

LA-UR-17-23067

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Title: Schema for the LANL infrasound analysis tool, infrapy

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Intended for: Report

Issued: 2017-04-14

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LA UR 17-XXXXX
April 2017

Schema for the LANL infrasound analysis tool, infrapy

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1.0 Introduction

The purpose of this document is to define the schema used for the operation of the infrasound analysis tool, infrapy. The tables described by this document extend the CSS3.0 or KB core schema to include information required for the operation of infrapy. This document is divided into three sections, the first being this introduction. Section two defines eight new, infrasonic data processing-specific database tables. Both internal (ORACLE) and external formats for the attributes are defined, along with a short description of each attribute. Section three of the document shows the relationships between the different tables by using entity-relationship diagrams.

2.0 Table Descriptions

This section describes the logical structure of each table used in the Infrapy software package. The name of the table is first, followed by a description of the purpose and use of the table. Below the description is a listing of the columns, in the order which they are defined in the tables. The storage column gives the actual ORACLE datatype for the column in question. The external format and character positions columns are provided for the convenience of database users who wish to transfer data between the ORACLE database tables and flat files.

2.1 Conventions

The following conventions are used, following Carr et al (2002):

Element	Appearance	Example
Database table	Bold	arrival
Database columns	Italic	<i>sta</i>
Database table and column when written in the dot notation	Bold.italic	arrival.sta
Value of a key or component of a key	Courier font	arid

2.2 Table Definitions: Infrapy-Specific Tables

Tables 2.10 through 2.18 are specific tables created during data processing in infrapy. Each table lists the columns in the table, along with the ORACLE storage type, the external format and character position that should be used if the information is provided in a flat file, and a short description of the column. For more detailed definitions of the columns, please see section 4.0.

fk_params

The **fk_params** table defines parameters for fk processing defined in the configuration file.

Table 2.1: fk_params					
<i>Relation:</i>		fk_params			
<i>Description:</i>		Parameters for fk processing			
attribute name	field no.	storage type	external format	character positions	attribute description
<i>pfkid</i>	1	integer	9d	1-9	fk processing id
<i>name</i>	2	string(32)	32.32s	11-42	fk process
<i>filtertype</i>	3	string(15)	15.15s	44-58	filter type
<i>filterl</i>	4	float(53)	5.3f	60-64	filter lower limit
<i>filterh</i>	5	float(53)	5.3f	66-70	filter higher limit
<i>fkfreql</i>	6	float(53)	5.3f	72-76	fkfreq lower limit
<i>fkfreqh</i>	7	float(53)	5.3f	78-82	fkfreq higher limit
<i>wlen</i>	8	float(53)	8d	84-91	fk window length
<i>overlapwlen</i>	9	integer	9d	93-101	overlap window length
<i>minslowness</i>	10	float(53)	5.3f	103-107	x minimum slowness
<i>maxslowness</i>	11	float(53)	5.3f	109-113	y minimum slowness
<i>stepslowness</i>	12	float(53)	5.3f	115-119	slowness step
<i>numsources</i>	13	integer	9d	121-129	number of sources
<i>additional1</i>	14	float(53)	9.4f	131-139	?
<i>additional2</i>	15	float(53)	9.4f	141-149	?
<i>algorithm</i>	16	string(15)	s15.15	151-165	fk algorithm

fk_results

The **fk_results** table stores fk processing results.

Table 2.2: fk_results					
<i>Relation:</i>		fk_results			
<i>Description:</i>		FK processing results			
attribute name	field no.	storage type	external format	character positions	attribute description
<i>pfkid</i>	1	integer	9d	1-9	fk processing id
<i>fkid</i>	2	integer	9d	11-19	fk result id
<i>chan</i>	3	string(8)	8.8s	21-28	channel
<i>nchan</i>	4	integer	9d	30-38	number of channels
<i>sta</i>	5	varchar2(6)	a6	40-45	station
<i>timeini</i>	6	float(53)	17.5f	47-63	time in
<i>timeend</i>	7	float(53)	17.5f	65-81	time end
<i>sx</i>	8	float(24)	5.3f	83-87	slowness x direction
<i>sy</i>	9	float(24)	5.3f	89-93	slowness y direction
<i>esx</i>	10	float(24)	5.3f	95-99	?
<i>esy</i>	11	float(24)	5.3f	101-105	?
<i>bz</i>	12	float(53)	7.2f	107-113	backazimuth
<i>slofk</i>	13	float(24)	9.4f	115-123	slowness
<i>ebz</i>	14	float(53)	7.2f	125-131	?
<i>eslofk</i>	15	float(24)	9.4f	133-141	?
<i>fval</i>	16	float(24)	9.4f	143-151	F value
<i>xcorrvalmax</i>	17	float(24)	9.4f	153-161	maximum x correlation value
<i>xcorrvalmean</i>	18	float(24)	9.4f	163-171	mean x correlation value
<i>rmsval</i>	19	float(24)	9.4f	173-181	rms value
<i>sourcenum</i>	20	integer	9d	183-191	number of sources
<i>additional1</i>	21	float(24)	9.4f	193-101	?
<i>additional2</i>	22	float(24)	9.4f	103-111	?

fd_params

The **fd_params** table defines parameters for detection processing defined in the configuration file.

Table 2.3: fd_params					
<i>Relation:</i>		fd_params			
<i>Description:</i>		FD processing parameters			
attribute name	field no.	storage type	external format	character positions	attribute description
<i>pfdid</i>	1	integer	9d	1-9	fd processing id
<i>name</i>	2	string(32)	32.32s	11-42	processing name
<i>pthr</i>	3	float(53)	9.4f	44-52	p threshold
<i>cthr</i>	4	float(53)	9.4f	54-62	correlation threshold
<i>numsource</i>	5	integer	9d	64-72	number of sources
<i>adapwlen</i>	6	float(53)	8d	74-81	adaptive window length
<i>minlen</i>	7	float(53)	8d	83-89	minimum event length
<i>algorithm</i>	8	string(15)	s15.15	91-105	detection algorithm
<i>additional1</i>	9	float(24)	9.4f	107-115	?
<i>additional2</i>	10	float(24)	9.4f	117-125	?

fd_results

The **fd_results** table stores detection results.

Table 2.4: fd_results					
<i>Relation:</i>		fd_results			
<i>Description:</i>		FD processing results			
attribute name	field no.	storage type	external format	character positions	attribute description
<i>fdid</i>	1	integer	9d	1-9	fd result id
<i>pfdid</i>	2	integer	9d	11-19	fd processing id
<i>pfkid</i>	3	integer	9d	21-29	fk processing id
<i>sta</i>	4	varchar2(6)	a6	31-36	station
<i>sourcenum</i>	5	integer	9d	38-46	number of sources
<i>timeini</i>	6	float(53)	17.5f	48-64	time in
<i>timeend</i>	7	float(53)	17.5f	66-82	time end
<i>maxfc</i>	8	float(24)	9.4f	84-92	C value time of maximum f value
<i>maxpfc</i>	9	float(24)	9.4f	94-102	
<i>maxfo</i>	10	float(24)	9.4f	104-112	
<i>c</i>	11	float(24)	9.4f	114-122	
<i>maxfc_time</i>	12	float(53)	17.5f	124-140	
<i>etimeini</i>	13	float(53)	17.5f	142-158	
<i>etimeend</i>	14	float(53)	17.5f	160-176	
<i>emaxpfc</i>	15	float(24)	9.4f	176-184	
<i>emaxfc</i>	16	float(24)	9.4f	186-194	
<i>emaxfc_time</i>	17	float(53)	17.5f	196-212	
<i>emaxfo</i>	18	float(24)	9.4f	214-222	fk result table
<i>ec</i>	19	float(24)	9.4f	224-232	
<i>fktablename</i>	20	float(53)	17.5f	234-250	

assoc_params

The **assoc_params** table defines parameters for association processing defined in the configuration file.

Table 2.5: assoc_params					
<i>Relation:</i>		assoc_params			
<i>Description:</i>		association processing parameters			
attribute name	field no.	storage type	external format	character positions	attribute description
<i>passocid</i>	1	integer	9d	1-9	association processing id
<i>name</i>	2	string(32)	32.32s	11-42	name of association process
<i>assocthresh</i>	3	float(53)	5.3f	44-48	association threshold
<i>maxlat</i>	4	float(53)	9.4f	50-58	maximum latitude
<i>minlat</i>	5	float(53)	9.4f	60-68	minimum latitude
<i>maxlon</i>	6	float(53)	9.4f	70-78	maximum longitude
<i>minlon</i>	7	float(53)	9.4f	80-88	minimum longitude
<i>wlen</i>	8	float(53)	8d	90-97	window length
<i>overlapwlen</i>	9	float(53)	8d	99-106	overlap window length
<i>algorithm</i>	10	string(15)	s15.15	108-122	association algorithm

assoc_results

The **assoc_results** table stores association results.

Table 2.6: assoc_results					
<i>Relation:</i>		assoc_results			
<i>Description:</i>		association results			
attribute name	field no.	storage type	external format	character positions	attribute description
<i>associd</i>	1	integer	9d	1-9	association result id
<i>passocid</i>	2	integer	9d	11-19	association processing id
<i>eventid</i>	3	integer	9d	21-29	event id
<i>fdid</i>	4	integer	9d	31-39	fd result id
<i>fdtable</i>	5	string(32)	32.32s	41-72	fd result table
<i>qassoc</i>	6	float(53)	5.3f	74-78	unique network identifier
<i>qdetcluster</i>	7	float(53)	5.3f	80-84	
<i>net</i>	8	varchar2(8)	a8	86-93	
<i>timeini</i>	9	float(53)	17.5f	95-111	
<i>timeend</i>	10	float(53)	17.5f	113-129	

loc_params

The **loc_params** table defines parameters for location processing defined in the configuration file.

Table 2.7: loc_params					
<i>Relation:</i>		loc_params			
<i>Description:</i>		location processing parameters			
attribute name	field no.	storage type	external format	character positions	attribute description
<i>plocid</i>	1	integer	9d	1-9	location processing id
<i>name</i>	2	string(32)	32.32s	11-42	
<i>maxlat</i>	3	float(53)	9.4f	44-52	maximum latitude
<i>minlat</i>	4	float(53)	9.4f	54-62	minimum latitude
<i>maxlon</i>	5	float(53)	9.4f	64-72	maximum longitude
<i>minlon</i>	6	float(53)	9.4f	74-82	minimum longitude
<i>priors</i>	7	integer	9d	84-92	priors used
<i>algorithm</i>	8	string(15)	s15.15	94-108	location algorithm

loc_results

The **loc_results** table stores location results.

Table 2.8: loc_results					
<i>Relation:</i>		loc_results			
<i>Description:</i>		location processing results			
attribute name	field no.	storage type	external format	character positions	attribute description
<i>locid</i>	1	integer	9d	1-9	location result id
<i>plocid</i>	2	integer	9d	11-19	location processing id
<i>eventid</i>	3	integer	9d	21-29	event id
<i>net</i>	4	varchar2(8)	a8	31-39	network
<i>numstations</i>	5	integer	9d	41-49	number of stations
<i>timeorigmap</i>	6	float(53)	17.5f	51-67	MAP origin time
<i>timeorigmean</i>	7	float(53)	17.5f	69-85	mean origin time
<i>timeorigvar</i>	8	float(53)	17.5f	87-103	origin time variance
<i>timeorigmin</i>	9	float(53)	17.5f	105-121	minimum origin time
<i>timeorigmax</i>	10	float(53)	17.5f	123-139	maximum origin time
<i>latorigmean</i>	11	float(53)	9.4f	141-149	mean origin latitude
<i>latorigvar</i>	12	float(53)	9.4f	151-159	origin latitude variance
<i>lonorigmean</i>	13	float(53)	9.4f	161-169	mean origin longitude
<i>lonorigvar</i>	14	float(53)	9.4f	171-179	origin longitude variance
<i>latlonorigcovar</i>	15	float(53)	9.4f	181-189	origin lat lon covariance
<i>lonorigmap</i>	16	float(53)	9.4f	191-199	MAP origin longitude
<i>latorigmap</i>	17	float(53)	9.4f	201-209	MAP origin latitude
<i>par_a</i>	18	float(24)	9.4f	211-219	?
<i>par_b</i>	19	float(24)	9.4f	221-229	?
<i>par_theta</i>	20	float(24)	9.4f	231-239	?
<i>timeini</i>	21	float(53)	17.5f	241-257	?
<i>timeend</i>	22	float(53)	17.5f	259-275	?
<i>additional1</i>	23	float(24)	9.4f	277-285	?
<i>additional2</i>	24	float(24)	9.4f	289-297	?
<i>additional3</i>	25	float(24)	9.4f	299-107	?
<i>additional4</i>	26	float(24)	9.4f	109-117	?

3.0 Table Relationships

Figure 1 describes relationships between tables. The table is always shown at the top of the table symbol.

