

2001

PC

PDA

XML

2002

PC PDA  
XML

論文 碩士學位 論文 提出

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PDA,

.

PC

PDA

가 가 .

ISP

,

.

가 .

,

가

가 ,

,

HTML

XML

,

. ,

.

XML

XSLT

Java

HTML

,

DTD XSL

가

XML



# I.

## A.

PDA(Personal Digital Assistant),

. 가

2000 2010 XML, WAP, Webtop, Bluetooth, E-Cash , 2002

6

[1]. PC PDA  
가 가 .

,

ISP(Internet Service Provider)

,

[2].

, PC ( , , , , ) ,

,

.

[2,3,4,5] , XML [6]

, [7]

, WAP(Wireless Application Protocol) forum

XHTML(eXtensible Hyper Text Markup Language) basic WAP2.0

[8] .

, XML(eXtensible Markup language)

, 가

WAP ME

가

XML

, XML

[3,6,9,10,11]가 . XSLT(eXtensible Stylesheet

Language Tranformation) Java , Oracle,

IBM XSLT ,

XSLT (open source software)

HTML

DTD(Document Type Definition) XSL(eXtensible  
Stylesheet Language)

B.

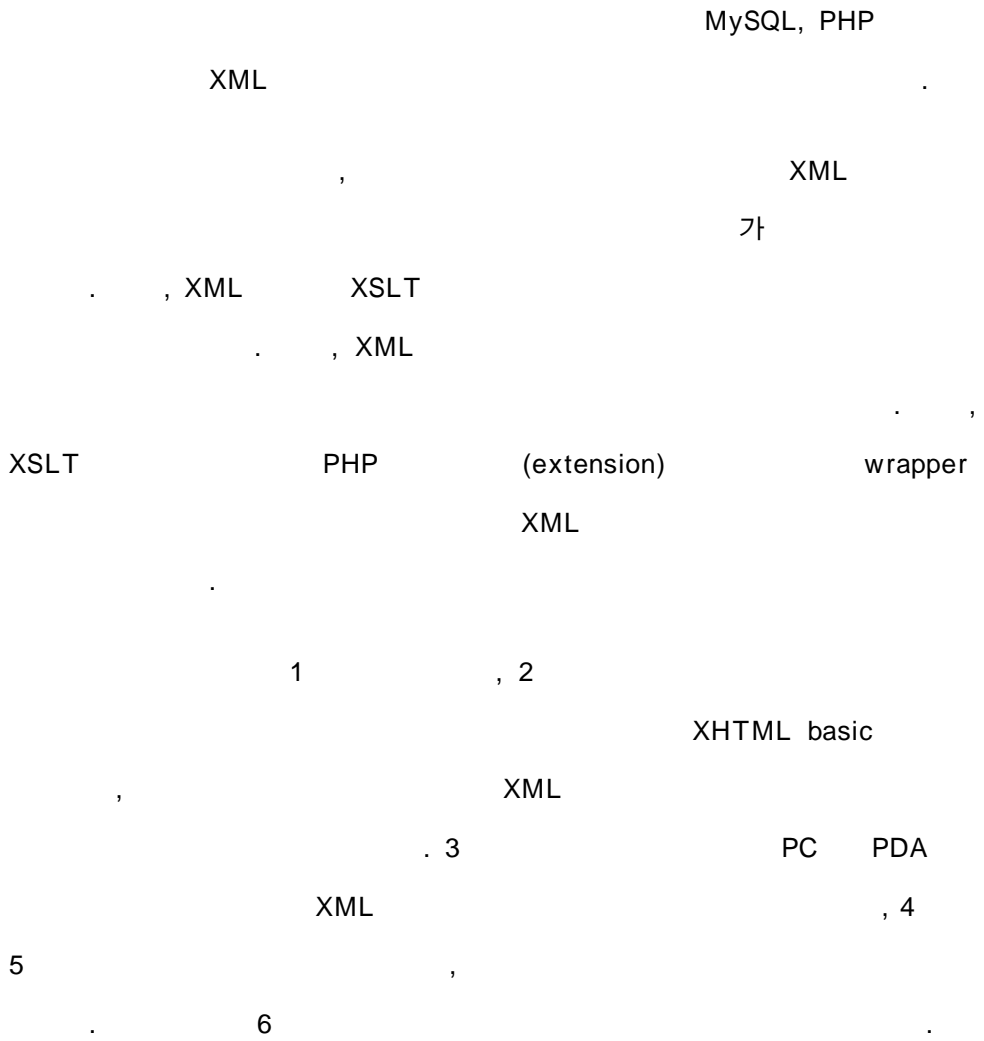
XML  
 가 [2], XML 가  
 XML  
 [2,9,10,11].

, XML HTML  
 가 가,  
 가

(MS) (MSXML )  
 Jsp, Servlet Java Oracle 9i

Excelon XML  
 , MSXML Excelon XML  
 MS  
 Java Oracle 9i  
 , Unix Linux

MySQL 가



## II.

WML(Wireless Markup Language), HDML(Handheld Device markup language), mHTML(mobile HTML), sHTML(small HTML), cHTML(compact HTML) 가 .

[2,3,4,5],

[7,8], XML

### A. (Contents Converter)

XML

가

Converter Transcoder [2].

(Contents Converter)

HTML

WML

HTML

WML

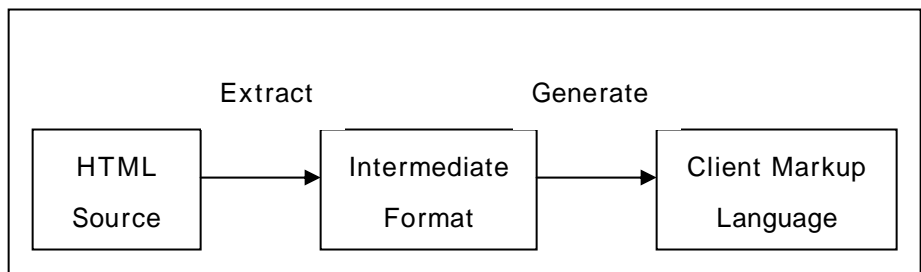
가 [4].

HTML WML

WAP

가 .

HTML



< II-1 >

가

HTML

(Automated Converter)

(Configurable Converter)

WAP Gateway

(converter)가

HTML

Qos(Quality of Service)

가

가 .

Phone.com

WAP Gateway, Argo

Actigate

가

, 가

. Oracle 9i Application server Wireless Edition, IBM Websphere  
Everyplace Suite, OpenTV Spyglass Prism .

가

가

가

,

,

가

,

가

,

## B. – XHTML basic

XHTML(The Extensible Hyper Text Markup Language) 1998 5 ,

HTML (“Shaping the Future of HTML”)

W3C(World Wide Web Consortium) XML

가 HTML . XHTML HTML 4.0 ,

, XML (application)

[12].

HTML SGML , XHTML XML  
 HTML 가 “XML+HTML” .  
 HTML XML  
 가 .

XHTML [13].

- XHTML XML . , XML 가  
 , , 가 .
- XHTML text/html , HTML  
 HTML .
- XHTML  
 text/xml, application/xml 가 ,  
 HTML .
- XHTML HTML DOM XML DOM  
 ( ) .
- XHTML XHTML1.0  
 XHTML .

XHTML Mobile phone, PALM, Set-top box  
 , XHTML  
 [14].

WAP Forum XHTMLMP(XHTML Mobile Profile) WAP 2.0  
 , XHTMLMP W3C XHTML Basic  
 [15]. XHTML basic XHTML 1.0



. XHTML

WML

가

. XHTML

[8].

XHTML XML Well Formed Document  
DTD(Document Type Definition) Valid Document

XHTML Internet Explorer  
PDA

CSS(Cascading Styel Sheet)

CSS

CSS

. CSS

CSS

가 . CSS

가

XHTML basic WML, HDML, cHTML

XHTML

가

가

가

### C. XML

#### 1. XML

#### HTML

가 , XML 가 ,

가 ( DB ) PDA

HTML

가

HTML

XML

XML HTML

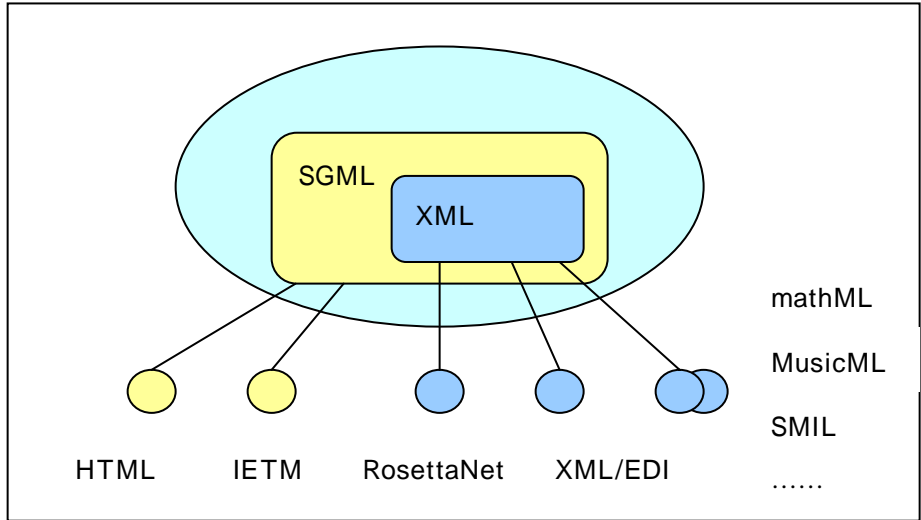
(Markup Language)

HTML SGML XML

XML SGML 가

[10]. , XML HTML

( )



< II-2>

XML HTML HTML 가  
 가 , XML  
 . XML HTML  
 가 XSL .

< II-1>

XML HTML

	XML	HTML
	,	,
	XSL	CSS

HTML

가 HTML  
 . , XML XML  
 XSL  
 ( , PDA ) 가  
 XML .  
 < II-2> 가 XML HTML

	XML	HTML
	XSL 가	CSS, HTML 가
	php(asp jsp) code 가	가 가 code 가
	XSL 가	HTML, CSS 가 + Script 가

< II-2> 가 XML  
 HTML . HTML  
 PDA PDA  
 HTML CSS ,  
 PHP 가 html  
 PHP 가 . 가  
 .  
 , XML 가 가

가 , xml 가

xsl 가 .

, XML

xml 가 .

가 가 xsl

.

XML

.

HTML , html 가

PHP 가 .

, 가 html

. XML DTD

xsl

, xml .

xsl , DTD가

,

## 2. XSLT

XSL(eXtensible Stylesheet Language)[16] XML

. XSL 가 , XML

XSLT(XSL Transformation)[17], XSLT XML

XPath[18], XML (

)

(Document description language) XSL Formatting Object[19] 가

.

XSLT Processor XML XSLT Stylesheet  
XML XML .

XSLT , XSLT

XML 가

. 가

[10].

, [20]

. , POST-PC

가

. ,

. ,

XML 가

HTML

HTML XSLT XML

.

, XML

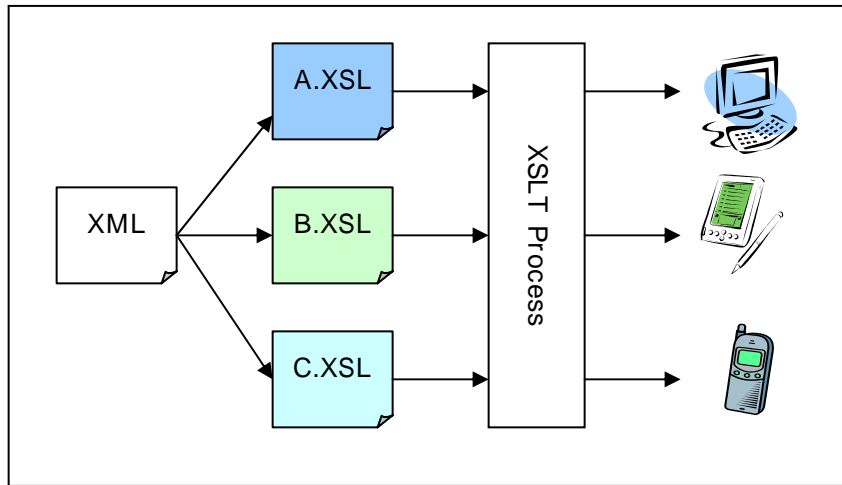
XSLT

.

XSLT

XML

XSL



< II-3> XSLT

XML

### 3. expat sablotron

expat James Clark Thai Open Source Software Center Ltd.

1998 C XML 1.0 [21]. Expat 2.0

<http://sourceforge.net/projects/expat/>

, 2001 7 expat 1.95.2

, Windows Unix(Linux) [22].

Python, Perl, Php script API

. Php , xml\_parser\_create(),

xml\_parse()

Apache apache-1.3.7 expat-lite  
 , apache-1.3.9 php expat  
 . Expat expat UTF-8,  
 ISO-8859-1 US-ASCII 가 encoding [23].  
 , iconv() 가 가

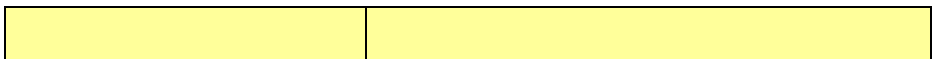
Sablotron Ginger Alliance ,  
 XSLT, DOM, XPath , XML toolkit .  
 Sablotron W3C 가 , ,  
 XML . Sabloton C++  
 , Solaris, FreeBSD, OpenBSD, HP-UX, Win32 Microsoft  
 . Sablotron Jame Clark expat XML  
 [24].

Sablotron sabcmd C API  
 Python, Perl, Php wrapper (extension)  
 가 .

php 4.0.3 sablotron extension 가 . Php 4.1  
 configure --enable-xslt --with-xslt-sablot  
 sablotron extention .

php sablotron .

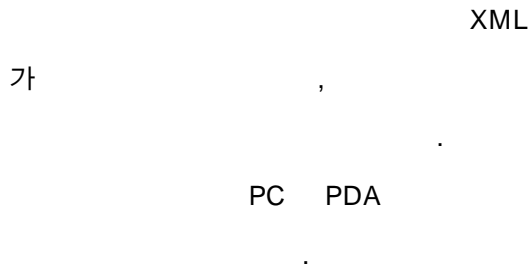
< II-3> sablotron php [25]



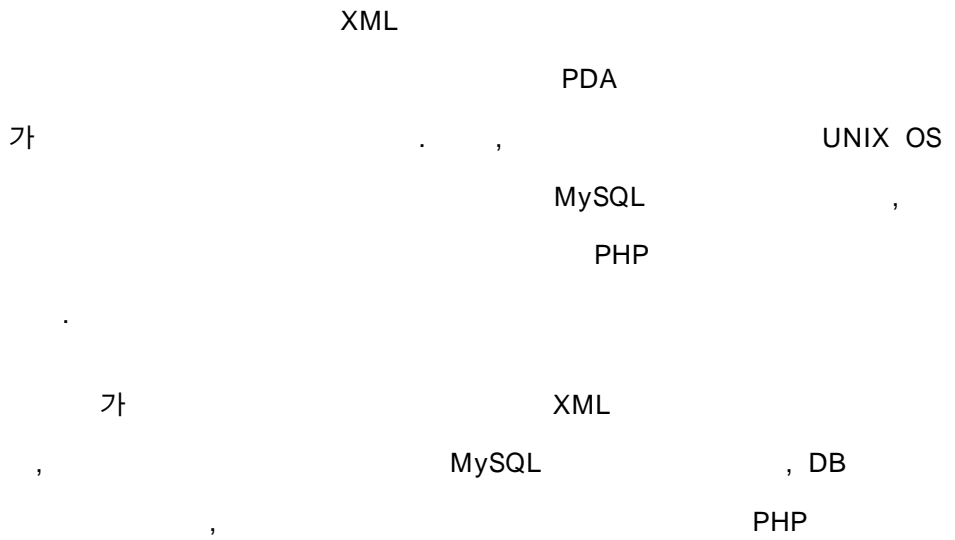


xslt_create	Create a new XSLT processor
xslt_errno	Return a error number
xslt_error	Return a error string
xslt_free	Free XSLT processor
xslt_process	Perform an XSLT transformation
xslt_set_base	Set the base URI for all XSLT transformations
xslt_set_encoding	Set the encoding for the parsing of XML documents
xslt_set_error_handler	Set an error handler for a XSLT processor
xslt_set_log	Set the log file to write log messages to
xslt_set_sax_handler	Set SAX handlers for a XSLT processor
xslt_set_sax_handlers	Set the SAX handlers to be called when the XML document gets processed
xslt_set_scheme_handler	Set Scheme handlers for a XSLT processor
xslt_set_scheme_handlers	Set the scheme handlers for the XSLT processor

### III. PC PDA XML



#### A.



PHP  
 , XML PHP 가  
 sablotron XSLT .

B.

PHP API  
 expat sablotron XML XSLT .

PC PDA

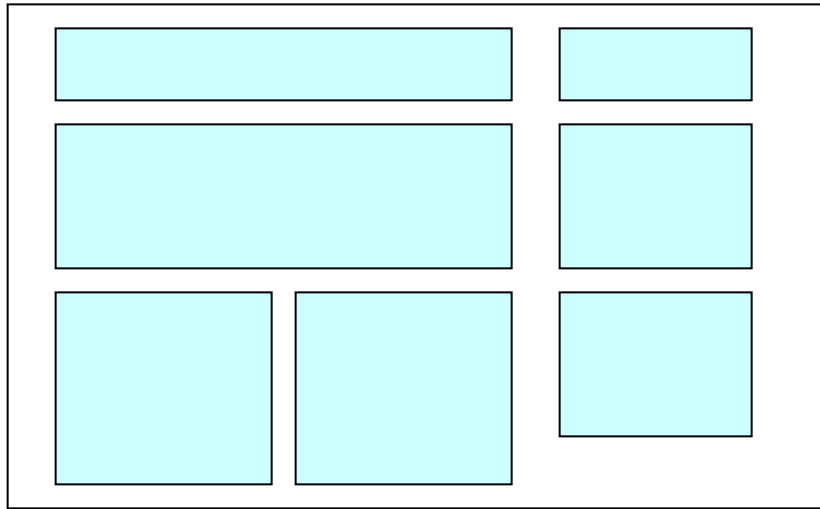
PC PDA 가 , PC PDA

<table>, <img>

< III-1> PC . PDA

가 가 ,

가 가 가 .

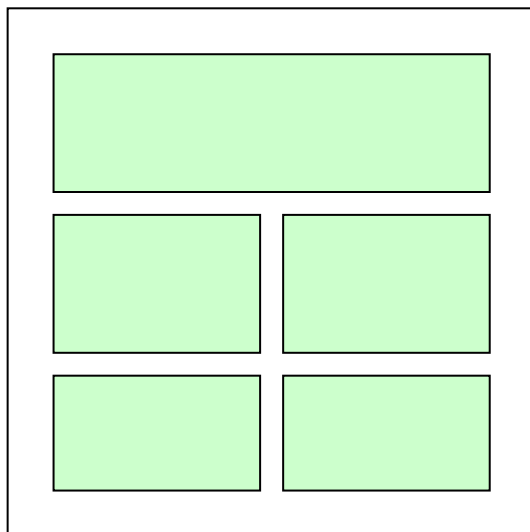


< III-1> PC

< III-2> PDA

PC

PDA



< III-2> PDA



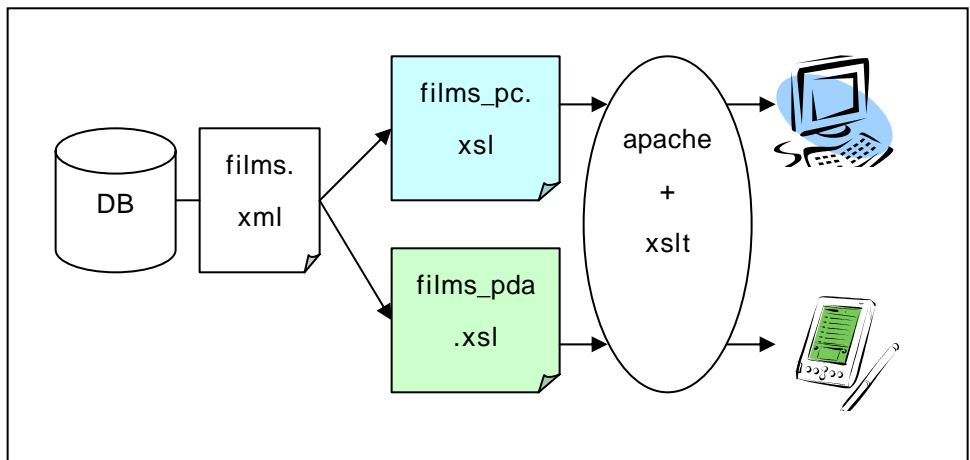
```
>configure --prefix=/WEB/php
--with-apache=/WEB/src/apache_1.3.19
--with-Mysql
--enable-libgcc --enable-iconv
--enable-xslt --enable-sablot-errors-descriptive
--with-xml2 --with-xml2-dir=/WEB/xml2
--with-xslt-sablot=/WEB/xml2
```

# IV.

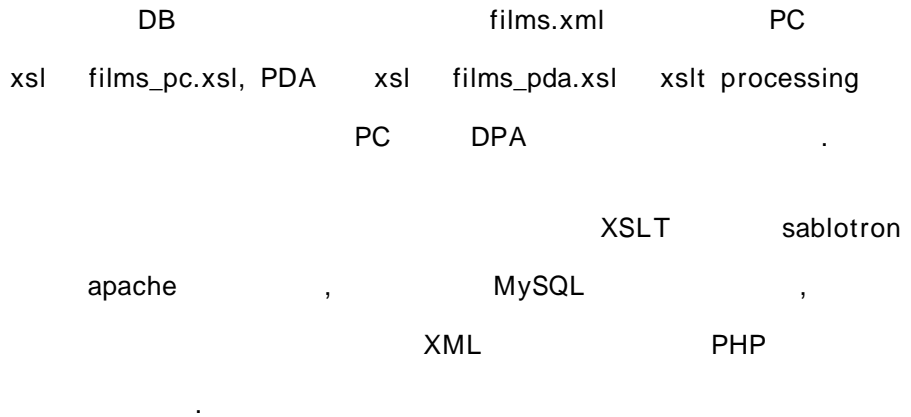
PC PDA XML  
XML DTD  
XML

A.

가 가 XSLT  
가



< IV-1 >



B. DB DTD

MySQL, ' ',  
' ', ' ', ' ', ' ',  
가 .

' ' hotnews, ' ' openmovie  
, ' ' playmovie, ' ' korbox  
, ' ' usabox,  
< IV-1> .

< IV-1> DB

hotnews		Id	Int	
		title	varchar(100)	
		contents	text	



openmovie		play_movie_code	char(5)	
		play_movie_title	varchar(100)	
		play_open_date		
playmovie		play_movie_code	char(5)	
		play_movie_title	varchar(100)	
		play_open_date		
korbox		id	Int	
		crank	smallint	
		writedate	char(10)	
		code	char(5)	
		title	char(100)	
usabox		id	Int	
		crank	smallint	
		writedate	char(10)	
		code	char(5)	
		title	char(100)	

XML

DTD(Document Type Definition)

.

DTD

, DTD

XML

XML

, XSL

&lt; IV-1&gt;

,

가

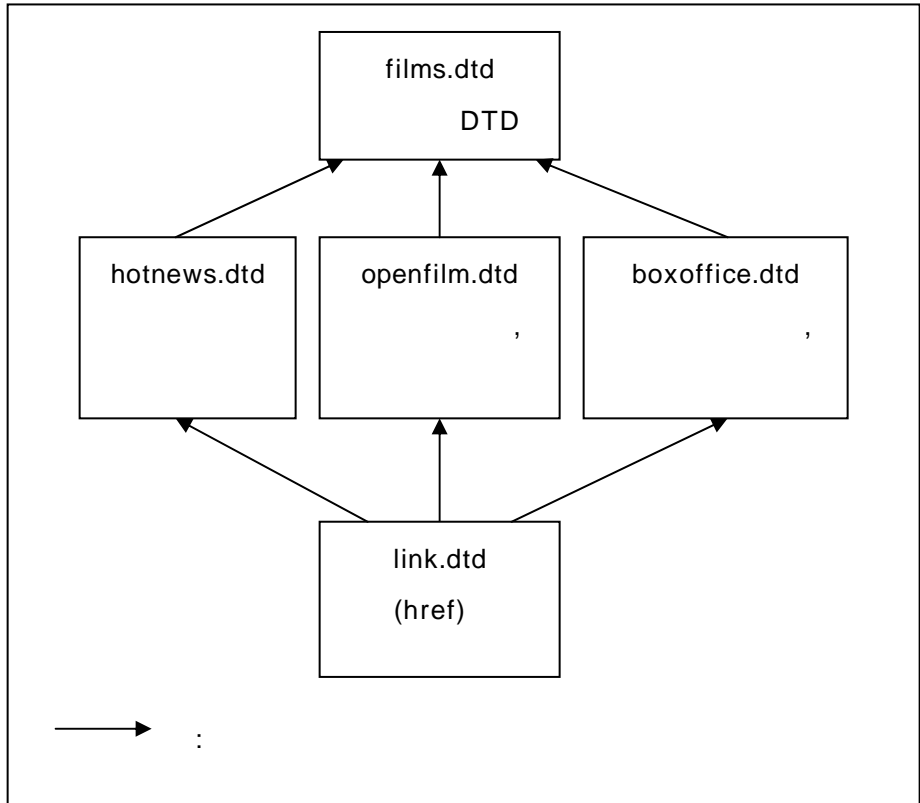
DTD

가

, ( )

DTD

< IV-2> DTD



< IV-2> DTD

```

<!ENTITY %hotnews SYSTEM "hotnews.dtd">
<!ENTITY %openfilm SYSTEM "openfilm.dtd">
<!ENTITY %boxoffice SYSTEM "boxoffice.dtd">
<!ELEMENT films (hotnews?, openfilm*, boxoffice*)>
  
```

< IV-3> films.dtd

< IV-3> films.dtd . films.dtd  
hotnews.dtd, openfilms.dtd, boxoffice.dtd  
가 .  
, , , , , , , , ,  
DTD . XML 가  
, , , , , , , , ,  
openfilm.dtd boxoffice.dtd 'category'  
.  
openfilm.dtd .

```

<!ENTITY % link SYSTEM "link.dtd">
%link;

<!ELEMENT openfilm firstfilm,(filmlist)*>
<!ATTLIST openfilm category (#PCDATA)>

<!ELEMENT firstfilm (#PCDATA)>
<!ATTLIST firstfilm %link;>

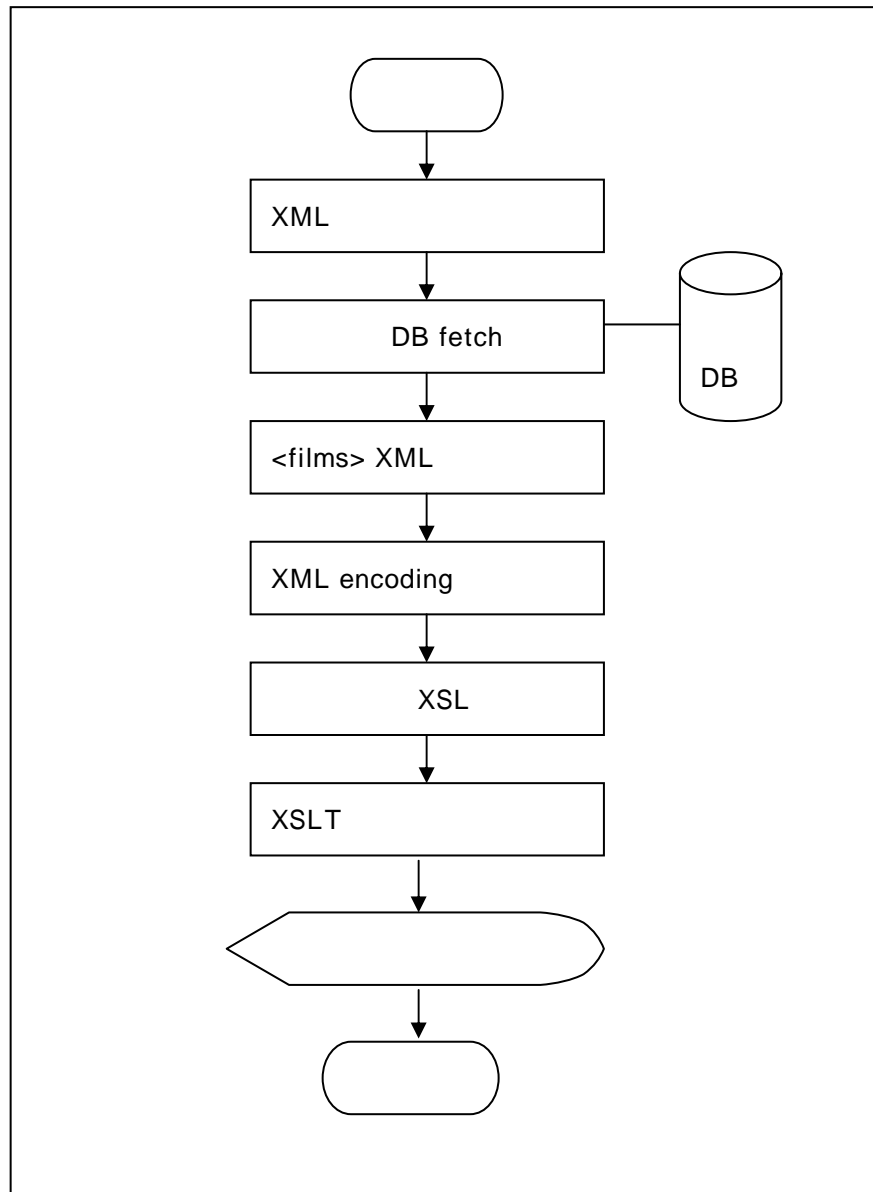
<!ELEMENT filmlist (#PCDATA)>
<!ATTLIST filmlist %link;>

```

< IV-4> openfilm.dtd

openfilm.dtd ( ) .  
link.dtd . 'openfilms'





V.

XML  
 , XSL XSLT

A. XML

DB XML  
 XML PHP  
 xml , XML '<?xml  
 version="1.0" .....?>' XML films (root  
 element) '<films>' DB

```
<?php
    // XML Header
    $xml = "";
    $xml .= "<?xml version= \"1.0\" encoding= \"UTF-8\"?> \n";
    $xml .= "<films xmlns:films= \"films.dtd\"> \n";

    // DB
    include "./dbClass.php";

    $db = new Mysqldb;
    $db->dbopen();
```

```

//      가
$sql = "select id, title from hotnews order by id desc limit 4";
$result = $db->dbquery($sql);
$cnt = Mysql_num_rows($result);
$num = 0;
if ($cnt) {
    // <hotnews> XML
    $xml .= "<hotnews xmlns:hotnews= \"hotnews.dtd \"> \n";
    while ($row = Mysql_fetch_array($result)) {
        $num++;
        $id = $row["id"];
        $sTitle = htmlspecialchars($row["title"]);
        // <newslist>      가
        $xml .= "<newslist href= \"/Board/view.html?id=".$id." \">\"
                . $sTitle.</newslist> \n";
    }
    // </hotnews>
    $xml .= "</hotnews> \n";
}
( )
$xml .= "</films> \n";
$db->dbclose();

//      'UTF-8'
$xml_src = iconv("EUC-KR", "UTF-8", $xml);
$fp = fopen("films.xml", "w");
fputs($fp, $xml_src);
fclose($fp);

```

```

        ' ' ' <hotnews>' , 4
select ' <newslst>' 4 . XML 가
        ' </newslst>' ' </hotnews>' 가 .
        ' ' 가 ' ' , ' ' , '
        ' , ' ' xml ' </films>'
        .
        $xml films xml 가 $xml
encoding 'UTF-8' films.xml .
    
```

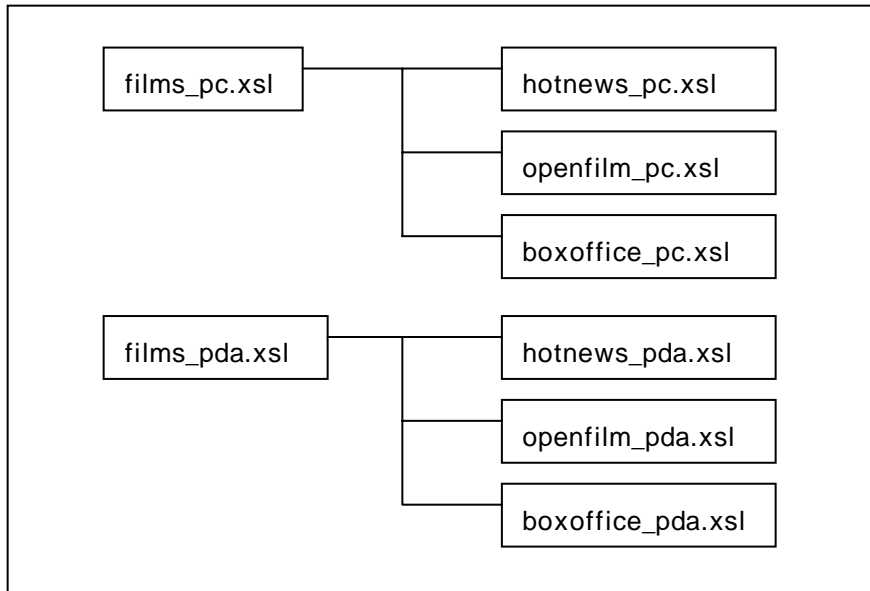
## B. XSL

XSL(extensible Stylesheet Language)

```

        . XSL 가 .
XSLT XSLT
        . , <xsl:import>, <xsl:include> XSL
        , <xsl:variable>, <xsl:param> 가
        , <xsl:choose>, <xsl:if>, <xsl:for-each>
가 .
        XSL <xsl:import href="..." />
        . xsl
        , xsl xsl
import .
    
```





< V-2> XSL

```

< V-2> films xsl . PC
films_pc.xml PDA films_pda.xml ,
xsl _pc.xml _pda.xml
.
<xsl:import>, <xsl:apply-templates> xsl
films_pc.xml . hotnews_pc.xml, openfilm_pc.xml,
boxoffice_pc.xml import apply-templates
apply-templates import xsl .
  
```

```

<?xml version="1.0"?>
<xsl:stylesheet version="1.0"
    xmlns:xsl="http://www.w3.org/1999/XSL/Transform">
<xsl:import href="./hotnews_pc.xsl"/>
<xsl:import href="./openfilm_pc.xsl"/>
<xsl:import href="./boxoffice_pc.xsl"/>
<xsl:output method="html" indent="yes" encoding="EUC-KR"/>

<xsl:template match="films">
<html>
    ( )
    <!-- Hot News -->
    <xsl:apply-templates select="hotnews"/>
    ( )
</html>
</xsl:template>

<xsl:template match="hotnews">
    <xsl:apply-imports/>
    //import hotnews_pc.xsl
</xsl:template>
( )
</xsl:stylesheet>


```


< V-3> <xsl:import> xsl (films\_pc.xsl)

가 DTD XSL

<xsl:if>

<xsl:if>

 [국내 박스오피스](#)

(title\_r\_boxoffice.gif)  [미국 박스오피스](#) (title\_a\_boxoffice.gif)

boxoffice\_pc.xml

```
<xsl:template match="boxoffice">
  <table width="169" cellpadding="0" cellspacing="0" border="0">
    <tr>
      <xsl:if test="(@category = 'koreabox')">
        <td></td>
      </xsl:if>
      <xsl:if test="(@category = 'usabox')">
        <td></td>
      </xsl:if>
    </tr>
  </table>
</xsl:template>
```

< V-4> <xsl:if> (boxoffice\_pc.xml)

## C. php, sablotron XSLT Processing

php sablotron XSLT wrapper  
 . xslt\_create(), xslt\_process(), xslt\_free(), xslt\_error()  
 가 .

xslt\_create() xslt\_process() XSLT

.

**resource = xslt\_create(void)**

xslt\_process() xslt\_create() xml , xsl  
 XSLT .

xslt\_process()

**mixed xslt\_process(resource xh, string xml, string xsl [, string result [,  
 array arguments[, array parameters]])]**

xslt\_process() 가 .

```
xslt_process($xslt_proc, 'a.xml', 'a.xsl', 'result.xml');
```

```
$result = xslt_process($xslt_proc, 'a.xml', 'a.xsl');
```

```
$arguments = array('/_xml' => $xml, '/_xsl' => $xsl);
```

```
$result = xslt_process($xslt_proc, 'arg:/_xml', 'arg:/_xsl', NULL,  

  $arguments);
```

xslt\_errno() xslt\_error()

**int xslt\_errno**(resource xh)

**mixed xslt\_errno**(resource xh)

xslt\_free() xslt

**void xslt\_free**(resource xh)

php

XSLT

xsl

XSLT

films.php

```
<?php
// XSLT Process
$xmlt_proc = xslt_create();

//          xslt_process
if ($device == "pda")
    $xmlt_result = xslt_process($xmlt_proc, "films.xml",
                              "films_pda.xml");
else
    $xmlt_result = xslt_process($xmlt_proc, "films.xml",
                              "films_pc.xml");
```

( )

```
if (!$xslt_result) {
    echo "error is ". xslt_error($xslt_proc);
    echo " error code is ". xslt_errno($xslt_proc);
}

// XSLT Process
xslt_free($xslt_proc);

//
echo "<pre> \n";
echo $xslt_result;
echo "</pre> \n";
?>
```

< V -5> XSLT (films.php)

D. PC PDA



< V-6> PC

< III-1>

가 PC



< V-7> PDA

< V-7> < III-2> PDA

< V-6> < V-7> XML

XSL , 가 PC

PDA



# VI.

가

XHTML basic, XML

, XSLT

XML

XSL

HTTP WAP

, m-HTML, s-HTML, c-HTML

HTTP

PC PDA

XML

가

, XML

XSLT

Open Source

XML

, XSLT

php extension

wrapper

XML

expat sablotron

Xlink

가

XML

XSL

DTD

XML

가

XML

가

- [1] Mosca, “                    가                    ”, <http://www.i-biznet.com/mobg/default.asp>, 2001.5
- [2]                    , “WAP Converter” <http://www.mosca.co.kr>, 2000.11
- [3] H. Ouahid, A. Karmouch “Converting Web Pages into Well-formed XML Documents”, Proceedings of IEEE International Conference on Communication, pp. 676-680, 1999
- [4]                    ,                    , “HTML                    WML                    ”,                    Vol.27 No.2 pp.263-265, 2000 가
- [5]                    ,                    ,                    , “HTML                    WAP                    ”,                    :                    7                    4                    , pp.350-358, 2001.8
- [6]                    , “XML                    .                    ”,                    , 2002
- [7]                    ,                    ,                    ,                    , “                    ”,                    Vol.28 No.1 pp.484-486, 2001
- [8]                    , “Xhtml based Integration between Wired Internet and Wireless Internet”,                    Weekly Newsletter : 時空                    29 (2001 5 2 )
- [9] Richard Vidgen, Steve Goodwin, “Special Feature E-Commerce XML: what is it good for?”, computing & control engineering journal, pp.119-124, June 2000
- [10]                    ,                    ,                    , “ 가                    가 XML Camp”, Press, 2001

- [11] , “XML ”, , pp.107, 2001
- [12] W3C, “Shaping the Future of HTML”, W3C workshop 4<sup>th</sup>/5<sup>th</sup> May 1998, <http://www.w3.org/MarkUp/future/>
- [13] , , “ ”, 5 3 pp.35-48, 2001 9
- [14] , “XHTML ”, KISDI IT FOCUS, , pp.68-71, 2001 4
- [15] WAP Forum, “WAP 2.0 Technical White Paper”, January 2002, [http://www.wapforum.org/what/WAPWhite\\_Paper1.pdf](http://www.wapforum.org/what/WAPWhite_Paper1.pdf)
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## ABSTRACT

### A Case Study of Developing XML-based Web Contents Supporting PC and PDA Browser

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Due to rapid advance of wireless communication technology and popularization of wireless devices, demand on wireless internet contents is gradually increasing. Therefore, there are many researches and solution developments to provide good qualified contents quickly for wireless internet. For example, researches into converting wired web contents into wireless web contents or using integrated markup language like XHTML basic to make contents.

XML(eXtensible Markup Language) is proper to make contents supporting different devices, because of its characteristic of separating data and presentation. XML can be converted into various formats via XSLT(XML Transformation), so the content could be viewed through a conventional PC browser or a wireless device like a PDA(Personal Digital Assistant) or a WAP(Wireless Application Protocol)-enabled cellphone.

In this paper, I propose a method to develop XML-based web contents which uses PHP language for data fetch from MySQL database. This method use open source software for a cost saving. Due to use of PHP extension as a XSLT engine, this method is very easy to apply. For a example of this method, a web content of movie information is implemented for PC and PDA browser.

Developing XML-based web contents is useful not only for supporting devices of multiple type, but also for rapid changes of user interface design and for exchange of contents between web sites.