           An API For Calendar-Based Fortune Heuristics Services
                         draft-divination-cfapi-00

Abstract

   This document describes a JSON HTTP API for online services that
   provide calendar-based fortune heuristics.

Status of This Memo

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## 1.  Introduction

   Fortune-telling, the practice of predicting information about a
   person's life, is an activity practiced throughout history.

   While there are myriad forms of fortune telling methodologies, this
   document applies to a particular form of service that provides
   fortune heuristics, commonly known as "luck", for a particular
   subject based on a calendar-based input.

   Since HTTP [RFC7230] status codes are insufficient to convey
   information about fortune heuristics, this specification defines a
   simple JSON [RFC8259] document format for this purpose.  The response
   can be used by HTTP APIs to deliver results to non-human clients or
   to an end-user.

## 2.  Conventions Used in This Document

The key words "*MUST*", "*MUST NOT*", "*REQUIRED*", "*SHALL*",
"*SHALL NOT*", "*SHOULD*", "*SHOULD NOT*", "*RECOMMENDED*", "*NOT
RECOMMENDED*", "*MAY*", and "*OPTIONAL*" in this document are to be
interpreted as described in BCP 14 [RFC2119] [RFC8174] when, and only
when, they appear in all capitals, as shown here.

The following definitions apply in this document:

Well-known URI
   This specification makes use of the "well-known URI" feature of
   HTTP servers [RFC5785] to provide a bootstrapping URI for the
   client usage of fortune heuristics services.

Root of Fortune
   The service discovery endpoint that provides a URI list of
   available fortune heuristic endpoints available, in accordance
   with Section 6.

## 3.  Fortune Heuristics Service Well-Known URI

A well-known URI called "fortune" is registered by this specification
for fortune heuristics services (see Section 10).

Services complying with this document *SHOULD* have its well-known
URI pointing (directly or through redirection) to the Root of
Fortune.

The Root of Fortune can be used by the client for service discovery,
namely, the available calendar-based fortune heuristics services
available on the server, as specified in Section 6.

### 3.1.  Well-Known URI Redirection

Servers *MUST* redirect HTTP requests for that resource to the actual
"context path" using one of the available mechanisms provided by HTTP
[RFC7230] (e.g., using a 301, 303, or 307 response).

Clients *MUST* handle HTTP redirects on the well-known URI.

### 3.2.  Well-Known URI Cache Behavior

Servers *SHOULD* set an appropriate Cache-Control header value (as
according to Section 5.2 of [RFC7234]) in the redirect response to
set caching behavior as required by the type of response generated.

4.  **New HTTP Methods: SEEK and DIVINE**

   This specification defines two new HTTP methods: "SEEK" and "DIVINE"
   methods for HTTP [RFC7230].

   While HTTP GET requests are treated equivalently as the "SEEK" and
   "DIVINE" requests, its usage is discouraged and therefore *SHOULD
   NOT* be used.

   Usage of these methods are defined in the sections below.

5.  **Defined Data Types: Date-Time Formats**

   This specification defines a number of date-time formats as according
   to the conventions of [RFC3339] for the unambiguous communication
   between client and server.

   The types defined are as follows.

   DATETIME
      As described in Section 5.6 of [RFC3339], with the addition that
      reduced accuracy representations described in [ISO.8601-1.2018]
      are supported.  Reduced accuracy date and times are accepted where
      a date or time component (2-digits long) is replaced by "--".
      For example, the date time "2018-04---T01:02:00Z" represents the
      UTC time of 1:02am, on an unknown day within April of the year
      2018.

   DATE
      As described in "DATETIME", but the "time" component will not be
      taken into account in the algorithm.

6.  **Fortune Heuristics Service Discovery**

6.1.  **Root of Fortune Path URI ("/")**

   The Root of Fortune URI, defined as "/" in this document, is used for
   service discovery on types of calendar-based fortune heuristics
   available.

   An empty SEEK request with the "application/json" request type *MUST*
   be sent to this endpoint to retrieve the available endpoints.  All
   other HTTP methods *MUST NOT* be supported at this URI.

   An example of such a response is as follows:

```
HTTP/1.1 200 Success
Content-Type: application/json
Content-Language: en

{
  "diviners" : [
    "/astrology",
    "/bazi",
  ]
}
```

A service discovery object *MUST* have the following members:

diviners
   (JSON array) An array that contains endpoints that conform to this
   specification.  All endpoints listed here are relative to the Root
   of Fortune path.  For example, the path "/astrology" listed in the
   example has an endpoint path of "[root-of-fortune]/astrology",
   where "[root-of-fortune]" indicates the real path of the Root of
   Fortune.

## 7.  Fortune Heuristics Service Endpoint

An endpoint offering fortune heuristics services *MUST* adhere to
specifications in this section.

A service *MAY* implement multiple divination services based on
different divination methods, such as the digital oracle shown in
Figure 1.

```
                              __
                          __===^-\
                      __===      -\
                   __===-          -\
                __===-               -\
             ___===-                   -\
          ===-            ---__          -\
          \\\           |||^^\ \__         -\
           \\\          |||        \__       -\
            \\\         |||      _____      -\
             \\\        |||   _/-******\\__     -\
              \\\       ||   /-****_****-\ \_   -\
               \\\      || |-***/    \***-\   \_ -\
                \\\     || |-***\___/***-|     \ -\
                 \\\    ||  \-*********-/   __--/ -\
                  \\\   ||     \-******/__--       -\
                   \\\  ||          __--            -\
                    \\\ ||      __--                  -\
                     \\\||__--                         -\
                      \\\                                -\
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                          \\\              __                -\
                           \\\           //##\\              -\
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                              \\\                    __--===
                               \\\              __--===
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                                  \\=
```
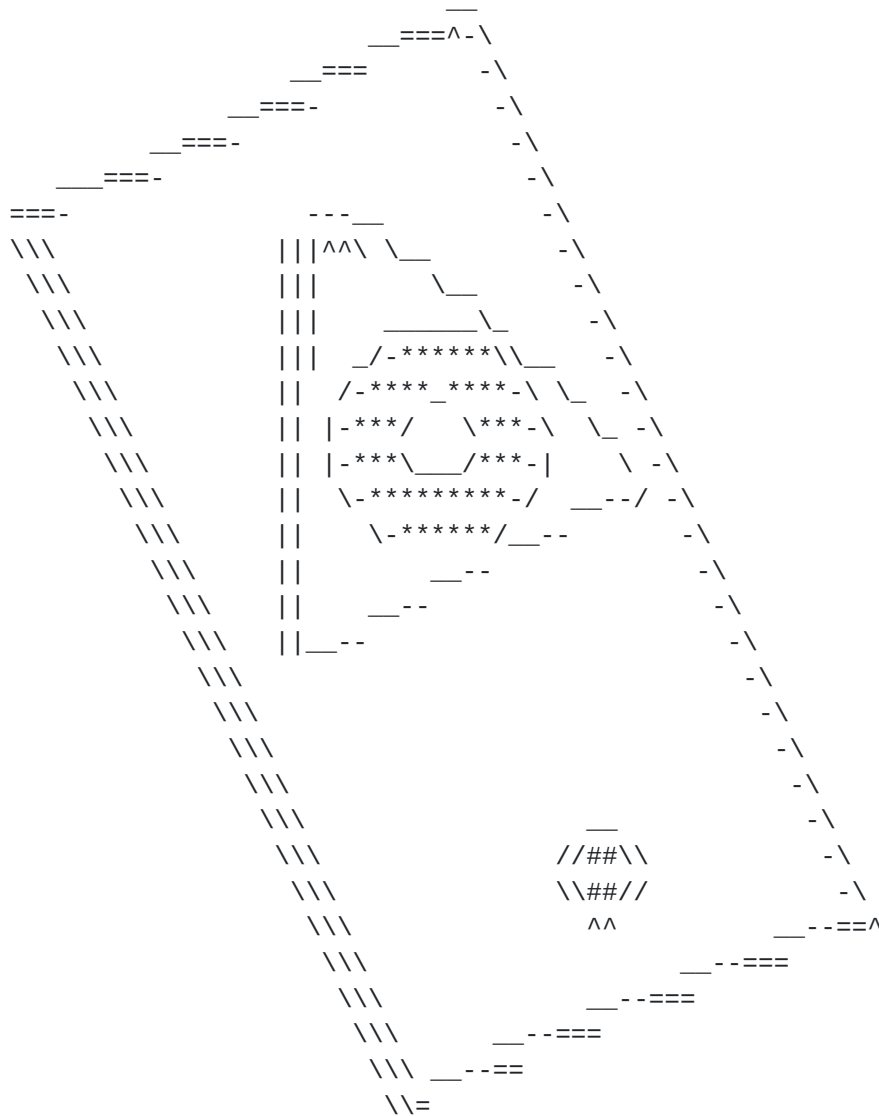
Figure 1: Dimensional Eye, a digital oracle that communicates through
                            one button

## [7.1](#).  Service Specification Request

To retrieve capabilities and parameters of an endpoint complying with
this specification, a service specification JSON object is returned.

An empty SEEK request with the "application/json" request type *MUST*
be sent to this endpoint to retrieve the service specification that
describes parameters accepted by this endpoint.

Two examples of such a response are given below.

```
HTTP/1.1 200 Success
Content-Type: application/json
Content-Language: en

{
  "description": "Gaze into your upcoming luck!",
  "details": "https://divine.example.com/manual/astrology-api",
  "parameters": {
    "birthday": {
      "type": "DATE",
      "description": "Your birth date in UTC"
    },
    "targetDateBegin": {
      "type": "DATE",
      "description": "Start of the target date range to report on"
    },
    "targetDateEnd": {
      "type": "DATE",
      "description": "End of the target date range to report on"
    },
    "interval": {
      "values": {
        "D": "Daily",
        "M": "Monthly",
        "Y": "Yearly"
      },
      "description": "Available intervals to report on."
    }
  }
}
```

```
HTTP/1.1 200 Success
Content-Type: application/json
Content-Language: en

{
  "description": "Matches and mis-matches according to the "
    "Yin Yang and Five Elements techniques",
  "details": "https://divine.example.com/manual/bazi-api",
  "parameters": {
    "birthday": {
      "type": "DATETIME",
      "description": "Your birth date and time in UTC"
    },
    "targetDateBegin": {
      "type": "DATETIME",
      "description": "Start of the target date/time range to report on"
    },
    "targetDateEnd": {
      "type": "DATETIME",
      "description": "End of the target date/time range to report on"
    },
    "interval": {
      "values": {
        "H": "Hourly",
        "D": "Daily",
        "M": "Monthly",
        "Y": "Yearly"
      },
      "description": "Available intervals to report on."
    }
  }
}
```

## 7.2.  Service Specification Object

A service specification object *MUST* contain the following members.

description
    (string) A short, human-readable summary of the fortune heuristic
    service at this endpoint.  This *SHOULD* be a stable reference.

details
    (URI, optional) A URI reference that provides further details for
    human consumption, such as API documentation that includes details
    of parameters accepted or response states.

parameters

(object, mandatory) An object that specifies what parameters are
accepted by this endpoint.  Each parameter key within this object
specifies an accepted parameter name, and its value is a parameter
specification object, which is described below.

A parameter specification object *SHOULD* contain the following
members:

type
   (string, optional) The value type accepted by this parameter.
   Value types are described in this document.  This member is
   mutually exclusive with "values".

description
   (string, mandatory) The purpose of this parameter.

values
   (object, optional) The accepted values of this parameter, unlisted
   values *SHOULD* not be accepted by the parameter.  Each key within
   this object specifies an accepted value, and its value provides a
   description of the purpose of the value.

## 8.  Fortune Heuristics Report Request and Response

## 8.1.  Fortune Heuristics Report Request

A request using the HTTP "DIVINE" method and the "application/json"
type *MUST* be sent to the fortune heuristic endpoint to retrieve
results for a fortune heuristic query.

The request made *MUST* conform to the specifications of the
endpoint, as retrieved via the "SEEK" method described in
Section 7.1.

An example of a request is provided below.

```
URI: /divination/astrology
Method: DIVINE
Content-Type: application/json
Content-Language: en

{
  "birthday": "1976-02-11T00:00:00Z",
  "targetDateBegin": "2018-01-01T00:00:00Z",
  "targetDateEnd": "2019-01-01T00:00:00Z",
  "interval": "M"
}
```

8.2.  Fortune Heuristics Report Response

   A fortune heuristic query using the "DIVINE" method triggers a
   response that contains a fortune heuristics report.

   A successful response returns a JSON object that *MUST* conform to
   the object structure described in this section.

   A report object *SHOULD* contain the following members:

   type
      (URI, mandatory) A URI that defines the type of the report located
      at the "report" key of this object.

   report
      (object, mandatory) An object that contains two keys, "intervals"
      and "events".  The "intervals" object contains an array of
      interval objects that matches the demanded intervals in the
      request within the target date range.  The "events" object
      contains an array of significant event objects within the target
      date range.

   An example of a response is provided below.

```
URI: /divination/astrology
Method: DIVINE
HTTP/1.1 200 Success
Content-Type: application/json
Content-Language: en

{
  "type": "https://association-of.astrology/reports/monthly",
  "report": {
    "intervals": [
      {
        "dateStart": "2018-01-01T00:00:00Z",
        "dateEnd": "2018-02-01T00:00:00Z",
        "categories": [
          {
            "category":
              "https://divine.example.com/astrology/categories/health"
            "value": 80,
            "description": "Charge ahead with excellent health."
          },
          {
            "category":
              "https://divine.example.com/astrology/categories/love"
            "value": 70,
```

```
              "description":
                "Give a certain person or situation another try!"
           },
           {
             "category":
               "https://divine.example.com/astrology/categories/finance"
             "value": 5,
             "description": "You've just realized that you don't have
               any cash on hand."
           }
         ]
       },
       {
         "dateStart": "2018-02-01T00:00:00Z",
         "dateEnd": "2018-03-01T00:00:00Z",
         "..."
       },
       "..."
     ],
     "events": [
       {
         "dateStart": "2018-01-15T03:20:00",
         "dateEnd": "2018-01-16T20:22:15",
         "description": "The planet of growth and good luck, Jupiter
           will make a harmonious connection with power planet Pluto,
           helping you connect with influential people",
         "recommendation": "Engage in networking during this time."
       },
       {
         "dateStart": "2018-03-22T00:12:40",
         "dateEnd": "2018-03-28T02:45:03",
         "description": "Communication planet Mercury enters your sign,
           which will find you in a busier and chattier mood.",
         "recommendation":
           "Take charge of work with your newfound energy."
       }
       "..."
     ]
   }
 }
```

   Fortune heuristic reports are created by a divination output that
   *MAY* requires quantitative interpretation.  A sample representation
   of interpreting a graphical divination output is provided in
   Figure 2.

```
                                    0000000000000000000000000
         0000000000000000000000001 G 1000000000000000000000000
         0000000000000000000000011 R 1100000000000000000000000
         0000000000000000000000111 A 1110000000000000000000000
         0000000000000000000001111 C 1111000000000000000000000
         0000000000000000000011111 E 1111100000000000000000000
         0000000000000000000111111 , 1111110000000000000000000
         0000000000000000001111111   1111111000000000000000000
         0000000011111111111111111 M 1111111111111111100000000
         0000000111111111111111111 E 1111111111111111110000000
         0000001111111111111111111 R 1111111111111111111000000
         0000011111111111111111111 C 1111111111111111111100000
         0000111111111111111111111 Y 1111111111111111111110000
         0001111111111111111111111 , 1111111111111111111111000
         0011111111111111111111111   1111111111111111111111100
         0111111111111111111111111 A 1111111111111111111111110
         0000000000000000011111111 N 1111111100000000000000000
         0000000000000000111111111 D 1111111110000000000000000
         0000000000000001111111111   1111111111000000000000000
         0000000000000011111111111 P 1111111111100000000000000
         0000000000000111111111111 E 1111111111110000000000000
         0000000000001111111111111 A 1111111111111000000000000
         0000000000011111111111111 C 1111111111111100000000000
         0000000000111111111111111 E 1111111111111110000000000
         0000000001111111111111111 . 1111111111111111000000000
```

Figure 2: Forty-nine yarrow sticks reveals a mystical message on
                              fortune

## 8.3.  Report Interval Object

The "intervals" value of a report object contains a number of report
intervals -- each representing a non-overlapping period of the
selected interval length.  When all of these intervals are put
together, the combined period *MUST* fully cover the requested report
target period.

An example interval object is shown below.

```
  {
    "dateStart": "2018-01-01T00:00:00Z",
    "dateEnd": "2018-02-01T00:00:00Z",
    "categories": [
      {
        "category":
          "https://divine.example.com/astrology/categories/health"
        "value": 80,
        "description": "Charge ahead with your excellent health."
      },
      {
        "category":
          "https://divine.example.com/astrology/categories/love"
        "value": 70,
        "description": "Give a certain person or situation another try!"
      },
      {
        "category":
          "https://divine.example.com/astrology/categories/finance"
        "value": 5,
        "description": "You've just realized that you don't have
          any cash on hand."
      }
    ]
  }
```

An interval object *MUST* contain the following members:

dateStart
   (datetime, mandatory) This value specifies the start of the period
   which this interval object applies to.

dateEnd
   (datetime, mandatory) This value specifies the end of the period
   which this interval object applies to.

In the given example, the "categories" key is an implementation
specific object that details heuristic results returned by the
selected algorithm.  This *MAY* differ in different algorithms.

## 8.4.  Report Events Object

The "events" value of a report object contains a number of event
objects.  Each event object represents an event relevant to the
calculation of fortune heuristics during a target report period.
These events *MAY* be of variable time lengths, and *MAY* be
overlapping amongst each other.

The following example demonstrates two event objects the service
determines relevant to a user's query.

```
{
  "dateStart": "2018-01-15T03:20:00",
  "dateEnd": "2018-01-16T20:22:15",
  "description": "The planet of growth and good luck, Jupiter will
    make a harmonious connection with power planet Pluto, helping you
    connect with influential people",
  "recommendation": "Engage in networking during this time."
},
{
  "dateStart": "2018-03-22T00:12:40",
  "dateEnd": "2018-03-28T02:45:03",
  "description": "Communication planet Mercury enters your sign,
    which will find you in a busier and chattier mood.",
  "recommendation": "Take charge of work with your newfound energy."
}
```

Similar to an interval object, an event object *MUST* contain the
following members:

dateStart
   (datetime, mandatory) This value specifies the start of the period
   described by the event.

dateEnd
   (datetime, mandatory) This value specifies the end of the period
   described by the event.

In the given example, the keys "description" and "recommendation" are
implementation-specific details.  This *MAY* differ in different
algorithms.

## 8.5.  Report Generation Errors

This specification makes use of normal HTTP error codes with the
following extensions.

Errors *MUST* be returned using the Problem JSON Structure as
accordance with [RFC7807].

422 Unprocessable Entity
   For example, a malformed date-time parameter, or an illogical
   input, such as when the subject's birthday occurs after the report
   target date period.

473 Beyond Existing Capability

   The service determines that the outcome is too difficult to
   predict.  For example, in the case where the calculation is too
   complex to complete in a certain time period.  The service
   *SHOULD* issue this response code to indicate that the client
   should not try the same request again.

474 Outcome Impossible
   The service determines that the outcome is impossible.  For
   example, when the algorithm determines that the subject will have
   deceased before the start of the requested target period.

## 9.  Security Considerations

o  TLS [RFC5246] and authenticated HTTP requests should be used to
   protect the DIVINE request and responses due to the personal
   nature of information transmitted.

o  A client *SHOULD* verify the identity of the server on every
   request to prevent impersonation or man-in-the-middle attacks, as
   data transmitted to and from the server is sensitive information,
   and at times critical information to the user.

o  Synchronization of client and server time *MUST* be well-
   considered in the implementation of this specification.  A
   mismatch of client and server time *MAY* lead to algorithm
   miscalculations that can cause mistaken choices of a user that
   depends on the reliability of this system.

## 10.  IANA Considerations

## 10.1.  Well-Known URI Registrations

   This document defines a well-known URI using the registration
   procedure and template from Section 5.1 of [RFC5785].

### 10.1.1.  "fortune" Well-Known URI Registration

   URI suffix
      fortune

   Change controller
      IETF

   Specification document(s)
      This document

   Related information
      N/A.

## 11.  References

### 11.1.  Normative References

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**Appendix A**.  **Acknowledgements**

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