

Data Broadcasting

June 15, 2000

Matsushita Electric Industrial Co. Ltd

Situation of Digital Broadcasting in Japan

Current Situation in Japan

- ❑ CS digital broadcasting service
 - ◆ SkyPerfecTV Japan provide digital satellite broadcasting services.
- ❑ BS digital broadcasting service and digital terrestrial broadcasting service
 - ◆ Japan will start BS digital broadcasting from December, 2000 and digital terrestrial broadcasting not later than 2003.
- ❑ Data broadcasting
 - ◆ Data broadcasting is expected to differentiate these DTV services from the existing analogue TV services, and therefore stimulate motivations for new business.
- ❑ Who will provide data broadcasting in BS digital service?
 - ◆ 8 TV broadcasters and 4 Radio broadcasters can provide their data broadcasting services within their allocated bandwidth.
 - ◆ They all are very interested in data broadcasting. NHK and other broadcasters are promoting the new services.
 - ◆ 8 data broadcasters who provides data services dedicatedly has been authorized.

Channel Planning in BS digital

HDTV **SDTV** **Audio** **Data**

Panasonic

BS Asahi
TV Asahi

22 slots HDTV

0.5 slots Audio

Digital Cast Int.
Asahi NP, Hitachi

1.5 slots

Nihon Media Ark
Kyodo News

1.5 slots

0.5 slots Audio

Japan Digital Communications
TBS

22 slots HDTV

WOWOW

22 slots HDTV

Audio

St.GIGA 0.5 slots

BS-J Radio 0.5 slots

HPA 0.5 slots

Media Serve

1.5slots

Audio

BS Japan
TV Tokyo

22 slots HDTV

BS Nihon
(NTV)

HDTV

Audio

Nihon Data Broadcast
(Yomiuri NP)

1.5slots

Weather News

1.5slots

Audio

BS Fuji
(Fuji TV)

22 slots HDTV

NHK

22 slots HDTV

NHK BS-2

6 slots SDTV

NHK BS-1

8 slots SDTV

Nihon BS Broadcast
(Big Camera)

2 slots

Mega Port
(Mainichi NP)

2 slots

Music Bird 1 slots

JFN Radio 1 slots

Star Channel

6 slots SDTV

BML: Broadcast Markup Language

Background

- ❑ The XML WG of ARIB*) has developed an XML based multimedia content format which can be commonly used for data broadcasting services of satellite and terrestrial broadcasting.
- ❑ It ensures high extensibility which is a feature of the XML based coding scheme and international exchangeability.
- ❑ It can also be introduced with the minimum influence on receiver costs from the start of BS digital broadcasting in the year 2000.

*) ARIB: Association of Radio Industries and Businesses

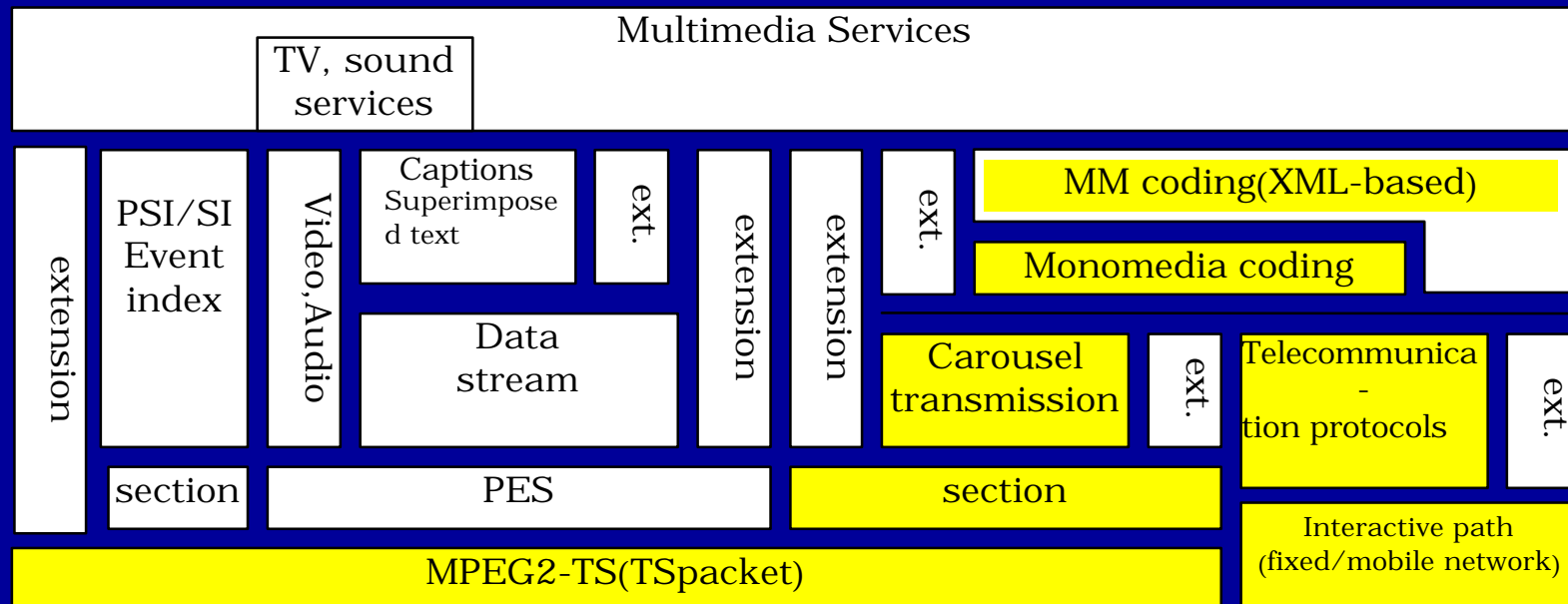
BML: Broadcast Markup Language

- Aimed for data broadcasting services for digital broadcast receiver.

Features	Specification
Base format	XHTML1.0
Procedural Description	ECMAScript DOM 1.0/2.0(partly)
Presentation Control	CSS1/2
Extension for broadcasting use	<ul style="list-style-type: none">- Synchronization with broadcast program- Automatic update of presented information- Control of video and audio- Remote controller as the main input device- Back-channel control

BML: Protocol Stacks

- ❑ In broadcasting, BML contents are transmitted with DSM-CC carousel.
- ❑ Telecommunication protocol can be used to send BML contents as well as simple data transmission.



BML: An example

```
<?xml version="1.0" encoding="EUC-JP"?>
<?bml bml-version="1.0"?>
<bml>
<head>
<style type="text/css">
p{
border-style:solid; border-width:5px;
border-color:blue; border-color-index:4;
}
:focus{
border-color:red; border-color-index:1;
}
</style>
<script>
<![CDATA[
var fpos = "start";
function focused(pos){
document.getElementById(pos).firstChild.data
= "Came from " + fpos;
fpos = pos;
}
function blurred(pos){
document.getElementById(pos).firstChild.data
= "blurred";
}
function fp0(){focused("p0");}
function fp1(){focused("p1");}
```

```
function fp2(){focused("p2");}
function bp0(){blurred("p0");}
function bp1(){blurred("p1");}
function bp2(){blurred("p2");}
]]>
</script>
</head>
<body style="background-color:yellow;
background-color-index:6;
resolution:960x540;
clut:sample.clut;">
<p id="p0" onfocus="fp0()" onblur="bp0()"
style="top:100px; left:100px; width:200px;
height 100px; nav-index:0; nav-right:1;
nav-down:2">First Paragraph</p>
<p id="p1" onfocus="fp1()" onblur="bp1()"
style="top:200px; left:100px; width:200px;
height 100px; nav-index:1; nav-right:0;
nav-down:2">Second Paragraph</p>
<p id="p2" onfocus="fp1()" onblur="bp1()"
style="top:200px; left:100px; width:200px;
height 100px; nav-index:2; nav-right:1;
nav-down:3">Last Paragraph</p>
</body>
</bml>
```

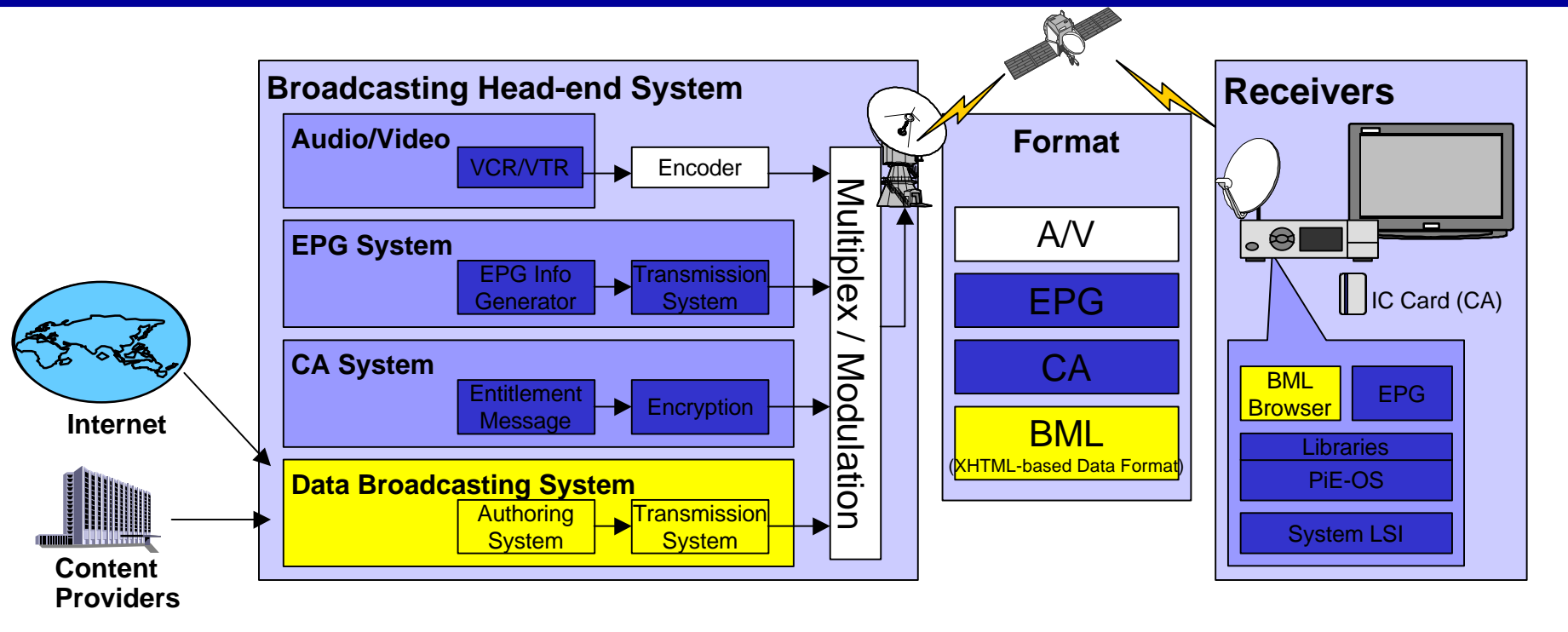
ECMAScript

CSS

End to End Solution for Data Broadcasting

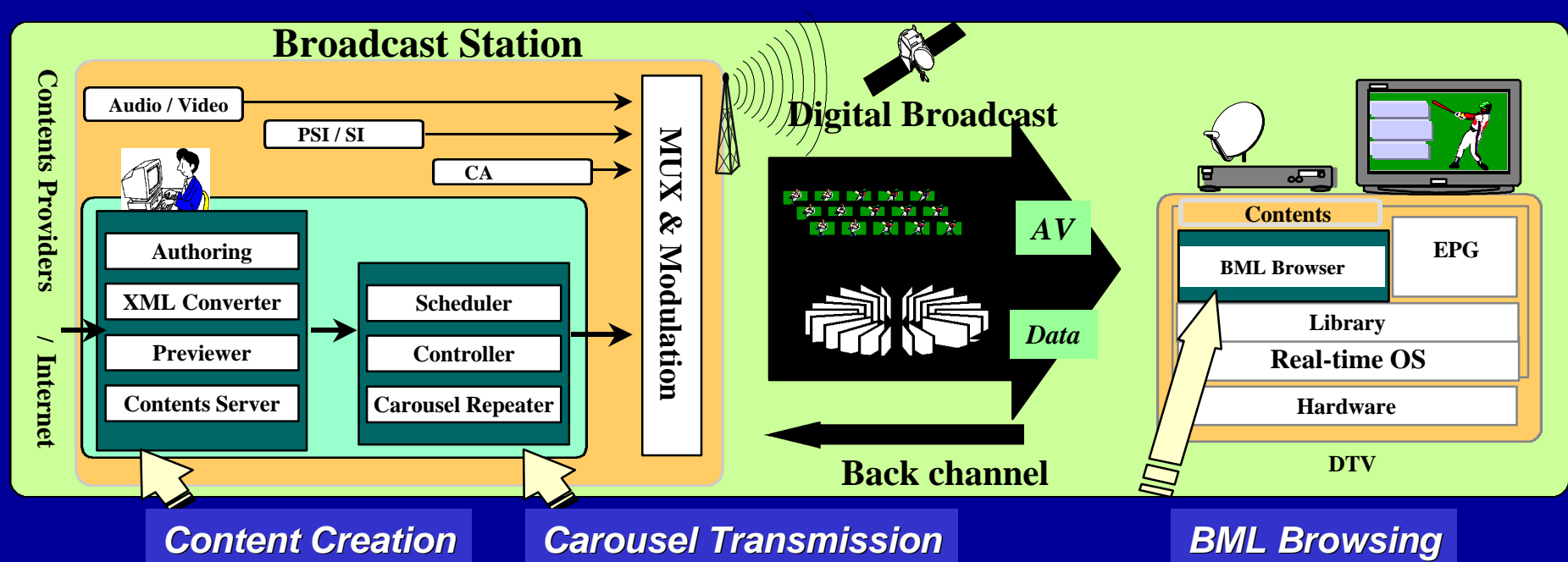
Digital Broadcasting System

- Digital broadcasting system consists of;
 - ◆ Audio/Video system
 - ◆ Electric program guide system
 - ◆ Conditional access system
 - ◆ Data broadcasting system



Data Broadcasting System Architecture

- Head-end system
 - ◆ Content Creation SubSystem:
 - Supports various patterns of content creations/authoring
 - ◆ Carousel Data Transmission SubSystem:
 - Scheduled transmission with automatic rate control
- DTV software
 - ◆ BML browser for DTV



BS Digital Receiver

