

MHP API 분석

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GEM (Globally Executable MHP)

•

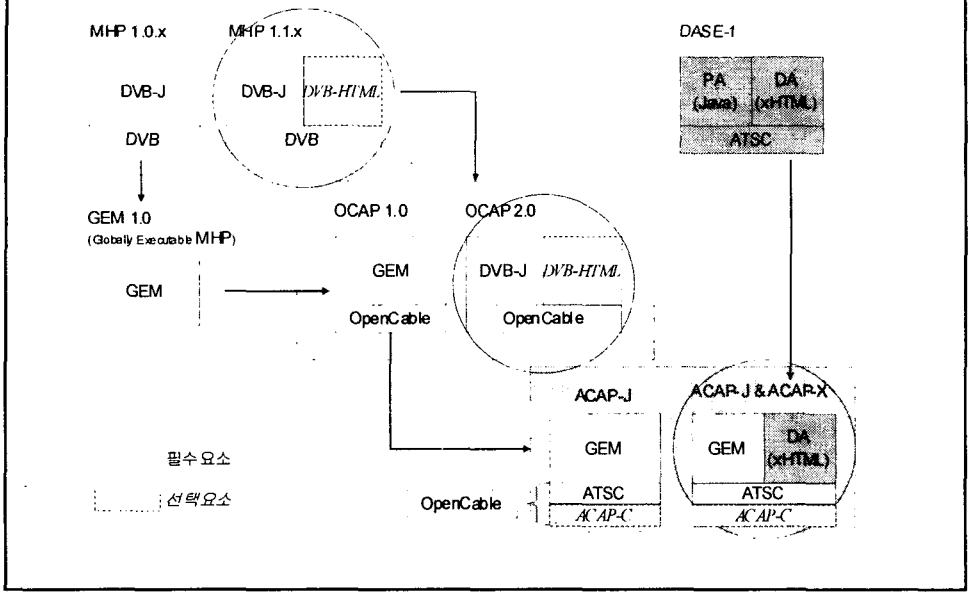
ARIB
Network Protocols
Service Information

ACAP
Features from DASE

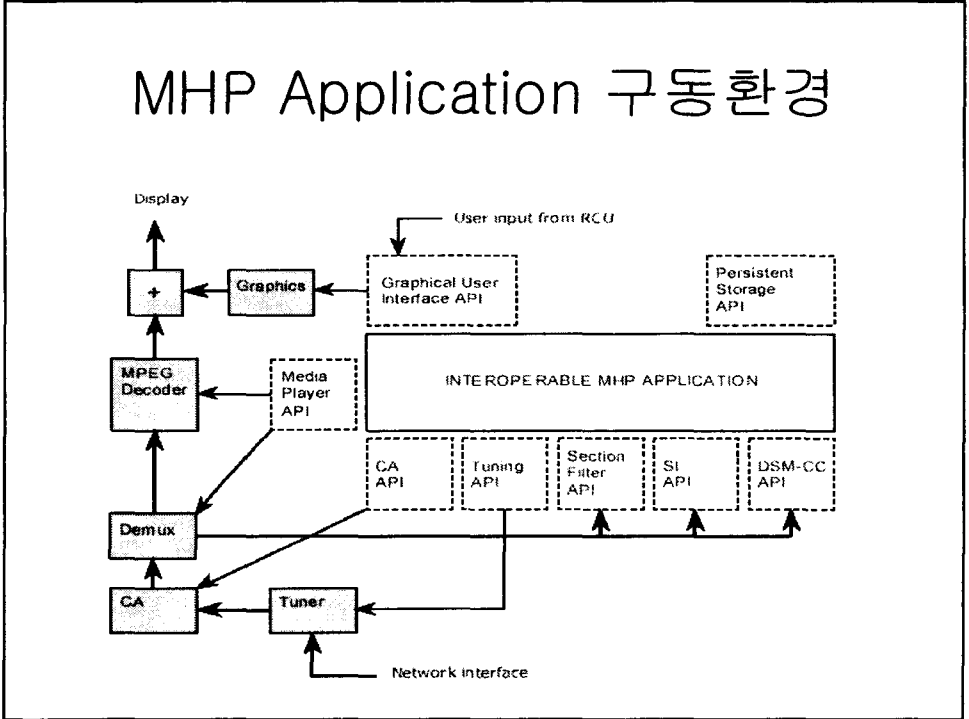
GEM	MHP
	Service Information
Network Protocols	Conditional Access

OCAP
Service Information
Conditional Access
Unbound Apps
Monitor Application

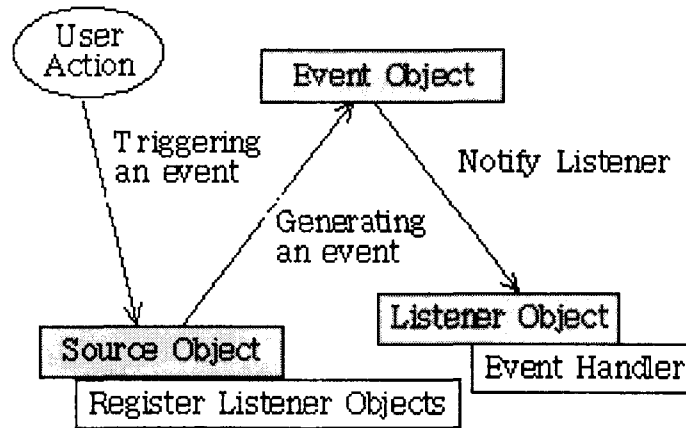
데이터방송 미들웨어표준 관계도



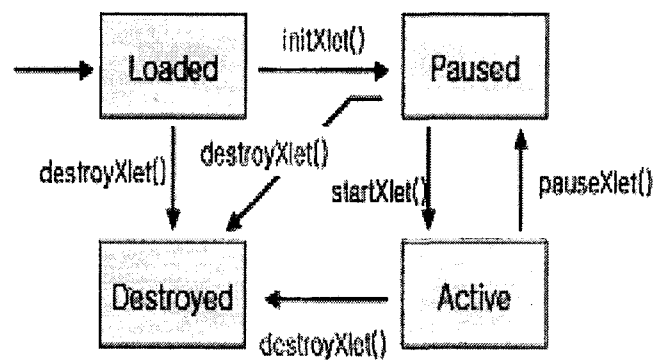
MHP Application 구동환경



Event Delegation Model



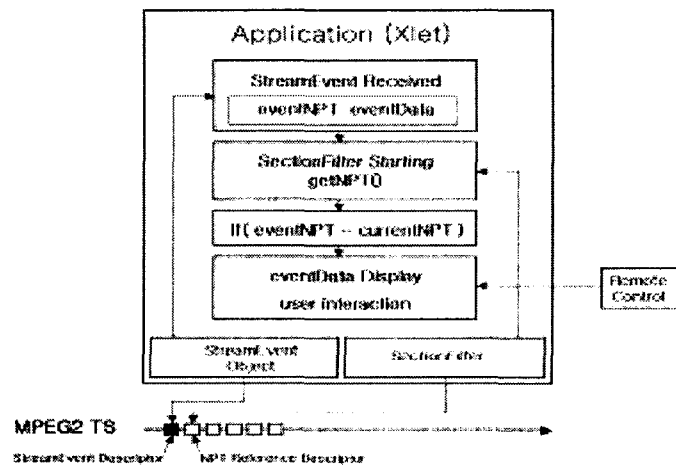
Xlet Lifecycle



“Xlet class”

- Xlet Interface 를 구현하는 클래스
- Interface Xlet = {void initXlet(XletContext xc);
void startXlet(); void resumeXlet(); void
destroyXlet() }
- Public class MyXlet extends Hcomponent
implements Xlet, KeyEventListener {
public void initXlet(Xletcontext xc){..}
public void startXlet() {...}
..
public keyPressed(..) {...}
}

동기화된 Xlet의 제어구조



• 동기화된 Xlet 의 구조

```

public class StreamEventXlet extends HComponent
implements Xlet, StreamEventListener, Timer {
...
    public void startXlet() {
        (1) DSMCCObject dsMobj = new DSMCCObject("StreamEvents");
        (2) DSMCCStream dsMStr = new DSMCCStream(dsMobj);
        (3) dsMobj.synchronousLoad();
        (4) DSMCCStreamEvent dsMSE
            = new DSMCCStreamEvent(dsMobj);
        (5) String eventList[] = dsMSE.getEventList();
        (6) for(int i = 0; i < eventList.length; i++)
            dsMSE.subscribe(eventList[i], this);
            /* this는 StreamEventListener 인터페이스를 구현하고 있는
            StreamEventXlet 클래스의 인스턴스임 */
        (7) Let the timer source object register "this" object as a listener
        to the timer event.
    }
    (8) public synchronized void
        receiveStreamEvent(StreamEvent ste)
    {
        static short i = 0; /* set to 0 only once initially */
        byte eventData[] = ste.getEventData();
        eventNPT = ste.getEventNPT(); ...
    }
}

```

MHP Application APIs

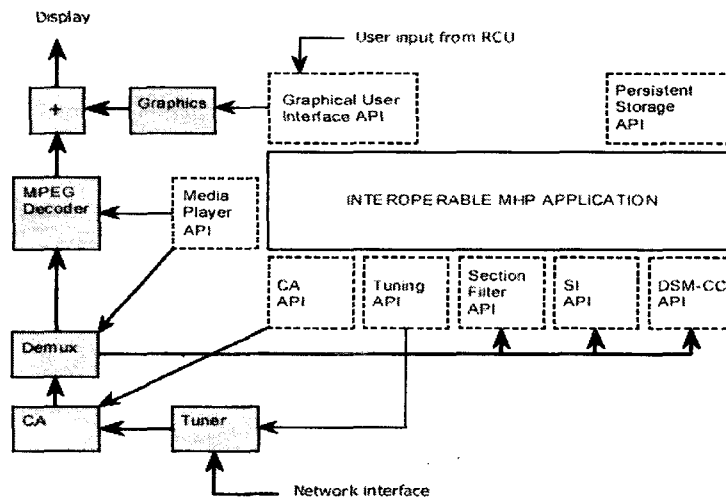


표 1. Section Filter API

Source Class	Event Class	Listener Interface
SectionFilter	SectionFilterEvent	SectionFilterListener
	SectionAvailableEvent	
	VersionChangeDetectedEvent	
	EndOfFilteringEvent	
	TimeOutEvent	
	IncompleteFilteringEvent	
SectionFilterGroup	ForcedDisconnectedEvent	(org.davic.resources 패키지)
	FilterResourcesAvailableEvent	ResourceStatusListener

표 2. SI API 패키지 리스트 -1

SI API 패키지	비고
javax.tv.service	SI database에 접근하는 기본적인 포인트를 제공하고, Service, SIElement interface와 같은 다른 SI package에서 사용하고 있는 공통 클래스들을 포함하고 있다.
javax.tv.service.guide	스케줄, 개별 프로그램 이벤트, 프로그램 등급 등, EPG의 기능을 지원하기 위한 API를 제공한다.
javax.tv.service.navigation	DVB에서 Service, ATSC에서 Virtual Channel이라고 불리는 서비스들을 탐색하는데 사용되는 클래스들을 제공한다.

표 2. SI API 패키지 리스트 - 2

SI API 패키지	비고
<code>javax.tv.service.transport</code>	SI Data에 의해 설명되고 있는 현재 Transport Stream의 전송 메커니즘에 관한 추가적인 정보를 제공한다.
<code>javax.tv.service.selection</code>	Service를 선택하는 메커니즘을 제공한다.
<code>org.dvb.si</code>	DVB service information에 대한 접근을 제공한다.
<code>org.dvb.application</code>	Service내 애플리케이션의 리스트에 접근하고 애플리케이션에 대한 정보를 제공한다

표 3. SI API - 1

Source Class	Event Class	Listener Interface
	<code>SIChangeEvent</code>	<code>SIChangeListener</code>
<code>ProgramSchedule</code>	<code>ProgramScheduleEvent</code>	<code>ProgramScheduleListener</code>
<code>ServiceDetails</code>	<code>ServiceDetailsSIChangeEvent</code>	<code>ServiceComponentChangeListener</code>
	<code>ServiceComponentChangeEvent</code>	
<code>BouquetCollection</code>	<code>BouquetChangeEvent</code>	<code>BouquetChangeListener</code>
<code>NetworkCollection</code>	<code>NetworkChangeEvent</code>	<code>NetworkChangeListener</code>
<code>Transport</code>	<code>ServiceDetailsChangeEvent</code>	<code>ServiceDetailsChangeListener</code>
<code>TransportStreamCollection</code>	<code>TransportStreamChangeEvent</code>	<code>TransportStreamChangeListener</code>

표 3. SI API - 2

Source Class	Event Class	Listener Interface
ServiceContext	ServiceContextEvent	ServiceContext Listener
	PresentationTerminatedEvent	
	ServiceContextDestroyedEvent	
	NormalContentEvent	
	PresentationChangedEvent	
	AlternativeContentEvent	
	SelectionFailedEvent	
	ServiceContextListener	
AppsDatabase	AppsDatabaseEvent	AppsDatabaseEventListener
AppProxy	AppStateChangeEvent	AppStateChangeListener

표 3. SI API - 3

Source Class	Event Class	Listener Interface
SI Database	SI RetrievalEvent	SI RetrievalListener
	SI SuccessfulRetrieveEvent	
	SI TableUpdatedEvent	
	SI NotInCacheEvent	
	SI ObjectNotInTableEvent	
	SI RequestCancelledEvent	
	SI TableNotFoundEvent	
	SI LackOfResourcesEvent	
	SI MonitoringEvent	SI MonitoringListener

II 4. DSM-CC API - 1

Source Class	Event Class	Listener Interface
CarouselFile	CarouselFileChangeEvent	CarouselFileListener
DSMCCObject	AsynchronousLoadingEvent	AsynchronousLoading EventListener
	SuccessEvent	
	InvalidFormatEvent	
	InvalidPathnameEvent	
	LoadingAbortedEvent	
	MPEGDeliveryErrorEvent	
	ServiceXFRErrorEvent	
	NotEntitledEvent	

II 4. DSM-CC API - 2

Source Class	Event Class	Listener Interface
DSMCCStream	NPTPresentEvent	NPTListener
	NPTStatusEvent	
	NPTDiscontinuityEvent	
	NPTRemovedEvent	
	NPTRateChangeEvent	
DSMCCStreamEvent	StreamEvent	StreamEventListener
DSMCCObject	ObjectChangeEvent	ObjectChangeEventListener

표 5. Tuning API

Source Class	Event Class	Listener Interface
NetworkInterfaceManager	NetworkInterfaceEvent	NetworkInterfaceListener
	NetworkInterfaceTuningEvent	
	NetworkInterfaceTuningOverEvent	
NetworkInterface	NetworkInterfaceReleasedEvent	org.davic.resources.ResourceStatusListener
	NetworkInterfaceReservedEvent	

표 6. CA API - 1

Source Class	Event Class	Listener Interface
CAModuleManager	CAEvent	CAListener
	MMIActiveEvent	
	MMIInactiveEvent	
	ModuleRemovedEvent	
	NewModuleEvent	
	PIDChangeEvent	
	TuneRequestEvent	
DescramblerProxy	DescramblerEvent	DescramblerListener

¶ 6. CA API – 2

Source Class	Event Class	Listener Interface
CAModule	MessageEvent	MessageListener
	ModuleResponseEvent	
	ModuleStateChangedEvent	
	SessionClosedEvent	
	SessionOpenedEvent	
CAModuleManager	MMIEvent	MMIListener
	CloseMMIEvent	
	StartMMIEvent	
CAModuleManager	DescramblingStoppedEvent	org.davic.resources. ResourceStatusListener
	DescramblingStartedEvent	

¶ 7. Media Player API– 1

Source Class	Event Class	Listener Interface
VideoFormatControl	VideoFormatEvent	VideoFormatListener
	ActiveFormatDescription ChangedEvent	
	AspectRatioChangedEvent	
	DFCChangedEvent	
javax.media.Player	CASStopEvent	javax.media.Controller Listener
	NoComponentSelectedEvent	
	ServiceRemovedEvent	
	StopByResourceLossEvent	
	PresentationChangedEvent	

표 7. Media Player API- 2

Source Class	Event Class	Listener Interface
SubtitlingEventControl	SubtitleAvailableEvent	SubtitleListener
	SubtitleNotAvailableEvent	
	SubtitleNotSelectedEvent	
	SubtitleSelectedEvent	
javax.media.Player	MediaPresentedEvent	javax.media.ControllerListener
	MediaTimePositionChangedEvent	
	ResourceReturnedEvent	
	ResourceWithdrawnEvent	
MediaSelectControl	MediaSelectEvent	MediaSelectListener
	MediaSelectFailedEvent	
	MediaSelectCARefusedEvent	
	MediaSelectSucceededEvent	

표 8. GUI API- 1

Source Class	Event Class	Listener Interface
org.havi.ui.HTextButton	HActionEvent	HActionListener
org.havi.ui.HAdjustmentValue	HAdjustmentEvent	HAdjustmentListener
org.havi.ui.HBackgroundImage	HBackgroundImageEvent	HBackgroundImageListener
org.havi.ui.HComponent	HFocusEvent	HFocusListener
org.havi.ui.HItemValue	HItemEvent	HItemListener
org.havi.ui.HTextValue	HKeyEvent	HKeyListener
	HRcEvent	

표 8. GUI API- 2

Source Class	Event Class	Listener Interface
org.havi.ui.Hscreen Device	HScreenConfigurationEvent	HScreenConfigurationListener
org.havi.ui.Hscreen Device	HScreenDeviceReleasedEvent	org.davic.resources.ResourceStatusListener
	HScreenDeviceReservedEvent	
org.havi.ui.Hvideo Component	HScreenLocationModifiedEvent	HScreenLocationModifiedListener
org.havi.ui.EventManager	UserEvent	org.davic.resources
	UserEventAvailableEvent	ResourceStatusListener
	UserEventUnavailableEvent	UserEventListener