<th>Perl</th>
<th>Python</th>
</tr>
</thead>
<tbody>
<tr>
<td>curl -X GET</td>
<td>&quot;<a href="https://virtserv.server.swaggerhub.com/RI-GM/caiso_crr_auction_v1.0.0_openapi/1.0.0/auction/v1.0/portsfolio/%5C%7BmarketName%5C%7D/%5C%7BportfolioName%5C%7D/%5C%7BparticipantName%5C%7D">https://virtserv.server.swaggerhub.com/RI-GM/caiso_crr_auction_v1.0.0_openapi/1.0.0/auction/v1.0/portsfolio/\{marketName\}/\{portfolioName\}/\{participantName\}</a>&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ISO Public
CAISO B2B Improvements – Free Swagger Editor Tool

https://editor.swagger.io/
## CAISO B2B Improvements – New Web Services for CRR

<table>
<thead>
<tr>
<th>Service</th>
<th>Operation</th>
</tr>
</thead>
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<tr>
<td>Allocation Nomination Portfolio</td>
<td>POST/GET</td>
</tr>
<tr>
<td>Auction Bid Portfolio</td>
<td>POST/GET</td>
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<tr>
<td>Historical and Forecasted Load</td>
<td>POST/GET</td>
</tr>
<tr>
<td>Existing CRRs (CRR Market Data)</td>
<td>GET</td>
</tr>
<tr>
<td>Market Data (CRR Market Data)</td>
<td>GET</td>
</tr>
<tr>
<td>Market Results (CRR Market Data)</td>
<td>GET</td>
</tr>
<tr>
<td>Private Allocation Results (CRR Market Data)</td>
<td>GET</td>
</tr>
<tr>
<td>Private Auction Results (CRR Market Data)</td>
<td>GET</td>
</tr>
<tr>
<td>Load Migration Data</td>
<td>POST/GET</td>
</tr>
<tr>
<td>Market Status (Market Info)</td>
<td>GET</td>
</tr>
<tr>
<td>CRR Messages</td>
<td>GET</td>
</tr>
<tr>
<td>Secondary Market</td>
<td>POST/GET</td>
</tr>
<tr>
<td>TOR Conversion</td>
<td>POST/GET</td>
</tr>
</tbody>
</table>
A2A/B2B OpenAPI File Naming Conventions for versioning:

File name example: **caiso_crr_market_info_v1.0.0_openapi.yaml**

Version Numbering Format: **MAJOR.MINOR.MINI**

- **MAJOR** version of the file name will be incremented if there are any new services added or any major version update to any of the existing services.

- **MINOR** version of the file name will be incremented if there any minor version update to any of the existing services.

- **MINI** version of the file name will be incremented if there are only documentation changes/corrections, with no service changes.
CAISO B2B Improvements

Each version update of the file name will reset the version numbers on the right.

Version numbers will be tracked into the YAML file as part of the Release Notes.

Example:

- **v1.0.0**  File is published to market participants
- **v1.0.1**  Edits were made to documentations, no functional changes
- **v1.0.2**  Edits were made to documentations, no functional changes
- **v1.0.3**  Edits were made to documentations, no functional changes
- **v1.1.0**  Added a Minor version for a service
- **v1.1.1**  Edits were made to documentations, no functional changes
- **v1.2.0**  Added a Minor version for a service
- **v1.3.0**  Added a Minor version for a service
- **v2.0.0**  Added a Major version for a service
- **v2.0.1**  Edits were made to documentations, no functional changes
- **v3.0.0**  Added a new service