

# Vaucanson XML developement documentation.

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December 2003

This document describe the Vaucanson XML developement.

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There is three way to use the Vaucanson XML interface.

- static mode
- dynamic mode
- pseudo-generic mode

## 1 Static mode

This mode use the standard Vaucanson I/O system. An instance of the `vcsn::xml::xml_loader` class has to be passed to the `automaton_loader` and `automaton_saver` functions.

---

```
#include <vaucanson/xml/static.hh>
#include <vaucanson/tools/usual.hh>
#include <iostream>
```

```
int main()
{
    using namespace vcsn;
    using namespace vcsn::tools;
    using namespace vcsn::xml;
```

```

XML_BEGIN;
AUTOMATON_TYPES_EXACT(usual_automaton_t);

automaton_t a;

std::cin >> automaton_loader(a, io::string_out(),
                             xml::xml_loader());

/* work on a */

std::cout << automaton_saver(a, io::string_out(),
                             xml::xml_loader());

XML_END;
}

```

---

## 2 Dynamic mode

This mode able to choose the implementation following the type of the automaton described in the XML Document.

The automaton is first loaded in a `xml_automaton_t` typed variable. Then the type can be accessed.

Here is an easy to understand example :

---

```

#include <vaucanson/xml/dynamic.hh>
#include <vaucanson/tools/usual.hh>
#include <iostream>

int main()
{
    xml_automaton_t dynamic_automaton;

    std::cin >> dynamic_automaton;

    if (x.set().semiring_set() == XmlSet::B) {
        AUTOMATON_TYPES_EXACT(usual_automaton_t);
        XMLOF(automaton_t) xml_automaton = dynamic_automaton;
        automaton_t automaton = xml_automaton;

        /* work on automaton */

        xml_automaton = automaton;
        std::cout << xml_automaton;
    }
}

```

```

if ((x.set().semiring_type() == XmlSet::NUMERICAL)
    && (x.set().semiring_set() == XmlSet::Z)) {
    AUTOMATON_TYPES_EXACT(weighted_automaton_t);
    XMLOF(automaton_t) xml_automaton = dynamic_automaton;
    automaton_t automaton = xml_automaton;

    /* work on automaton */

    xml_automaton = automaton;
    std::cout << xml_automaton;
}

return 0;
}

```

---

But this example can be written better using generic programming.

---

```

#include <vaucanson/xml/dynamic.hh>
#include <vaucanson/tools/usual.hh>
#include <iostream>

template <typename T>
int print_out(typename XMLOF(T) x)
{
    using namespace vcsn;
    using namespace vcsn::tools;
    using namespace vcsn::xml;

    AUTOMATON_TYPES_EXACT(T);

    automaton_t a = x;

    /* work on a */

    x = a;
    std::cout << x;
    return 0;
}

int main()
{
    using namespace vcsn;
    using namespace vcsn::tools;
    using namespace vcsn::xml;

    XML_BEGIN;

```

```

xml_automaton_t x;

std::cin >> x;

if ((x.set().semiring_type() == XmlSet::NUMERICAL)
    && (x.set().semiring_set() == XmlSet::Z))
    return print_out<numerical_automaton_t>(x);

if (x.set().semiring_set() == XmlSet::B)
    return print_out<usual_automaton_t>(x);

std::cerr << "Automaton type not dealt" << std::endl;
return -1;
}

```

---

### 3 Generic mode

The generic mode is very long to compile. So, some constants have to be set for activating some parts.

- VCSN\_XML\_GENRERIC\_WEIGHTED: Enable "Z" and "R" for semiring.
  - VCSN\_XML\_GENRERIC\_TRANSDUCERS: Enable "ratseries" for semiring (no recursion).
  - VCSN\_XML\_GENRERIC\_CHAR\_PAIRS: Enable "pair" of letters for free monoid.
  - VCSN\_XML\_GENRERIC\_WEIGHTED\_LETTERS: Enable "weighted" letters for free monoid.
  - VCSN\_XML\_GENRERIC\_INT\_LETTERS: Enable "integers" for free monoid.
- 

```

#define VCSN_XML_GENRERIC_WEIGHTED 1

#include <vaucanson/xml/generic.hh>
#include <vaucanson/tools/usual.hh>
#include <iostream>

struct MyData
{
    int argc;
    char **argv;
    MyData(int c, char** v) : argc(c), argv(v) { }
};

template <typename Auto>
struct MyCallBack
{
    int operator()(Auto& a, MyData&)
    {

```

```
using namespace vcsn;
using namespace vcsn::tools;
using namespace vcsn::xml;

AUTOMATON_TYPES(Auto);

/* work on a */

return 0;
}
};

int main(int argc, char *argv[])
{
    using namespace vcsn;
    using namespace vcsn::xml;

    XML_BEGIN;

    MyData data(argc, argv);
    return apply<MyCallBack, MyData>(std::cin, data);
}
```

---

## 4 Error processing

There are two possibilities, for error processing.

- The program exit on failure.
- The program raise an exception on failure (default).

To switch this mode a macro has to be set.

- `#define FAIL WITH_EXIT` for exiting.
- `#define FAIL WITH_THROW` for raising exception.

When raising exceptions, the raised exception is mainly a `vcsn::xml::LoaderException` one. This exception provides the method `get_msg()`.

---

```
xml_automaton_t x;

try {
    std::cin >> x;
}
catch (const xml::LoaderException& e) {
```

---

```

    std::cerr << "XML parser error: " << e.get_msg() << std::endl;
    return -1;
}

```

---

## 5 Geometry

### 5.1 Keeping

To keep the geometry in a graph implemented automaton, the type has to be converted to accept attached data.

---

```

template <typename T>
int print_out(typename XMLOF(T) x)
{
    using namespace vcsn;
    using namespace vcsn::tools;
    using namespace vcsn::xml;

    typedef typename ATTACHXMLINFOS(T) my_automaton_t;
    AUTOMATON_TYPES(my_automaton_t);

    automaton_t a = x;

    /* then, here, a contains the geometry */

    return 0;
}

```

---

### 5.2 Accessing

The data are in the Tag. This tag is `XmlInfosTag` typed. See Vaucanson API documentation for more information.

---

```

// This example align states diagonally with a depth-first traversal.
template<typename I>
void align(I& a)
{
    AUTOMATON_TYPES(I);
    int x = 0;
    std::map<hstate_t, bool> visited;
    std::stack<hstate_t> stack;

    for_each_state(i, a) {
        visited[*i] = false;
        // ensure inaccessible states will be visited
    }
}

```

```

    stack.push(*i);
}

for_each_initial_state(i, a)
    stack.push(*i);

while (!stack.empty()) {
    hstate_t i = stack.top();
    stack.pop();

    if (!visited[i]) {
        visited[i] = true;

        a.tag().states[i]().x = a.tag().states[i]().y = x++;

        std::list<hedge_t> aim;
        a.deltac(aim, i, delta_kind::edges());
        for_all_const_(std::list<hedge_t>, j, aim)
            stack.push(a.aim_of(*j));
    }
}
}

```

---

## 6 Sessions

Sessions are handled like lifo by class `xml::XmlSession`. `<<` and `>>` operators are use for popping un pushing.

---

```

#include <vaucanson/xml/session.hh>
#include <vaucanson/tools/usual.hh>
#include <iostream>

int main()
{
    using namespace vcsn;
    using namespace vcsn::tools;
    using namespace vcsn::xml;

    XML_BEGIN;

    typedef XMLOF(usual_automaton_t) my_xml_automaton_t;
    AUTOMATON_TYPES_EXACT(usual_automaton_t);

    automaton_t a;
    my_xml_automaton_t x;
    xml_automaton_t dyn;

```

```
XmlSession session1, session2;
std::cin >> session1;
session1 >> dyn;
a = my_xml_automaton_t(dyn);

/* work on a */

session2 << my_xml_automaton_t(a);

session >> dyn;
a = my_xml_automaton_t(dyn);

/* work on a */

session2 << my_xml_automaton_t(a);

XML_END;

return 0;
}
```

---