

Open Source RAD with OpenObject

PREAMBLE **OpenERP** is a modern Enterprise Management Software, released under the AGPL license, and featuring CRM, HR, Sales, Accounting, Manufacturing, Inventory, Project Management, ... It is based on **OpenObject**, a modular, scalable, and intuitive *Rapid Application Development (RAD)* framework written in Python.

OpenObject features a complete and modular toolbox for quickly building applications: integrated *Object-Relationship Mapping (ORM)* support, template-based *Model-View-Controller (MVC)* interfaces, a report generation system, automated internationalization, and much more.

Python is a high-level dynamic programming language, ideal for *RAD*, combining power with clear syntax, and a core kept small by design.

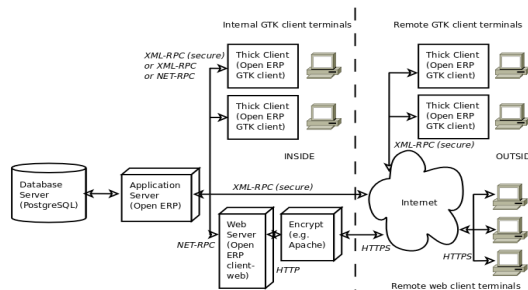
Tip: Useful links

- Main website, with OpenERP downloads: www.openerp.com
- Functional & technical documentation: doc.openerp.com
- Community resources: www.launchpad.net/open-object
- Integration server: test.openobject.com
- Learning Python: doc.python.org
- OpenERP E-Learning platform: edu.openerp.com

Installing OpenERP

OpenERP is distributed as packages/installers for most platforms, but can of course be installed from the source on any platform.

OpenERP Architecture



OpenERP uses the well-known client-server paradigm, with different pieces of software acting as client and server depending on the desired configuration. Client software OpenERP provides a thick desktop client (GTK+) on all platforms, and a web interface is also accessible using any modern browser.

Tip: Installation procedure

The procedure for installing OpenERP is likely to evolve (dependencies and so on), so make sure to always check the specific documentation (packaged & on website) for the latest procedures. See <http://doc.openerp.com/install>

Package installation

- Windows all-in-one installer, and separate installers for server, client, and webserver are on the website
- Linux *openerp-server* and *openerp-client* packages are available via corresponding package manager (e.g. Synaptic on Ubuntu)
- Mac look online for package installers for the GTK client, as well as tutorials for installing the server (e.g. devteam.taktik.be)

Installing from source

There are two alternatives: using a tarball provided on the website, or directly getting the source using Bazaar (distributed Source Version Control). You also need to install the required dependencies (PostgreSQL and a few Python libraries – see documentation on doc.openerp.com).

Compilation tip: OpenERP being Python-based, no compilation step is needed

Typical bazaar checkout procedure (on Debian-based Linux)

- ```
1 $ sudo apt-get install bzip2 # install bazaar version control
2 $ bzip2 -d lp:openerp # retrieve source installer
3 $ cd openerp && python ./bzip2_set.py # fetch code and perform setup
```

### Database creation

After installation, run the server and the client. From the GTK client, use *File→Databases→New Database* to create a new database (default super admin password is *admin*). Each database has its own modules and config, and demo data can be included.

## Building an OpenERP module: idea

**CONTEXT** The code samples used in this memento are taken from a hypothetical *idea* module. The purpose of this module would be to help creative minds, who often come up with ideas that cannot be pursued immediately, and are too easily forgotten if not logged somewhere. It could be used to record these ideas, sort them and rate them.

## Note: Modular development

OpenObject uses modules as feature containers, to foster maintainable and robust development. Modules provide feature isolation, an appropriate level of abstraction, and obvious MVC patterns.

### Composition of a module

A module may contain any of the following elements:

- **business objects:** declared as Python classes extending the `osv.osv` OpenObject class, the persistence of these resources is completely managed by OpenObject ;
- **data:** XML/CSV files with meta-data (views and workflows declaration), configuration data (modules parametrization) and demo data (optional but recommended for testing, e.g. sample ideas) ;
- **wizards:** stateful interactive forms used to assist users, often available as contextual actions on resources ;
- **reports:** RML (XML format), MAKO or OpenOffice report templates, to be merged with any kind of business data, and generate HTML, ODT or PDF reports.

### Typical module structure

Each module is contained in its own directory within the `server/bin/addons` directory in the server installation.

**Note:** You can declare your own add-ons directory in the configuration file of OpenERP (passed to the server with the `-c` option) using the `addons_path` option.

```
4 | addons/
5 | |- idea/ # The module directory
6 | |- demo/ # Demo and unit test population data
7 | |- i18n/ # Translation files
8 | |- report/ # Report definitions
9 | |- security/ # Declaration of groups and access rights
10 | |- view/ # Views (forms,lists), menus and actions
11 | |- wizard/ # Wizards definitions
12 | |- workflow/ # Workflow definitions
13 | |- __init__.py # Python package initialization (required)
14 | |- __terp__.py # module declaration (required)
15 | |- idea.py # Python classes, the module's objects
```

The `__init__.py` file is the Python module descriptor, because an OpenERP module is also a regular Python module.

```
__init__.py:
16 | # Import all files & directories containing python code
17 | import idea, wizard, report
```

The `__terp__.py` (may also be named `__openerp__.py` as of v5.2) is the OpenERP descriptor and contains a single Python dictionary with the actual declaration of the module: its name, dependencies, description, and composition.

```
__terp__.py:
18 | {
19 | 'name' : 'Idea',
20 | 'version' : '1.0',
21 | 'author' : 'OpenERP',
22 | 'description' : 'Ideas management module',
23 | 'category': 'Enterprise Innovation',
24 | 'website': 'http://www.openerp.com',
25 | 'depends' : ['base'], # list of dependencies, conditioning startup order
26 | 'update_xml' : [
27 | 'security/groups.xml', # always load groups first!
28 | 'security/ir.model.access.csv', # load access rights after groups
29 | 'workflow/workflow.xml',
30 | 'view/views.xml',
31 | 'wizard/wizard.xml',
32 | 'report/report.xml',
33 |],
34 | 'demo_xml': ['demo/demo.xml'], # demo data (for unit tests)
35 | 'active': False, # whether to install automatically at new DB creation
36 | }
```

## Object Service – ORM

Key component of OpenObject, the Object Service (OSV) implements a complete Object-Relational mapping layer, freeing developers from having to write basic SQL plumbing.

Business objects are declared as Python classes inheriting from the `osv.osv` class, which makes them part of the OpenObject Model, and magically persisted by the ORM layer.

Predefined attributes are used in the Python class to specify a business object's characteristics for the ORM:

**idea.py:**

```

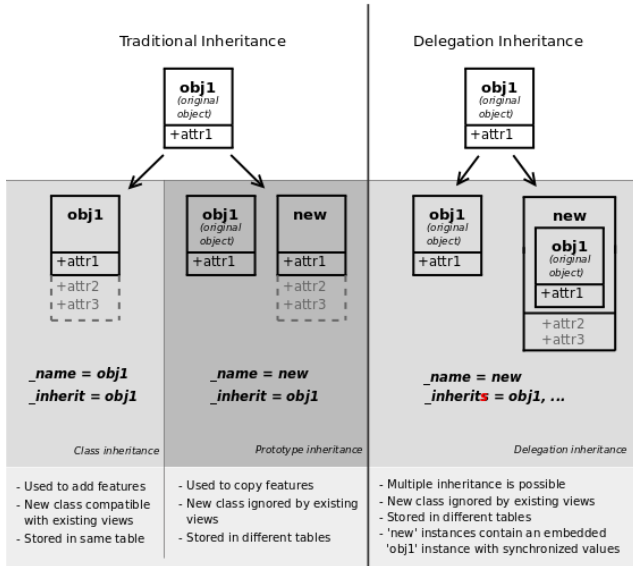
37 from osv import osv, fields
38 class idea(osv.osv):
39 _name = 'idea.idea'
40 _columns = {
41 'name': fields.char('Title', size=64, required=True, translate=True),
42 'state': fields.selection([('draft', 'Draft'),
43 ('confirmed', 'Confirmed')], 'State', required=True, readonly=True),
44 # Description is read-only when not draft!
45 'description': fields.text('Description', readonly=True,
46 states={'draft': [('readonly', False)]}),
47 'active': fields.boolean('Active'),
48 'invent_date': fields.date('Invent date'),
49 # by convention, many2one fields end with '_id'
50 'inventor_id': fields.many2one('res.partner', 'Inventor'),
51 'inventor_country_id': fields.related('inventor_id', 'country',
52 readonly=True, type='many2one',
53 relation='res.country', string='Country'),
54 # by convention, *2many fields end with '_ids'
55 'vote_ids': fields.one2many('idea.vote', 'idea_id', 'Votes'),
56 'sponsor_ids': fields.many2many('res.partner', 'idea_sponsor_rel',
57 'idea_id', 'sponsor_id', 'Sponsors'),
58 'score': fields.float('Score', digits=(2,1)),
59 'category_id' = many2one('idea.category', 'Category'),
60 }
61 _defaults = {
62 'active': lambda *a: 1, # ideas are active by default
63 'state': lambda *a: 'draft', # ideas are in draft state by default
64 }
65 def _check_name(self, cr, uid, ids):
66 for idea in self.browse(cr, uid, ids):
67 if 'spam' in idea.name: return False # Can't create ideas with spam!
68 return True
69 _sql_constraints = [('name_uniq', 'unique(name)', 'Idea must be unique!')]
70 _constraints = [(_check_name, 'Please avoid spam in ideas !', ['name'])]
71 idea() # Instantiate the class

```

#### Predefined osv.osv attributes for business objects

|                                  |                                                                                                                                                                                                    |
|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>_name</code> (required)    | business object name, in dot-notation (in module namespace)                                                                                                                                        |
| <code>_columns</code> (required) | dictionary {field names → object fields declarations }                                                                                                                                             |
| <code>_defaults</code>           | dictionary: { field names → functions providing defaults }<br><code>_defaults['name'] = lambda self, cr, uid, context: 'eggs'</code>                                                               |
| <code>_auto</code>               | if <code>True</code> (default) the ORM will create the database table – set to <code>False</code> to create your own table/view within the <code>init()</code> method                              |
| <code>_inherit</code>            | <code>_name</code> of the parent business object (for <i>prototype</i> inheritance)                                                                                                                |
| <code>_inherits</code>           | for multiple / <i>instance</i> inheritance mechanism: dictionary mapping the <code>_name</code> of the parent business objects to the names of the corresponding foreign key fields to use         |
| <code>_constraints</code>        | list of tuples defining the Python constraints, in the form <code>(func_name, message, fields)</code> . (→ 70)                                                                                     |
| <code>_sql_constraints</code>    | list of tuples defining the SQL constraints, in the form <code>(name, sql_def, message)</code> . (→ 69)                                                                                            |
| <code>_log_access</code>         | If <code>True</code> (default), 4 fields (create_uid, create_date, write_uid, write_date) will be used to log record-level operations, made accessible via osv's <code>perm_read()</code> function |
| <code>_order</code>              | Name of the field used to sort the records in lists (default: 'id')                                                                                                                                |
| <code>_rec_name</code>           | Alternative field to use as name, used by osv's <code>name_get()</code> (default: 'name')                                                                                                          |
| <code>_sql</code>                | SQL code to create the table/view for this object (if <code>_auto</code> is <code>False</code> ) – can be replaced by SQL execution in the <code>init()</code> method                              |
| <code>_table</code>              | SQL table name to use (default: <code>_name</code> with dots '.' replaced by underscores '_')                                                                                                      |

## Inheritance mechanisms



## ORM field types

Objects may contain 3 types of fields: simple, relational, and functional. *Simple* types are integers, floats, booleans, strings, etc. *Relational* fields represent the relationships between objects (one2many, many2one, many2many). *Functional* fields are not stored in the database but calculated on-the-fly as Python functions. Relevant examples in the *idea* class above are indicated with the corresponding line numbers (→xx,xx)

| ORM fields types                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>Common attributes supported by all fields (optional unless specified)</i>                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <ul style="list-style-type: none"> <li><b>string:</b> field label (<b>required</b>)</li> <li><b>required:</b> <i>True</i> if mandatory</li> <li><b>readonly:</b> <i>True</i> if not editable</li> <li><b>help:</b> help tooltip</li> <li><b>select:</b> <i>1</i> to include in search views and optimize for list filtering (with database index)</li> </ul> | <ul style="list-style-type: none"> <li><b>context:</b> dictionary with contextual parameters (for relational fields)</li> <li><b>change_default:</b> <i>True</i> if field should be usable as condition for default values in clients</li> <li><b>states:</b> dynamic changes to this field's common attributes based on the <b>state</b> field (→ 42,46)</li> </ul>                                                                                          |
| <b>Simple fields</b>                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>boolean(...)</b> <b>integer(...)</b> <b>date(...)</b> <b>datetime(...)</b> <b>time(...)</b>                                                                                                                                                                                                                                                               | <pre>'active': fields.boolean('Active'), 'priority': fields.integer('Priority'), 'start_date': fields.date('Start Date'),</pre>                                                                                                                                                                                                                                                                                                                               |
| <b>char(string, size, translate=False, ...)</b> <b>text(string, translate=False, ...)</b><br><i>Text-based fields</i>                                                                                                                                                                                                                                        | <ul style="list-style-type: none"> <li><b>translate:</b> <i>True</i> if field values can be translated by users</li> <li><b>size:</b> maximum size for <b>char</b> fields (→ 41,45)</li> </ul>                                                                                                                                                                                                                                                                |
| <b>float(string, digits=None, ...)</b><br><i>Floating-point value with arbitrary precision and scale</i>                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"> <li><b>digits:</b> tuple (precision, scale) (→ 58) . If <b>digits</b> is not provided, it's a float, not a decimal type.</li> </ul>                                                                                                                                                                                                                                                                                        |
| <b>selection(values, string, ...)</b><br><i>Field allowing selection among a set of predefined values</i>                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"> <li><b>values:</b> list of values (key-label tuples) or function returning such a list (<b>required</b>) (→ 42)</li> </ul>                                                                                                                                                                                                                                                                                                 |
| <b>binary(string, filters=None, ...)</b><br><i>Field for storing a file or binary content.</i>                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"> <li><b>filters:</b> optional filename filters</li> </ul> <pre>'picture': fields.binary('Picture', filters='*.png,*.gif')</pre>                                                                                                                                                                                                                                                                                             |
| <b>reference(string, selection, size,...)</b><br><i>Field with dynamic relationship to any other object, associated with an assistant widget</i>                                                                                                                                                                                                             | <ul style="list-style-type: none"> <li><b>selection:</b> model <b>_name</b> of allowed objects types and corresponding label (same format as <b>values</b> for <b>selection</b> fields) (<b>required</b>)</li> <li><b>size:</b> size of text column used to store it (as text: 'model_name,object_id') (<b>required</b>)</li> </ul> <pre>'contact': fields.reference('Contact', [ ('res.partner', 'Partner'), ('res.partner.contact', 'Contact')], 128)</pre> |
| <b>Relational fields</b>                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <i>Common attributes supported by relational fields</i>                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>many2one(obj, ondelete='set null', ...)</b> (→ 50)<br><i>Relationship towards a parent object (using a foreign key)</i>                                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li><b>obj:</b> <b>_name</b> of destination object (<b>required</b>)</li> <li><b>ondelete:</b> deletion handling, e.g. 'set null', 'cascade', see PostgreSQL documentation</li> </ul>                                                                                                                                                                                                                                      |
| <b>one2many(obj, field_id, ...)</b> (→ 55)<br><i>Virtual relationship towards multiple objects (inverse of many2one)</i>                                                                                                                                                                                                                                     | <ul style="list-style-type: none"> <li><b>obj:</b> <b>_name</b> of destination object (<b>required</b>)</li> <li><b>field_id:</b> field name of inverse many2one, i.e. corresponding foreign key (<b>required</b>)</li> </ul>                                                                                                                                                                                                                                 |
| <b>many2many(obj, rel, field1, field2, ...)</b> (→ 56)<br><i>Bidirectional multiple relationship between objects</i>                                                                                                                                                                                                                                         | <ul style="list-style-type: none"> <li><b>obj:</b> <b>_name</b> of destination object (<b>required</b>)</li> <li><b>rel:</b> relationship table to use (<b>required</b>)</li> <li><b>field1:</b> name of field in <b>rel</b> table storing the id of the current object (<b>required</b>)</li> <li><b>field2:</b> name of field in <b>rel</b> table storing the id of the target object (<b>required</b>)</li> </ul>                                          |

| ORM fields types                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Functional fields                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <p><b>function</b>(fnct, arg=None, fnct_inv=None, fnct_inv_arg=None, type='float', fnct_search=None, obj=None, method=False, store=False, multi=False,...)</p> <p><i>Functional field simulating a real field, computed rather than stored</i></p> <ul style="list-style-type: none"> <li>• <b>fnct</b>: function to compute the field value (<b>required</b>)<br/> def fnct(self, cr, uid, ids, field_name, arg, context)<br/> returns a dictionary { ids → values } with values of type <b>type</b></li> <li>• <b>fnct_inv</b>: function used to write a value in the field instead<br/> def fnct_inv(obj, cr, uid, id, name, value, fnct_inv_arg, context)</li> <li>• <b>type</b>: type of simulated field (any other type besides 'function')</li> <li>• <b>fnct_search</b>: function used to search on this field<br/> def fnct_search(obj, cr, uid, obj, name, args)<br/> returns a list of tuples arguments for <b>search()</b>, e.g. [('id','in',[1,3,5])]</li> <li>• <b>obj</b>: model <b>_name</b> of simulated field if it is a relational field</li> <li>• <b>store, multi</b>: optimization mechanisms (see usage in Performance Section)</li> </ul> |
| <p><b>related</b>(f1, f2, ..., type='float', ...) <i>Shortcut field equivalent to browsing chained fields</i></p> <ul style="list-style-type: none"> <li>• <b>f1,f2,...</b>: chained fields to reach target (<b>f1 required</b>) (→ 51)</li> <li>• <b>type</b>: type of target field</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <p><b>property</b>(obj, type='float', view_load=None, group_name=None, ...)</p> <p><i>Dynamic attribute with specific access rights</i></p> <ul style="list-style-type: none"> <li>• <b>obj</b>: object (<b>required</b>)</li> <li>• <b>type</b>: type of equivalent field</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

### Tip: relational fields symmetry

- one2many ↔ many2one are symmetric
- many2many ↔ many2many are symmetric when inversed (swap field1 and field2)
- one2many ↔ many2one + many2one ↔ one2many = many2many

### Special / Reserved field names

A few field names are reserved for pre-defined behavior in OpenObject. Some of them are created automatically by the system, and in that case any field with that name will be ignored.

|                                                       |                                                                                                                                                                                         |
|-------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>id</b>                                             | unique system identifier for the object (created by ORM, do not add it)                                                                                                                 |
| <b>name</b>                                           | defines the value used by default to display the record in lists, etc.<br>if missing, set <b>_rec_name</b> to specify another field to use for this purpose                             |
| <b>active</b>                                         | defines visibility: records with <b>active</b> set to <i>False</i> are hidden by default                                                                                                |
| <b>sequence</b>                                       | defines order and allows drag&drop reordering if included in list views                                                                                                                 |
| <b>state</b>                                          | defines life-cycle stages for the object, used for workflows                                                                                                                            |
| <b>parent_id</b>                                      | defines tree structure on records, and enables <b>child_of</b> operator                                                                                                                 |
| <b>parent_left, parent_right</b>                      | used in conjunction with <b>_parent_store</b> flag on object, allows faster access to tree structures (see also <i>Performance Optimization</i> section)                                |
| <b>create_date, create_uid, write_date, write_uid</b> | used to log creator, last updater, date of creation and last update date of the record. disabled if <b>_log_access</b> flag is set to <i>False</i><br>(created by ORM, do not add them) |

### Working with the ORM

Inheriting from the **osv.osv** class makes all the ORM methods available on business objects. These methods may be invoked on the **self** object within the Python class itself (see examples in the table below), or from outside the class by first obtaining an instance via the ORM pool system.

#### ORM usage sample

```

72 class idea2(osv.osv):
73 _name = 'idea.idea'
74 _inherit = 'idea.idea'
75 def _score_calc(self, cr, uid, ids, field, arg, context=None):
76 res = {}
77 # This loop generates only 2 queries thanks to browse()!
78 for idea in self.browse(cr, uid, ids, context=context):
79 sum_vote = sum([v.vote for v in idea.vote_ids])
80 avg_vote = sum_vote/len(idea.vote_ids)
81 res[idea.id] = avg_vote
82 return res
83 _columns = {
84 # Replace static score with average of votes
85 'score': fields.function(_score_calc, type='float', method=True)
86 }
87 idea2()

```

## ORM Methods on osv.osv objects

|                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>OSV generic accessor</i>                                                                                                                                                                                            | <ul style="list-style-type: none"> <li><code>self.pool.get('object_name')</code> may be used to obtain a model class from anywhere</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <i>Common parameters, used by multiple methods</i>                                                                                                                                                                     | <ul style="list-style-type: none"> <li><code>cr</code>: database connection (cursor)</li> <li><code>uid</code>: id of user performing the operation</li> <li><code>ids</code>: list of record <code>ids</code>, or single integer when there is only one id</li> <li><code>context</code>: optional dictionary of contextual parameters, such as user language<br/>e.g. <code>{ 'lang': 'en_US', ... }</code></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>create</b> ( <code>cr, uid, values, context=None</code> )<br><br><i>Creates a new record with the specified value</i><br><i>Returns: id of the new record</i>                                                       | <ul style="list-style-type: none"> <li><code>values</code>: dictionary of field values for the record</li> </ul> <pre>idea_id = self.create(cr, uid,     { 'name': 'Spam recipe',       'description': 'spam &amp; eggs',       'inventor_id': 45,     })</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>search</b> ( <code>cr, uid, args, offset=0, limit=None, order=None, context=None, count=False</code> )<br><br><i>Returns: list of ids of records matching the given criteria</i>                                    | <ul style="list-style-type: none"> <li><code>args</code>: list of tuples specifying search criteria</li> <li><code>offset</code>: optional number of records to skip</li> <li><code>limit</code>: optional max number of records to return</li> <li><code>order</code>: optional columns to sort by (default: <code>self._order</code>)</li> <li><code>count</code>: if <code>True</code>, returns only the number of records matching the criteria, not their ids</li> </ul> <pre>#Operators: =, !=, &gt;, &gt;=, &lt;, &lt;=, like, ilike, #in, not in, child_of, parent_left, parent_right #Prefix operators: '&amp;' (default), ' ', '!' #Fetch non-spam partner shops + partner 34 ids = self.search(cr, uid,     [ ' ', ('partner_id', '!=', 34),       '!', ('name', 'ilike', 'spam'), ],     order='partner_id')</pre> |
| <b>read</b> ( <code>cr, user, ids, fields=None, context=None</code> )<br><br><i>Returns: list of dictionaries with requested field values</i>                                                                          | <ul style="list-style-type: none"> <li><code>fields</code>: optional list of field names to return (default: all fields)</li> </ul> <pre>results = self.read(cr, uid, [42,43],     ['name', 'inventor_id']) print 'Inventor:', results[0]['inventor_id']</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>write</b> ( <code>cr, uid, ids, values, context=None</code> )<br><br><i>Updates records with given ids with the given values.</i><br><i>Returns: True</i>                                                           | <ul style="list-style-type: none"> <li><code>values</code>: dictionary of field values to update</li> </ul> <pre>self.write(cr, uid, [42,43],     { 'name': 'spam &amp; eggs',       'partner_id': 24,     })</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>copy</b> ( <code>cr, uid, id, defaults, context=None</code> )<br><br><i>Duplicates record with given id updating it with defaults values.</i><br><i>Returns: True</i>                                               | <ul style="list-style-type: none"> <li><code>defaults</code>: dictionary of field values to change before saving the duplicated object</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>unlink</b> ( <code>cr, uid, ids, context=None</code> )<br><br><i>Deletes records with the given ids</i><br><i>Returns: True</i>                                                                                     | <pre>self.unlink(cr, uid, [42,43])</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>browse</b> ( <code>cr, uid, ids, context=None</code> )<br><br><i>Fetches records as objects, allowing to use dot-notation to browse fields and relations</i><br><i>Returns: object or list of objects requested</i> | <pre>idea = self.browse(cr, uid, 42) print 'Idea description:', idea.description print 'Inventor country code:',     idea.inventor_id.address[0].country_id.code for vote in idea.vote_ids:     print 'Vote %2.2f' % vote.vote</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>default_get</b> ( <code>cr, uid, fields, context=None</code> )<br><br><i>Returns: a dictionary of the default values for fields (set on the object class, by the user preferences, or via the context)</i>          | <ul style="list-style-type: none"> <li><code>fields</code>: list of field names</li> </ul> <pre>defs = self.default_get(cr, uid,     ['name', 'active']) # active should be True by default assert defs['active']</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>perm_read</b> ( <code>cr, uid, ids, details=True</code> )<br><br><i>Returns: a list of ownership dictionaries for each requested record</i>                                                                         | <ul style="list-style-type: none"> <li><code>details</code>: if <code>True</code>, <code>*_uid</code> fields are replaced with the name of the user</li> <li>returned dictionaries contain: object id (<code>id</code>), creator user id (<code>create_uid</code>), creation date (<code>create_date</code>), updater user id (<code>write_uid</code>), update date (<code>write_date</code>)</li> </ul> <pre>perms = self.perm_read(cr, uid, [42,43]) print 'creator:', perms[0].get('create_uid', 'n/a')</pre>                                                                                                                                                                                                                                                                                                               |

## ORM Methods on osv.osv objects

|                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>fields_get</b>(cr, uid, fields=None, context=None)</p> <p>Returns a dictionary of field dictionaries, each one describing a field of the business object</p>                                                                                                                      | <ul style="list-style-type: none"> <li>• <b>fields</b>: list of field names</li> </ul> <pre>class idea(osv.osv):     (...)     _columns = {         'name' : fields.char('Name', size=64)     }     (...)     def test_fields_get(self, cr, uid):         assert(self.fields_get('name')['size'] == 64)</pre>                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <p><b>fields_view_get</b>(cr, uid, view_id=None, view_type='form', context=None, toolbar=False)</p> <p>Returns a dictionary describing the composition of the requested view (including inherited views and extensions)</p>                                                             | <ul style="list-style-type: none"> <li>• <b>view_id</b>: id of the view or None</li> <li>• <b>view_type</b>: type of view to return if view_id is None ('form','tree', ...)</li> <li>• <b>toolbar</b>: True to include contextual actions</li> </ul> <pre>def test_fields_view_get(self, cr, uid):     idea_obj = self.pool.get('idea.idea')     form_view = idea_obj.fields_view_get(cr, uid)</pre>                                                                                                                                                                                                                                                                                                                                  |
| <p><b>name_get</b>(cr, uid, ids, context={})</p> <p>Returns tuples with the text representation of requested objects for to-many relationships</p>                                                                                                                                      | <pre># Ideas should be shown with invention date def name_get(self, cr, uid, ids):     res = []     for r in self.read(cr, uid, ids['name', 'create_date']):         res.append((r['id'], '%s (%s)' (r['name'], year)))     return res</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <p><b>name_search</b>(cr, uid, name="", args=None, operator='ilike', context=None, limit=80)</p> <p>Returns list of object names matching the criteria, used to provide completion for to-many relationships. Equivalent of <code>search()</code> on <code>name + name_get()</code></p> | <ul style="list-style-type: none"> <li>• <b>name</b>: object name to search for</li> <li>• <b>operator</b>: operator for name criterion</li> <li>• <b>args, limit</b>: same as for <code>search()</code></li> </ul> <pre># Countries can be searched by code or name def name_search(self, cr, uid, name='',     args=[], operator='ilike', context={},     limit=80):     ids = []     if name and len(name) == 2:         ids = self.search(cr, user,             [('code', '=', name)] + args,             limit=limit, context=context)     if not ids:         ids = self.search(cr, user,             [('name', operator, name)] + args,             limit=limit, context=context)     return self.name_get(cr, uid, ids)</pre> |
| <p><b>export_data</b>(cr, uid, ids, fields, context=None)</p> <p>Exports <code>fields</code> for selected objects, returning a dictionary with a <code>datas</code> matrix. Used when exporting data via client menu.</p>                                                               | <ul style="list-style-type: none"> <li>• <b>fields</b>: list of field names</li> <li>• <b>context</b> may contain <code>import_comp</code> (default: <code>False</code>) to make exported data compatible with <code>import_data()</code> (may prevent exporting some fields)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <p><b>import_data</b>(cr, uid, fields, data, mode='init', current_module="", noupdate=False, context=None, filename=None)</p> <p>Imports given data in the given module Used when exporting data via client menu</p>                                                                    | <ul style="list-style-type: none"> <li>• <b>fields</b>: list of field names</li> <li>• <b>data</b>: data to import (see <code>export_data()</code>)</li> <li>• <b>mode</b>: 'init' or 'update' for record creation</li> <li>• <b>current_module</b>: module name</li> <li>• <b>noupdate</b>: flag for record creation</li> <li>• <b>filename</b>: optional file to store partial import state for recovery</li> </ul>                                                                                                                                                                                                                                                                                                                 |

**Tip:** use `read()` through webservice calls, but always `browse()` internally

## Building the module interface

To construct a module, the main mechanism is to insert data records declaring the module interface components. Each module element is a regular data record: menus, views, actions, roles, access rights, etc.

### Common XML structure

XML files declared in a module's `update_xml` attribute contain record declarations in the following form:

```
88 <?xml version="1.0" encoding="utf-8"?>
89 <openerp>
90 <data>
91 <record model="object_model_name" id="object_xml_id">
92 <field name="field1">value1</field>
93 <field name="field2">value2</field>
94 </record>
95 <record model="object_model_name2" id="object_xml_id2">
96 <field name="field1" ref="module.object_xml_id"/>
97 <field name="field2" eval="ref('module.object_xml_id')"/>
98 </record>
99 </data>
100 </openerp>
```

Each type of record (view, menu, action) support a specific set of child entities and attributes, but all share the following special attributes:

|             |                                                                                                                                                                             |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>id</b>   | the unique (per module) XML identifier of this record ( <code>xml_id</code> )                                                                                               |
| <b>ref</b>  | used instead of element content to reference another record (works cross-module by prepending the module name)                                                              |
| <b>eval</b> | used instead of element content to provide value as a Python expression, that can use the <code>ref()</code> method to find the database id for a given <code>xml_id</code> |

### Tip: XML RelaxNG validation

OpenObject validates the syntax and structure of XML files, according to a RelaxNG grammar, found in `server/bin/import_xml.rng`.

For manual check use `xmllint -relaxng /path/to/import_xml.rng <file>`

### Common CSV syntax

CSV files can also be added in `update_xml`, and the records will be inserted by the OSV's `import_data()` method, using the CSV filename to determine the target object model. The ORM automatically reconnects relationships based on the following special column names:

|                                   |                                                                                    |
|-----------------------------------|------------------------------------------------------------------------------------|
| <code>id (xml_id)</code>          | column containing identifiers for relationships                                    |
| <code>many2one_field</code>       | reconnect many2one using <code>name_search()</code>                                |
| <code>many2one_field:id</code>    | reconnect many2one based on object's <code>xml_id</code>                           |
| <code>many2one_field.id</code>    | reconnect many2one based on object's <code>database id</code>                      |
| <code>many2many_field</code>      | reconnects via <code>name_search()</code> , repeat for multiple values             |
| <code>many2many_field:id</code>   | reconnects with object's <code>xml_id</code> , repeat for multiple values          |
| <code>many2many_field.id</code>   | reconnects with object's <code>database id</code> , repeat for multiple values     |
| <code>one2many_field/field</code> | creates <code>one2many</code> destination record and sets <code>field</code> value |

### ir.model.access.csv

```
101 "id","name","model_id:id","group_id:id","perm_read","perm_write","perm_create","perm_unlink"
102 "access_idea_idea","idea.idea","model_idea_idea","base.group_user",1,0,0,0
103 "access_idea_vote","idea.vote","model_idea_vote","base.group_user",1,0,0,0
```

### Menus and actions

Actions are declared as regular records and can be triggered in 3 ways:

- by clicking on menu items linked to a specific action
- by clicking on buttons in views, if these are connected to actions
- as contextual actions on an object

### Action declaration

```
104 <record model="ir.actions.act_window" id="action_id">
105 <field name="name">action.name</field>
106 <field name="view_id" ref="view_id"/>
107 <field name="domain">[list of 3-tuples (max 250 characters)]</field>
108 <field name="context">{context dictionary (max 250 characters)}</field>
109 <field name="res_model">object.model.name</field>
110 <field name="view_type">form|tree</field>
111 <field name="view_mode">form,tree,calendar,graph</field>
112 <field name="target">new</field>
113 <field name="search_view_id" ref="search_view_id"/>
114 </record>
```

|                             |                                                                                                                                        |
|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| <code>id</code>             | identifier of the action in table <code>ir.actions.act_window</code> , must be unique                                                  |
| <code>name</code>           | action name ( <b>required</b> )                                                                                                        |
| <code>view_id</code>        | specific view to open (if missing, highest priority view of given type is used)                                                        |
| <code>domain</code>         | tuple (see <code>search()</code> arguments) for filtering the content of the view                                                      |
| <code>context</code>        | context dictionary to pass to the view                                                                                                 |
| <code>res_model</code>      | object model on which the view to open is defined                                                                                      |
| <code>view_type</code>      | set to <code>form</code> to open records in edit mode, set to <code>tree</code> for a tree view only                                   |
| <code>view_mode</code>      | if <code>view_type</code> is <code>form</code> , list allowed modes for viewing records ( <code>form</code> , <code>tree</code> , ...) |
| <code>target</code>         | set to <code>new</code> to open the view in a new window                                                                               |
| <code>search_view_id</code> | identifier of the search view to replace default search form ( <i>new in version 5.2</i> )                                             |

### Menu declaration

The `menuitem` entity is a shortcut for declaring an `ir.ui.menu` record and connect it with a corresponding action via an `ir.model.data` record.

```
115 <menuitem id="menu_id" parent="parent_menu_id"
116 name="label" action="action_id" icon="icon-code"
117 groups="groupname1,groupname2" sequence="10"/>
```

|                       |                                                                                                                                                |
|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>id</code>       | identifier of the menuitem, must be unique                                                                                                     |
| <code>parent</code>   | id of the parent menu in the hierarchy                                                                                                         |
| <code>name</code>     | Optional menu label (default: action name)                                                                                                     |
| <code>action</code>   | identifier of action to execute, if any                                                                                                        |
| <code>icon</code>     | icon to use for this menu (e.g. <code>terp-graph</code> , <code>STOCK_OPEN</code> , see <a href="http://doc.openerp.com">doc.openerp.com</a> ) |
| <code>groups</code>   | list of groups that can see this menu item (if missing, all groups can see it)                                                                 |
| <code>sequence</code> | integer index for ordering sibling menuitems (10,20,30..)                                                                                      |

## Views and inheritance

Views form a hierarchy. Several views of the same type can be declared on the same object, and will be used depending on their priorities. By declaring an inherited view it is possible to add/remove features in a view.

### Generic view declaration

```
118 <record model="ir.ui.view" id="view_id">
119 <field name="name">view.name</field>
120 <field name="model">object_name</field>
121 <field name="type">form</field> # tree, form, calendar, search, graph, gantt
122 <field name="priority" eval="16"/>
123 <field name="arch" type="xml">
124 <!-- view content: <form>, <tree>, <graph>, ... -->
125 </field>
126 </record>
```

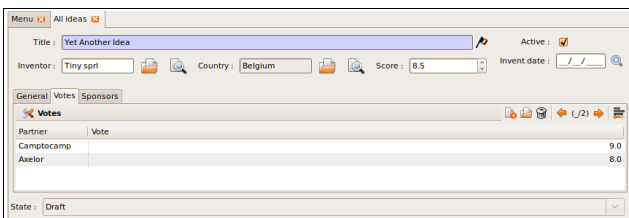
*id* unique view identifier  
*name* view name  
*model* object model on which the view is defined (same as *res\_model* in actions)  
*type* view type: *form*, *tree*, *graph*, *calendar*, *search*, *gantt* (*search* is new in 5.2)  
*priority* view priority, smaller is higher (default: 16)  
*arch* architecture of the view, see various view types below

### Forms (to view/edit records)

Forms allow creation/editing of resources, and correspond to `<form>` elements.

|                  |                                      |
|------------------|--------------------------------------|
| Allowed elements | <i>all (see form elements below)</i> |
|------------------|--------------------------------------|

```
127 <form string="Idea form">
128 <group col="6" colspan="4">
129 <group colspan="5" col="6">
130 <field name="name" select="1" colspan="6"/>
131 <field name="inventor_id" select="1"/>
132 <field name="inventor_country_id" />
133 <field name="score" select="2"/>
134 </group>
135 <group colspan="1" col="2">
136 <field name="active"/><field name="invent_date"/>
137 </group>
138 </group>
139 <notebook colspan="4">
140 <page string="General">
141 <separator string="Description"/>
142 <field colspan="4" name="description" nolabel="1"/>
143 </page>
144 <page string="Votes">
145 <field colspan="4" name="vote_ids" nolabel="1" select="1">
146 <tree>
147 <field name="partner_id"/>
148 <field name="vote"/>
149 </tree>
150 </field>
151 </page>
152 <page string="Sponsors">
153 <field colspan="4" name="sponsor_ids" nolabel="1" select="1"/>
154 </page>
155 </notebook>
156 <field name="state"/>
157 <button name="do_confirm" string="Confirm" icon="gtk-ok" type="object"/>
158 </form>
```



## Form Elements

Common attributes for all elements:

- **string**: label of the element
- **nolabel**: 1 to hide the field label
- **colspan**: number of column on which the field must span
- **rowspan**: number of rows on which the field must span
- **col**: number of column this element must allocate to its child elements
- **invisible**: 1 to hide this element completely
- **eval**: evaluate this Python code as element content (content is string by default)
- **attrs**: Python map defining dynamic conditions on these attributes: **readonly**, **invisible**, **required** based on search tuples on other field values

**field** automatic widgets depending on the corresponding field type. Attributes:

- **string**: label of the field, also for search (overrides field name)
- **select**: 1 to show the field in normal search, 2 for advanced only
- **nolabel**: 1 to hide the field label
- **required**: override **required** field attribute
- **readonly**: override **readonly** field attribute
- **password**: *True* to hide characters typed in this field
- **context**: Python code declaring a context dictionary
- **domain**: Python code declaring list of tuples for restricting values
- **on\_change**: Python method call to trigger when value is changed
- **completion**: 1 to enable auto-completion of values when possible
- **groups**: comma-separated list of group (id) allowed to see this field
- **widget**: select alternative widget (*one2many\_list*, *many2many*, *url*, *email*, *image*, *float\_time*, *reference*, *text\_wiki*, *text\_html*, *progressbar*)

**properties** dynamic widget showing all available properties (no attribute)

**button** clickable widget associated with actions. Specific attributes:

- **type**: type of button: *workflow* (default), *object*, or *action*
- **name**: workflow signal, function name (without parentheses) or action to call (depending on **type**)
- **confirm**: text of confirmation message when clicked
- **states**: comma-separated list of states in which this button is shown
- **icon**: optional icon (all GTK STOCK icons e.g. *gtk-ok*)

**separator** horizontal separator line for structuring views, with optional label

**newline** place-holder for completing the current line of the view

**label** free-text caption or legend in the form

**group** used to organise fields in groups with optional label (adds frame)

**notebook, page** **notebook** elements are tab containers for **page** elements. Attributes:

- **name**: label for the tab/page
- **position**: tabs position in notebook (*inside*, *top*, *bottom*, *left*, *right*)

## Dynamic views

In addition to what can be done with **states** and **attrs** attributes, functions may be called by view elements (via buttons of type **object**, or **on\_change** attributes on fields) to obtain dynamic behavior. These functions may alter the view interface by returning a Python map with the following entries:

|                |                                                                              |
|----------------|------------------------------------------------------------------------------|
| <b>value</b>   | a dictionary of field names and their updated values                         |
| <b>domain</b>  | a dictionary of field names and their updated domains of value               |
| <b>warning</b> | a dictionary with a <i>title</i> and <i>message</i> to show a warning dialog |

## Lists/Trees

Lists include **field** elements, are created with type **tree**, and have a **<tree>** parent element.

|                  |                                                                                                                                                                                                                                                                                                                                 |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Attributes       | <ul style="list-style-type: none"> <li>• <b>colors</b>: list of colors mapped to Python conditions</li> <li>• <b>editable</b>: <i>top</i> or <i>bottom</i> to allow in-place edit</li> <li>• <b>toolbar</b>: set to <i>True</i> to display the top level of object hierarchies as a side toolbar (example: the menu)</li> </ul> |
| Allowed elements | <i>field</i> , <i>group</i> , <i>separator</i> , <i>tree</i> , <i>button</i> , <i>filter</i> , <i>newline</i>                                                                                                                                                                                                                   |

```

159 <tree string="Idea Categories" toolbar="1" colors="blue:state==draft">
160 <field name="name"/>
161 <field name="state"/>
162 </tree>

```

## Calendars

Views used to display date fields as calendar events (**<calendar>** parent)

|                  |                                                                                                                                                                                                                                                                                                                                                                                                                               |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Attributes       | <ul style="list-style-type: none"> <li>• <b>color</b>: name of field for color segmentation</li> <li>• <b>date_start</b>: name of field containing event start date/time</li> <li>• <b>day_length</b>: length of a calendar day in hours (default: 8)</li> <li>• <b>date_stop</b>: name of field containing event stop date/time</li> <li>or</li> <li>• <b>date_delay</b>: name of field containing event duration</li> </ul> |
| Allowed elements | <i>field</i> (to define the label for each calendar event)                                                                                                                                                                                                                                                                                                                                                                    |

```

163 <calendar string="Ideas" date_start="invent_date" color="inventor_id">
164 <field name="name"/>
165 </calendar>

```

## Gantt Charts

Bar chart typically used to show project schedule (**<gantt>** parent element)

|                  |                                                                                                                                                                                                             |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Attributes       | same as <calendar>                                                                                                                                                                                          |
| Allowed elements | <i>field, level</i><br><ul style="list-style-type: none"> <li>• <i>level</i> elements are used to define the Gantt chart levels, with the enclosed field used as label for that drill-down level</li> </ul> |

```

166 <gantt string="Ideas" date_start="invent_date" color="inventor_id">
167 <level object="idea.idea" link="id" domain="[]">
168 <field name="inventor_id"/>
169 </level>
170 </gantt>

```

### Charts (Graphs)

Views used to display statistical charts (<graph> parent element)

**Tip:** charts are most useful with custom views extracting ready-to-use statistics

|                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Attributes       | <ul style="list-style-type: none"> <li>• <i>type</i>: type of chart: <i>bar, pie</i> (default)</li> <li>• <i>orientation</i>: <i>horizontal, vertical</i></li> </ul>                                                                                                                                                                                                                                                                                      |
| Allowed elements | <i>field</i> , with specific behavior: <ul style="list-style-type: none"> <li>• first field in view is X axis, 2<sup>nd</sup> one is Y, 3<sup>rd</sup> one is Z</li> <li>• 2 fields required, 3<sup>rd</sup> one is optional</li> <li>• <i>group</i> attribute defines the GROUP BY field (set to 1)</li> <li>• <i>operator</i> attribute sets the aggregation operator to use for other fields when one field is grouped (+, *, **, min, max)</li> </ul> |

```

171 <graph string="Total idea score by Inventor" type="bar">
172 <field name="inventor_id" />
173 <field name="score" operator="+"/>
174 </graph>

```

### Search views (new in v5.2)

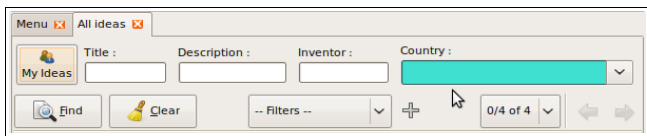
Search views are used to customize the search panel on top of list views, and are declared with the *search* type, and a top-level <search> element. After defining a search view with a unique *id*, add it to the action opening the list view using the *search\_view\_id* field in its declaration.

|                  |                                                                                                                                                                                                                                                                                                                                                                          |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Allowed elements | <i>field, group, separator, label, search, filter, newline, properties</i> <ul style="list-style-type: none"> <li>• <i>filter</i> elements allow defining button for domain filters</li> <li>• adding a <i>context</i> attribute to fields makes widgets that alter the search context (useful for context-sensitive fields, e.g. pricelist-dependent prices)</li> </ul> |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

```

175 <search string="Search Ideas">
176 <group col="6" colspan="4">
177 <filter string="My Ideas" icon="terp-partner"
178 domain="[('inventor_id', '=', uid)]"
179 help="My own ideas"/>
180 <field name="name" select="1"/>
181 <field name="description" select="1"/>
182 <field name="inventor_id" select="1"/>
183 <!-- following context field is for illustration only -->
184 <field name="inventor_country_id" select="1" widget="selection"
185 context="{ 'inventor_country': self }"/>
186 </group>
187 </search>

```



### View Inheritance

Existing views should be modifying through inherited views, never directly. An inherited view references its parent view using the *inherit\_id* field, and may add or modify existing elements in the view by referencing them through XPath expressions, specifying the appropriate *position*.

**Tip:** XPath reference can be found at [www.w3.org/TR/xpath](http://www.w3.org/TR/xpath)

|                 |                                                                                                                                           |                                                                                                                                    |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| <i>position</i> | <ul style="list-style-type: none"> <li>• <i>inside</i>: placed inside match (default)</li> <li>• <i>replace</i>: replace match</li> </ul> | <ul style="list-style-type: none"> <li>• <i>before</i>: placed before match</li> <li>• <i>after</i>: placed after match</li> </ul> |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|

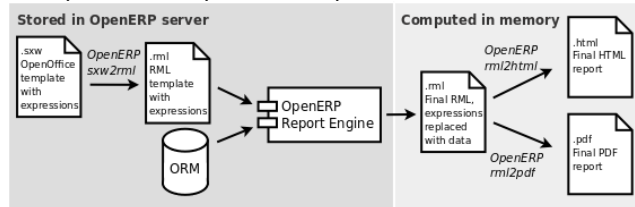
```

188 <!-- improved idea categories list -->
189 <record id="idea_category_list2" model="ir.ui.view">
190 <field name="name">id.category.list2</field>
191 <field name="model">ir.ui.view</field>
192 <field name="inherit_id" ref="id_category_list"/>
193 <field name="arch" type="xml">
194 <xpath expr="/tree/field[@name='description']" position="after">
195 <field name="idea_ids" string="Number of ideas"/>
196 </xpath>
197 </field>
198 </record>

```

# Reports

There are several report engines in OpenERP, to produce reports from different sources and in many formats.



Special expressions used inside report templates produce dynamic data and/or modify the report structure at rendering time.

Custom report parsers may be written to support additional expressions.

## Alternative Report Formats (see [doc.openerp.com](http://doc.openerp.com))

|             |                                                                                                                                              |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| sxw2rml     | OpenOffice 1.0 templates (.sxw) converted to RML with sxw2rml tool, and the RML rendered in HTML or PDF                                      |
| rml         | RML templates rendered directly as HTML or PDF                                                                                               |
| xml,xsl:rml | XML data + XSL:RML stylesheets to generate RML                                                                                               |
| odt2odt     | OpenOffice templates (.odt) used to produce directly OpenOffice documents (.odt) (As of OpenERP 5.2)                                         |
| mako        | Mako template library used to produce HTML output, by embedding Python code and OpenERP expressions within any text file (As of OpenERP 5.2) |

### Expressions used in OpenERP report templates

`[[ <content> ]]` double brackets content is evaluated as a Python expression based on the following expressions

#### Predefined expressions:

- `objects` contains the list of records to print
- `data` comes from the wizard launching the report
- `user` contains the current user (as per `browse()`)
- `time` gives access to Python `time` module
- `repeatIn(list,'var','tag')` repeats the current parent element named `tag` for each object in `list`, making the object available as `var` during each loop
- `setTag('tag1','tag2')` replaces the parent RML `tag1` with `tag2`
- `removeParentNode('tag')` removes parent RML element `tag`
- `formatLang(value, digits=2, date=False, date_time=False, grouping=True, monetary=False)` can be used to format a date, time or amount according to the locale
- `setLang('lang_code')` sets the current language and locale for translations

#### Report declaration

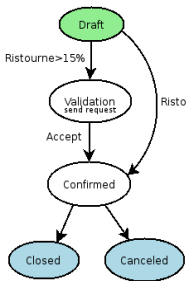
```
199 <!-- The following creates records in ir.actions.report.xml model -->
200 <report id="idea_report" string="Print Ideas" model="idea.idea"
201 name="idea.report" rml="idea/report/idea.rml" >
202 <!-- Use addons/base_report_designer/wizard/tiny_sxw2rml/tiny_sxw2rml.py
203 to generate the RML template file from a .sxw template -->
```

|                                 |                                                                                                                                                                                                                                      |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>id</code>                 | unique report identifier                                                                                                                                                                                                             |
| <code>name</code>               | name for the report ( <b>required</b> )                                                                                                                                                                                              |
| <code>string</code>             | report title ( <b>required</b> )                                                                                                                                                                                                     |
| <code>model</code>              | object model on which the report is defined ( <b>required</b> )                                                                                                                                                                      |
| <code>rml, sxw, xml, xsl</code> | path to report template sources (starting from <code>addons</code> ), depending on report                                                                                                                                            |
| <code>auto</code>               | set to <code>False</code> to use a custom parser, by subclassing <code>report_sxw.rml_parse</code> and declaring the report as follows:<br><code>report_sxw.report_sxw(report_name, object_model,rml_path,parser=customClass)</code> |
| <code>header</code>             | set to <code>False</code> to suppress report header (default: <code>True</code> )                                                                                                                                                    |
| <code>groups</code>             | comma-separated list of groups allowed to view this report                                                                                                                                                                           |
| <code>menu</code>               | set to <code>True</code> to link the report with the Print icon (default: <code>True</code> )                                                                                                                                        |
| <code>keywords</code>           | specify report type keyword (default: <code>client_print_multi</code> )                                                                                                                                                              |

**Tip:** RML User Guide: [www.reportlab.com/docs/rml2pdf-userguide.pdf](http://www.reportlab.com/docs/rml2pdf-userguide.pdf)

#### Example RML report extract:

```
204 <story>
205 <blockTable style="Table">
206 <tr>
207 <td><para style="Title">Idea name</para> </td>
208 <td><para style="Title">Score</para> </td>
209 </tr>
210 <tr>
211 <td><para>[[repeatIn(objects,'o','tr')]][[o.name]]</para></td>
212 <td><para>[[o.score]]</para></td>
213 </tr>
214 </blockTable>
215 </story>
```



## Workflows

Workflows may be associated with any object in OpenERP, and are entirely customizable. Workflows are used to structure and manage the lifecycles of business objects and documents, and define transitions, triggers, etc. with graphical tools. Workflows, activities (nodes or actions) and transitions (conditions) are declared as XML records, as usual. The tokens that navigate in workflows are called *workitems*.

### Workflow declaration

Workflows are declared on objects that possess a state field (see the example *idea* class in the ORM section)

```
216 <record id="wkf_idea" model="workflow">
217 <field name="name">idea.basic</field>
218 <field name="osv">idea.idea</field>
219 <field name="on_create" eval="1"/>
220 </record>
```

*id* unique workflow record identifier  
*name* name for the workflow (**required**)  
*osv* object model on which the workflow is defined (**required**)  
*on\_create* if *True*, a workitem is instantiated automatically for each new *osv* record

### Workflow Activities (nodes)

```
221 <record id="act_confirmed" model="workflow.activity">
222 <field name="name">confirmed</field>
223 <field name="wkf_id" ref="wkf_idea"/>
224 <field name="kind">function</field>
225 <field name="action">action_confirmed(</field>
226 </record>
```

*id* unique activity identifier  
*wkf\_id* parent workflow identifier  
*name* activity node label  
*flow\_start* *True* to make it a 'begin' node, receiving a workitem for each workflow instance  
*flow\_stop* *True* to make it an 'end' node, terminating the workflow when all items reach it  
*join\_mode* logical behavior of this node regarding incoming transitions:  

- *XOR*: activate on the first incoming transition (default)
- *AND*: waits for all incoming transitions to become valid

*split\_mode* logical behavior of this node regarding outgoing transitions:  

- *XOR*: one valid transition necessary, send workitem on it (default)
- *OR*: send workitems on all valid transitions (0 or more), sequentially
- *AND*: send a workitem on all valid transitions at once (fork)

*kind* type of action to perform when node is activated by a transition:  

- *dummy* to perform no operation when activated (default)
- *function* to invoke a function determined by *action*
- *subflow* to execute the subflow with *subflow\_id*, invoking *action* to determine the record id of the record for which the subflow should be instantiated. If action returns no result, the workitem is deleted.
- *stopall* to terminate the workflow upon activation

*subflow\_id* if kind *subflow*, id of the subflow to execute (use *ref* attribute or *search* with a tuple)  
*action* object method call, used if kind is *function* or *subflow*. This function should also update the *state* field of the object, e.g. for a function kind:

```
def action_confirmed(self, cr, uid, ids):
 self.write(cr, uid, ids, { 'state' : 'confirmed' })
 # ... perform other tasks
 return True
```

### Workflow Transitions (edges)

Conditions are evaluated in this order: *role\_id*, *signal*, condition expression

```
227 <record id="trans_idea_draft_confirmed" model="workflow.transition">
228 <field name="act_from" ref="act_draft"/>
229 <field name="act_to" ref="act_confirmed"/>
230 <field name="signal">button_confirm</field>
231 <field name="role_id" ref="idea_manager"/>
232 <field name="condition">1 == 1</field>
233 </record>
```

*act\_from, act\_to* identifiers of the source and destination activities  
*signal* name of a button of type workflow that triggers this transition  
*role\_id* reference to the role that user must have to trigger the transition (see *Roles*)  
*condition* Python expression that must evaluate to *True* for transition to be triggered

[CUSTOMISE]

MANAGE VIEWS  
 MANAGE WORKFLOWS  
 CUSTOMISE OBJECT

**Tip:** The Web client features a graphical workflow editor, via the *Customise*→*Manage Workflows* link at the bottom left in lists and forms.

## Security

Access control mechanisms must be combined to achieve a coherent security policy.

## Group-based access control mechanisms

Groups are created as normal records on the `res.groups` model, and granted menu access via **menu** definitions. However even without a menu, objects may still be accessible indirectly, so actual **object-level permissions** (*create,read,write,unlink*) must be defined for groups. They are usually inserted via CSV files inside modules. It is also possible to restrict access to **specific fields** on a view or object using the field's `groups` attribute.

### ir.model.access.csv

```
234 | "id","name","model_id:id","group_id:id","perm_read","perm_write","perm_create","perm_unlink"
235 | "access_idea_idea","idea.idea","model_idea_idea","base.group_user",1,1,1,0
236 | "access_idea_vote","idea.vote","model_idea_vote","base.group_user",1,1,1,0
```

## Roles

Roles are created as normal records on the `res.roles` model and used only to condition workflow transitions through transitions' `role_id` attribute.

## Wizards

Wizards describe stateful interactive sessions with the user through dynamic forms. As of OpenERP v5.0, wizards make use of the `osv_memory` in-memory persistence to allow constructing wizards from regular business objects and views.

### Wizard objects (`osv_memory`)

In-memory objects are created by extending `osv.osv_memory`:

```
237 | from osv import fields,osv
238 | import datetime
239 | class cleanup_wizard(osv.osv_memory):
240 | _name = 'idea.cleanup.wizard'
241 | _columns = {
242 | 'idea_age': fields.integer('Age (in days)'),
243 | }
244 | def cleanup(self, cr, uid, ids, context={}):
245 | idea_obj = self.pool.get('idea.idea')
246 | for wiz in self.browse(cr,uid,ids):
247 | if wiz.idea_age <= 3:
248 | raise osv.except_osv('UserError','Please select a larger age')
249 | limit = datetime.date.today()-datetime.timedelta(days=wiz.idea_age)
250 | ids_to_del = idea_obj.search(cr,uid, [('create_date', '<',
251 | limit.strftime('%Y-%m-%d 00:00:00'))], context=context)
252 | idea_obj.unlink(cr,uid,ids_to_del)
253 | return {}
254 | cleanup_wizard()
```

## Views

Wizards use regular views and their buttons may use a special `cancel` attribute to close the wizard window when clicked.

```
255 | <record id="wizard_idea_cleanup" model="ir.ui.view">
256 | <field name="name">idea.cleanup.wizard.form</field>
257 | <field name="model">idea.cleanup.wizard</field>
258 | <field name="type">form</field>
259 | <field name="arch" type="xml">
260 | <form string="Idea Cleanup Wizard">
261 | <label colspan="4" string="Select the age of ideas to cleanup"/>
262 | <field name="idea_age" string="Age (days)"/>
263 | <group colspan="4">
264 | <button string="Cancel" special="cancel" icon="gtk-cancel"/>
265 | <button string="Cleanup" name="cleanup" type="object" icon="gtk-ok"/>
266 | </group>
267 | </form>
268 | </field>
269 | </record>
```

### Wizard execution

Such wizards are launched via regular action records, with a special `target` field used to open the wizard view in a new window.

```
270 | <record id="action_idea_cleanup_wizard" model="ir.actions.act_window">
271 | <field name="name">Cleanup</field>
272 | <field name="type">ir.actions.act_window</field>
273 | <field name="res_model">idea.cleanup.wizard</field>
274 | <field name="view_type">form</field>
275 | <field name="view_mode">form</field>
276 | <field name="target">new</field>
277 | </record>
```

## WebServices – XML-RPC

OpenERP is accessible through XML-RPC interfaces, for which libraries exist in many languages.

### Python example

```
278 import xmlrpclib
279 # ... define HOST, PORT, DB, USER, PASS
280 url = 'http://%s:%d/xmlrpc/common' % (HOST,PORT)
281 sock = xmlrpclib.ServerProxy(url)
282 uid = sock.login(DB,USER,PASS)
283 print "Logged in as %s (uid:%d)" % (USER,uid)
284
285 # Create a new idea
286 url = 'http://%s:%d/xmlrpc/object' % (HOST,PORT)
287 sock = xmlrpclib.ServerProxy(url)
288 args = {
289 'name' : 'Another idea',
290 'description' : 'This is another idea of mine',
291 'inventor_id': uid,
292 }
293 idea_id = sock.execute(DB,uid,PASS, 'idea.idea', 'create', args)
```

### PHP example

```
294 <?
295 include('xmlrpc.inc'); // Use phpxmlrpc library, available on sourceforge
296 // ... define $HOST, $PORT, $DB, $USER, $PASS
297 $client = new xmlrpc_client("http://$HOST:$PORT/xmlrpc/common");
298 $msg = new xmlrpcmsg("login");
299 $msg->addParam(new xmlrpcval($DB, "string"));
300 $msg->addParam(new xmlrpcval($USER, "string"));
301 $msg->addParam(new xmlrpcval($PASS, "string"));
302 $resp = $client->send($msg);
303 uid = $resp->value()->scalarval()
304 echo "Logged in as $USER (uid:$uid)"
305
306 // Create a new idea
307 $arrayVal = array(
308 'name'=>new xmlrpcval("Another Idea", "string"),
309 'description'=>new xmlrpcval("This is another idea of mine", "string"),
310 'inventor_id'=>new xmlrpcval($uid, "int"),
311);
312 $msg = new xmlrpcmsg('execute');
313 $msg->addParam(new xmlrpcval($DB, "string"));
314 $msg->addParam(new xmlrpcval($uid, "int"));
315 $msg->addParam(new xmlrpcval($PASS, "string"));
316 $msg->addParam(new xmlrpcval("idea.idea", "string"));
317 $msg->addParam(new xmlrpcval("create", "string"));
318 $msg->addParam(new xmlrpcval($arrayVal, "struct"));
319 $resp = $client->send($msg);
320 ?>
```

## Internationalization

Each module can provide its own translations within the `i18n` directory, by having files named `LANG.po` where `LANG` is the locale code for the country, or country and language combination when they differ (e.g. `pt.po` and `pt_BR.po`). Translations will be loaded automatically by OpenERP for all enabled languages.

Developers always use English when creating a module, then export the module terms using OpenERP's `gettext POT` export feature ([Administration>Translations>Export a Translation File](#) without specifying a language), to create the module template POT file, and then derive the translated PO files.

Many IDE's have plugins or modes for editing and merging PO/POT files.

**Tip:** The GNU `gettext` format (Portable Object) used by OpenERP is integrated into LaunchPad, making it an online collaborative translation platform, with automatic translation features.

```
321 |- idea/ # The module directory
322 |- i18n/ # Translation files
323 | - idea.pot # Translation Template (exported from OpenERP)
324 | - fr.po # French translation
325 | - pt_BR.po # Brazilian Portuguese translation
326 | (...)
```

**Tip:** By default OpenERP's POT export only extracts labels inside XML records or inside field definitions in Python code, but any Python string can be translated by surrounding it with the `tools.translate.__` method (e.g. `__('Label')`)

# Rapid Application Development

## Module recorder

The `base_module_record` module can be used to export a set of changes in the form of a new module. It should be used for all customizations that should be carried on through migrations and updates. It has 2 modes:

- Start/Pause/Stop mode, where all operations (on business objects or user interface) are recorded until the recorder is stopped or paused.
- Date- and model-based mode where all changes performed after a given date on the given models (object types) are exported. .

## Report Creator (view) and Report Designer (print) modules

The `base_report_creator` module can be used to automate the creation of custom statistics views, e.g. to construct dashboards. The resulting dashboards can then be exported using the `base_module_record` module.

The `base_report_designer` module can be used in conjunction with the OpenOffice plugin to provide a user-friendly interface for selecting data from OpenERP and designing report templates within OpenOffice.

## Quality assessment module

When writing you module, use the `base_module_quality` module to test various aspects of your module: coding standards, code duplication, code efficiency, etc. (web client only). Make sure to provide a lot of demo data.

## Unit tests

Unit test files are regular OpenERP XML files, with regular `record` elements plus an appropriate combination of `function`, `workflow` and `assert` elements to test the module's business logic.

The continuous integration server will automatically execute unit tests and provide feedback. Unit tests can also be used as installation checks if you reference the XML file in the `update_xml` section of your module descriptor.

### idea\_unit\_test.xml

```
327 <record id="idea_test_1" model="idea.idea">
328 <field name="name">Unit Test Idea</field>
329 <field name="description">A sample idea for performing tests</field>
330 <field name="invent_date">20100101</field>
331 </record>
332 <assert id="idea_test_1" model="idea.idea" severity="warning"
333 string="New idea is not draft!">
334 <test expr="state">draft</field>
335 </assert>
336 <workflow ref="idea_test_1" model="idea.idea" action="button_confirm"
337 uid="base.user_admin"/>
338 <assert id="idea_test_1" model="idea.idea" severity="warning"
339 string="Confirm button does not work!">
340 <test expr="state == 'confirmed'"/>
341 </assert>
342 <function model="idea.idea" name="unlink">
343 <value eval="ref('idea_test_1')"/>
344 </function>
345 <assert search="[('name','=', 'Unit Test Idea']" model="idea.idea" count="0"
346 severity="warning" string="Test data is not deleted (name is unique!)">
```

Common attributes:

- **model**: target object model name
- **id**: `xml_id` of the record to test (`assert`) or to move in workflow (`workflow`)
- **uid**: optional id of user to perform operation (`function` or `workflow`)

- assert** Perform test(s) and fail with given string if tests do not pass.
- **string**: error message in case of test failure
  - **severity**: error severity in case of test failure (`debug,info,error,warning,critical`)
  - **search**: domain of search to perform if **id** is not provided (each record is tested)
  - **count**: if search is provided number of expected records (failure if not verified)
  - **<test>** children with **expr** Python expression that must evaluate to **True** or to the text content of the element. It can use any field of the object, Python built-ins and the **ref()** method that returns the database id for a given `xml_id`.
- function** Call method on the given model, passing the **value** children as arguments.
- **name**: name of method to call
  - **<value>** children with Python expressions, that can use the **ref()** method
- workflow** Send a workflow signal on a given object
- **ref**: `xml_id` of object to send workflow signal to
  - **action**: name of workflow signal to send

## Recurrent jobs

The `ir.cron` model is used to setup recurrent tasks.

```
347 <record id="task_id" model="ir.cron">
348 <field name="name">Task title</field>
349 <field name="user_id" ref="module.user_xml_id">
350 <field name="interval_type">minutes|hours|days|work_days|weeks|months</field>
351 <field name="interval_number" eval="<number>"/>
352 <field name="numbercall" eval="<number,negative for unlimited>"/>
353 <field name="doall" eval="True|False"/> <!-- Repeat missed calls? -->
354 <field name="model">model.name</field>
```

```

355 <field name="function">name_of_model_function_to_call</field>
356 <field name="args" eval="python code for arguments tuple"/>
357 <field name="priority" eval="<integer, smaller is higher"/>
358 </record>

```

## Performance Optimization

As Enterprise Management Software typically has to deal with large amounts of records, you may want to pay attention to the following *anti-patterns*, to obtain consistent performance:

- Do not place `browse()` calls inside loops, put them before and access only the browsed objects inside the loop. The ORM will optimize the number of database queries based on the *browsed* attributes.
- Avoid recursion on object hierarchies (objects with a `parent_id` relationship), by adding `parent_left` and `parent_right` integer fields on your object, and setting `_parent_store` to `True` in your object class. The ORM will use a *modified preorder tree traversal* to be able to perform recursive operations (e.g. `child_of`) with database queries in  $O(1)$  instead of  $O(n)$
- Do not use function fields lightly, especially if you include them in tree views. To optimize function fields, two mechanisms are available:
  - `multi`: all fields sharing the same `multi` attribute value will be computed with one single call to the function, which should then return a dictionary of values in its `values` map
  - `store`: function fields with a `store` attribute will be stored in the database, and recomputed on demand when the relevant trigger objects are modified. The format for the trigger specification is as follows: `store = {'model': (_ref_fnct, fields, priority)}` (see example below)

```

359 def _get_idea_from_vote(self, cr, uid, ids, context={}):
360 res = {}
361 vote_ids = self.pool.get('idea.vote').browse(cr, uid, ids, context=context)
362 for v in vote_ids:
363 res[v.idea_id.id] = True # Store the idea identifiers in a set
364 return res.keys()
365 def _compute(self, cr, uid, ids, field_name, arg, context={}):
366 res = {}
367 for idea in self.browse(cr, uid, ids, context=context):
368 vote_num = len(idea.vote_ids)
369 vote_sum = sum([v.vote for v in idea.vote_ids])
370 res[idea.id] = {
371 'vote_sum': vote_sum,
372 'vote_avg': (vote_sum/vote_num) if vote_num else 0.0,
373 }
374 return res
375 _columns = {
376 # These fields are recomputed whenever one of the votes changes
377 'vote_avg': fields.function(_compute, method=True, string='Votes Average',
378 store = {'idea.vote': (_get_idea_from_vote, ['vote'], 10)}, multi='votes'),
379 'vote_sum': fields.function(_compute, method=True, string='Votes Sum',
380 store = {'idea.vote': (_get_idea_from_vote, ['vote'], 10)}, multi='votes'),
381 }

```

## Community / Contributing

OpenERP projects are hosted on LaunchPad(LP), where all project resources may be found: Bazaar branches, bug tracking, blueprints, roadmap, FAQs, etc. Create a free account on [launchpad.net](http://launchpad.net) to be able to contribute.

### Launchpad groups

| Group*                                    | Members                           | Bazaar/LP restrictions                                                                        |
|-------------------------------------------|-----------------------------------|-----------------------------------------------------------------------------------------------|
| OpenERP Quality Team<br>(~openerp)        | OpenERP Core Team                 | Can merge and commit on official branches.                                                    |
| OpenERP Committers<br>(~openerp-commiter) | Selected active community members | Can mark branches to be merged into official branch. Can commit on <i>extra-addons</i> branch |
| OpenERP Drivers<br>(~openerp-drivers)     | Selected active community members | Can confirm bugs and set milestones on bugs / blueprints                                      |
| OpenERP Community<br>(~openerp-community) | Open group, anyone can join       | Can create community branches where everyone can contribute                                   |

**\*Members of upper groups are also members of lower groups**

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Published by Open Object Press, Grand Rosière, Belgium