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Proposed Use Cases for the IDC, Version 0.1

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1. USE CASE HIERARCHY

In support of the International Data Center (IDC) Reengineering Phase 2 project, a list of proposed use cases with brief descriptions is provided for review.

The proposed IDC Use Case Hierarchy is based on the US NDC Use Case Hierarchy, as described in the previously released US NDC Use Case Model Survey, November 2013. The US NDC Use Case Hierarchy is modified to include new use cases unique to the IDC, and changes to common use cases. Changes in this table are noted in bold.

1	System Acquires Data
1.1	System Receives Station Data
1.2	System Receives Bulletin Data
1.3	System Automatically Distributes Data
2	System Detects Event
2.1	System Determines Waveform Data Quality
2.2	System Enhances Signals
2.3	System Detects Events using Waveform Correlation
2.4	System Detects Signals
2.5	System Measures Signal Features
2.6	System Builds Events using Signal Detections
2.7	System Resolves Event Conflicts
2.8	System Refines Event Location
2.9	System Refines Event Magnitude
2.10	**System Evaluates Moment Tensor**
2.11	**System Performs Further Analysis**
3	**Analyzes Events**
3.1	Selects Data for Analysis
3.2	Refines Event
3.2.1	Determines Waveform Data Quality
3.2.2	Enhances Signals
3.2.3	Detects Signals
3.2.4	Measures Signal Features
3.2.5	Refines Event Location
3.2.6	Refines Event Magnitude
3.2.7	**Evaluates Moment Tensor**
3.2.8	Compares Events
3.2.9	**Performs Further Analysis**
3.3	Scans Waveforms and Unassociated Detections
3.4	Builds Event
3.5	Marks Processing Stage Complete
4	Reports Event of Interest
5	Provides Data to Customers
5.1	**Requests US NDC Data**

11	Performs Research
11.1	Analyzes Special Events
11.2	Develops New Algorithms and Models
12	Performs Training
12.1	Configures Data for Training Subsystem
12.2	Trains Analysts
12.3	Views Training Feedback
13	Operates Standalone Subsystem
13.1	Conducts Site Survey
13.2	Performs Standalone Analysis
14	**IDC Unique**
14.1	**System Acquires Meteorological Data**
14.2	**System Assesses Event Consistency**
14.3	**Assesses Event Consistency**
14.4	**System Screens Event**
14.5	**Controls Monitoring Stations**

2. PROPOSED USE CASES

2.10 System Evaluates Moment Tensor (New Common)
This use case describes how the System evaluates the moment tensor for an event. The System uses Greens functions to invert observed ground motion data from the event to determine the moment tensor. The System decomposes the moment tensor into deviatoric and isotropic components. The system decomposes the deviatoric component into best-fitting double couple and compensated linear vector dipole (CLVD) components.

2.11 System Performs Further Analysis (New Common)
This use case describes how the System performs further automated analysis. This use case provides an extension point to include new features or group features that are unique to an IDC System or US NDC System distribution.

3 Analyzes Events (Modified)
This use case describes how the Analyst analyzes event hypotheses created by either pipeline processing or a previous Analyst and builds new events. This can be done either locally or remotely. The Analyst selects data to analyze (see 'Selects Data for Analysis' UC), refines event hypotheses for selected events (see 'Refines Event' UC), reviews waveforms and unassociated detections (see 'Scans Waveforms and Unassociated Detections' UC) and builds new event hypotheses for events missed by the System or previous Analysts (see 'Builds Event' UC). When finished with the analysis, the Analyst marks the processing stage as complete for the selected data (see 'Marks Processing Stage Complete' UC) to prepare the event hypotheses for further analysis in subsequent processing stages.

3.2.7 Evaluates Moment Tensor (New Common)
This use case describes how the Analyst evaluates the moment tensor for an event. The Analyst determines which observed waveforms to include in the inversion. The Analyst selects which Earth model to use for the inversion (i.e. which Greens functions). The Analyst invokes the system to evaluate the moment tensor (see 'System Evaluates Moment Tensor' UC).

3.2.9 Performs Further Analysis (New Common)
This use case describes how the Analyst performs further interactive analysis. This use case provides an extension point to include new features or group features that are unique to an IDC System or US NDC System distribution.

5.1 Requests System Data (Modified)
This use case describes how an Authorized External User requests data from the System. Authorized External Users access web servers to request approved waveform data, reports, station SOH, and station data acquisition availability statistics. The Authorized External User selects criteria to define the data provided by the System. The Authorized External User also requests data that is not already available, including reports of events of interest.

14 IDC Unique (New IDC Unique)
This use case includes use cases that are unique to an IDC System distribution.

14.1 System Acquires Meteorological Data (New IDC Unique)
This use case describes how the System acquires meteorological data for use in automatic and interactive processing. The System requests the latest available high-resolution global meteorological data from external data centers and puts it into the correct formats for generation of 3-D infrasound velocity and attenuation models. The Data Acquisition Partition moves meteorological data to the Data Processing Partition for automatic and interactive processing.

14.2 System Assesses Event Consistency (New IDC Unique)
This use case describes how the System assesses the consistency of observations for an event with expected observations for an event of comparable size in the same general location. The System calculates any event characteristics needed for assessing event consistency. The System compares event characteristics against expected values and quantifies inconsistencies. The System provides a summary of inconsistencies. The System attempts to correct inconsistencies. The event characteristics that are calculated, the expected values, and the inconsistencies that can be automatically corrected are configured by the System Maintainer (see 'Configures Processing Components' UC).

14.3 Assesses Event Consistency (New IDC Unique)
This use case describes how the Analyst assesses the consistency of observations for an event with expected observations for an event of comparable size in the same general location. The Analyst selects an event or set of events. The Analyst invokes the system to assess event consistency for each event (see ‘System Assesses Event Consistency’ UC). The Analyst reviews the summary of inconsistencies and corrective actions.

14.4 System Screens Event (New IDC Unique)
This use case describes how the System creates a screened event list (ideally containing no non-nuclear events) by processing the list of Analyst-reviewed events. The System automatically calculates event characteristics for all events designated as having completed Analyst review. The System uses these event characteristics to screen events that are non-nuclear. The event characteristics that are calculated and the screening criteria are configured by the System Maintainer (see 'Configures Processing Components' UC).

14.5 Controls Monitoring Stations (New IDC Unique)
This use case describes how the System Maintainer controls Monitoring Stations. The System Maintainer securely issues commands to Monitoring Stations and monitors response to support sensor calibration, authentication key maintenance, and station diagnostics.


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