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# Marlin – Broadband Shared Domain Topology Specification

Version 1.0  
Final

Source  
Date

Marlin Developer Community  
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61 [community.com](mailto:editor@marlin-community.com)

62 Contact information for the Marlin Trust Management Organization can be found at:  
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64

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## 106 **1 Introduction**

107 This document describes the Broadband Shared Domain Topology. This is an  
108 additional Node-Link topology for the Marlin Broadband Network Service Profile as  
109 specified in [MBNS].

110  
111 The purpose of this additional topology is to enable:

- 112 - A user to setup a single domain that can be used across multiple Service  
113 Providers.
- 114 - Users to setup a single domain that can be used for multiple users, e.g for all  
115 members of a household. (see [Shared Spaces])
- 116 - Domain management by an end-user device. (see [New Device])

117  
118 The basis for this functionality is present in [MCS] but it was not part of the subset of  
119 [MCS] used in [MBB] and [MBNS]. By defining a new topology for [MBNS], this  
120 specification enables this functionality with minimal changes to the existing server  
121 and client [MBNS] implementations. The additional topology also enables a gradual  
122 migration for existing services to take advantage of the new functionality.

### 123 **1.1 Document Organization**

124 This document is organized as follows:

- 125 • (This) introduction, including abbreviations, definitions and references.
- 126 • An overview
- 127 • Extensions to [MBNS]
- 128 • Extensions to [MBB]
- 129 • Extensions to [MUPnP]

### 130 **1.2 Conformance Conventions**

131 The key words “MUST”, “MUST NOT”, “REQUIRED”, “SHALL”, “SHALL NOT”,  
132 “SHOULD”, “SHOULD NOT”, “RECOMMENDED”, “MAY”, and “OPTIONAL” in this  
133 specification are to be interpreted as described in IETF RFC 2119 [RFC2119].

### 134 **1.3 Namespaces and Identifiers**

135 This specification defines schemas conforming to XML Schemas [Schema] and  
136 normative text to describe the syntax and semantics of XML-encoded objects and  
137 protocol messages. In cases of disagreement between the schema documents and  
138 the schema listings in this specification the schema documents take precedence.  
139 Note that in some cases the normative text of this specification imposes constraints  
140 beyond those indicated by the schema documents.

#### 141 **1.3.1 Namespaces and Notation**

142 The table below summarizes the external schemas used in this specification:  
143

Prefix	XML Namespace	Description
oct:	http://www.octopus-drm.com/profiles/base/1.0	[MCS]
bsa:	urn:marlin:broadband:1-2:nemo:services:action-token	[MBB]

*Table 1: Supporting Namespaces*

144 As a convention throughout this document we use the namespace prefixes described  
 145 above to qualify XML elements and attributes which are specified elsewhere. That is  
 146 the typographical convention is: <MarlinElement>, <ns:ForeignElement>,  
 147 XMLAttribute, Datatype, OtherKeyword.

#### 148 **1.4 Abbreviations**

CDS	Content Directory Service
CMS	Connection Manager Service
DMC	Digital Media Controller
DMP	Digital Media Player
DMR	Digital Media Renderer
DMS	Digital Media Server
PMP	Portable Media Player
UUID	Universally Unique Identifier
UPnP	Universal Plug and Play

#### 150 **1.5 Terms and Definitions**

151 Please refer to the Terms and Definitions introduced in [MBB]. In addition, Marlin  
 152 Broadband Shared Domain introduces the following:  
 153

Broadband Shared Domain	A Marlin Device Domain whose members give access to licensed content from various Service Providers via various user accounts and complying with a certain policy
Broadband Shared Domain Manager	Entity that determines which Marlin DRM Clients are members of a Broadband Shared Domain and issues Domain Nodes and Links to Marlin DRM Clients. The Broadband Shared Domain Manager may take an active role in the distribution of the Service Provider Nodes and Links to the Marlin DRM Clients that are a member of the Broadband Shared Domain.
Domain Node	Octopus Node that represents the Broadband Shared Domain.
Domain Link	Octopus Link that links a Marlin DRM Clients' Octopus Personality Node to a Domain Node.
Service Provider	Entity that issues Marlin Licenses for Content. These Marlin Licenses are bound to Service Provider Nodes that are linked to the Domain Node.
Service Provider Nodes	Service Provider-specific Octopus Nodes linked to a Domain Node to which a Service Provider can bind its Marlin Licenses. These Octopus Nodes for example represent an account or a subscription a user has at the Service Provider.
Service Provider Links	Service Provider specific Octopus Links that link a Domain Node to Service Provider Nodes or a Service Provider Node to another Service Provider Node.
User ID	User ID of the user account at the Service Provider represented by the User Node.

154

155 **1.6 References**

156 Normative References

[MBNS]	Marlin Broadband Network Service Profile Specification, Version 1.0
[MBB]	Marlin Broadband Delivery System Specification, Version 1.2
[MCS]	Marlin – Core System Specification, Version 1.3
[DLNA]	DLNA networked device interoperability guidelines, expanded October 2006, Volume 1: Architectures and Protocols, October 2006, <a href="http://www.dlna.org">www.dlna.org</a>
[MUPnP]	Marlin UPnP Extension Specification, Version 1.0 Draft WD002
[MURIT10]	URI Templates for Marlin, Version 1.0
[MPAC]	Marlin – Profile and Capability Signaling, Version 1.0
[RFC2119]	S. Bradner, Key words for use in RFCs to Indicate Requirement Levels, IETF RFC 2119, March 1997. <a href="http://www.ietf.org/rfc/rfc2119.txt">http://www.ietf.org/rfc/rfc2119.txt</a> .
[Schema]	XML Schema Part 1: Structures. W3C Recommendation. D. Beech, M. Maloney, N. Mendelsohn, H. Thompson. May 2001. <a href="http://www.w3.org/TR/2001/REC-xmlschema-1-20010502/">http://www.w3.org/TR/2001/REC-xmlschema-1-20010502/</a>

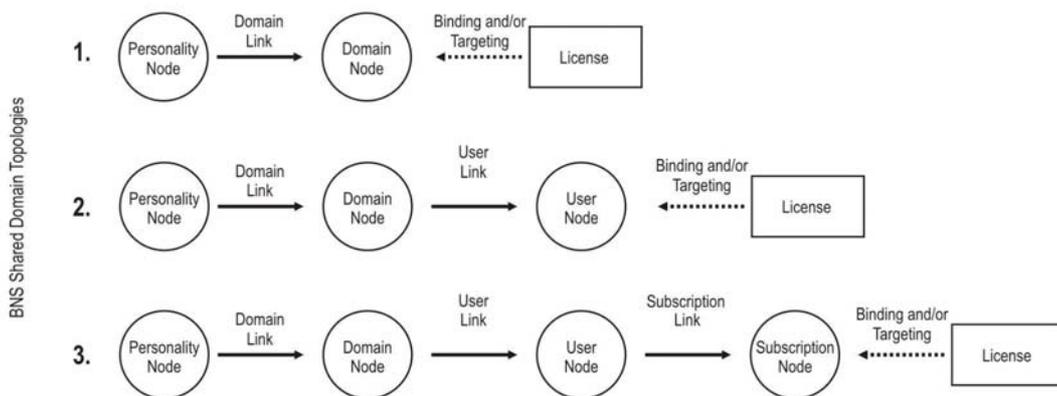
157

158 Informative Reference

[Shared Spaces]	<a href="http://www.marlin-community.com/benefits/use_cases/shared_spaces">http://www.marlin-community.com/benefits/use_cases/shared_spaces</a>
[New Device]	<a href="http://www.marlin-community.com/benefits/use_cases/adding_a_new_device">http://www.marlin-community.com/benefits/use_cases/adding_a_new_device</a>

159 **2 Overview (Informative)**

160 Figure 1 provides an overview of the Node-Link topologies and associated options for  
 161 license binding and targeting that are added to the [MBNS] profile by this  
 162 specification.  
 163



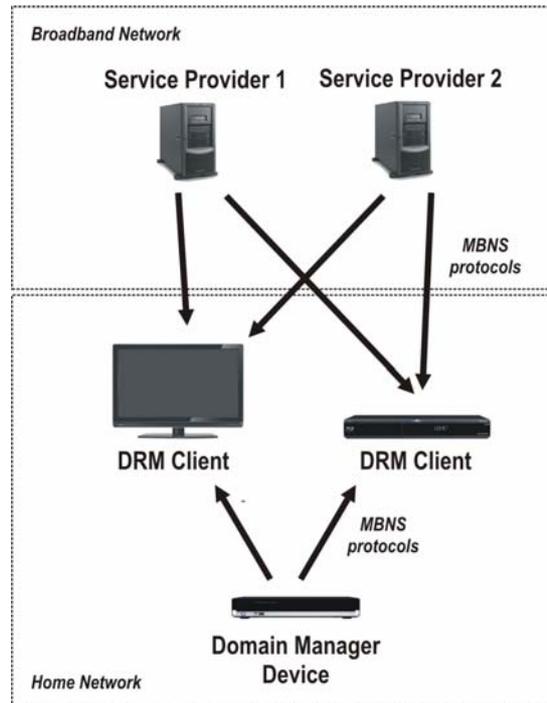
164

Figure 1: Supported Node Link Topologies

165

166 The Domain Node in these topologies is not necessarily issued by the same entity  
 167 that issues the User Node, Subscription Node and/or Marlin Licenses. This enables a  
 168 use case as depicted in Figure 2.

169



170

*Figure 2: Broadband Shared Domain use case indicating a different entity from the Service Provider that performs domain management*

171 In this use case the user owns a device with a domain management feature and uses  
 172 this device to setup and manage her/his domain but obtains content for this domain  
 173 from two Service Providers.

174

175 As with [MBNS], the Service Provider that issues the Content also issues the Marlin  
 176 Licenses and the Service Provider specific User Nodes and/or Subscriptions Nodes  
 177 to which that Marlin License may be bound and/or targeted. From that point of view  
 178 use of the Broadband Shared Domain Topology does not impact Service Providers. If  
 179 however a user has indicated that he/she prefers a different party to manage his/her  
 180 domain (a Broadband Shared Domain Manager device as in Figure 2 or simply  
 181 another Service Provider), then a Service Provider may choose to support this  
 182 domain that is preferred by the User and link its Service Provider specific User Nodes  
 183 and/or Marlin Licenses to the Domain Node issued by the other party instead of  
 184 directly to the Personality Nodes of the user's devices.

### 185 **3 Extensions to the [MBNS] specification**

186 A Marlin DRM Client that signals Broadband Shared Domain functionality using the  
 187 signalling mechanism defined in [MPAC] and the URI as specified below **MUST**  
 188 implement:

- 189 1. BNS Extended Topology as specified in [MBNS].
- 190 2. Broadband Shared Domain Topology.

#### 191 **3.1 *Broadband Shared Domain Topology***

192 This specification defines the following URI to signal the Broadband Shared Domain  
 193 Topology.

194

<b>Attribute Name</b>	<b>Attribute Value-space</b>
topology	urn:marlin:bb:1-2:topology:bbsd:1-0

195

196 When this attribute is signaled, a Marlin DRM Client **MUST** implement the extensions  
 197 to the [MBB] protocols as specified in chapter 4 and signal the Profile defined in  
 198 [MBNS] Section 6.1.

199

200 If a device signals this attribute and also implements [MUPnP], then the device  
 201 **MUST** implement the extensions to the [MUPnP] protocols as specified in chapter 5.

## 202 4 Extensions to the [MBB] specification

### 203 4.1 Extended License Acquisition request

204 The Client implementation SHALL be able to supply the public part of any Octopus  
205 Node types for the <oct:Bundle> parameter in the License Acquisition request.

### 206 4.2 Extended Link Acquisition request

207 The Client implementation SHALL be able to supply the public part of any Octopus  
208 Node types for the <oct:Bundle> parameter in the Link Acquisition request. If a  
209 Domain Node is supplied as the first <oct:Bundle> parameter, it is assumed that the  
210 Client already knows in advance prior to executing the Link Acquisition Protocol, the  
211 Domain Node to supply. Refer to Section 6 for an approach to perform selection of a  
212 Broadband Shared Domain.

### 213 4.3 Use of attributes

214 If issued as part of a Broadband Shared Domain Topology, a Domain Node SHALL  
215 include Domain ID and Domain Policy “urn:marlin:core:node:attribute:domain-policy-  
216 type” attributes, while a Domain Link SHALL include Domain ID  
217 “urn:marlin:link:attribute:domain-id” and Domain Policy  
218 “urn:marlin:link:attribute:domain-policy” as specified in [MCS],

- 219 ○ The Domain ID attribute value SHALL be the Domain Node ID
- 220 ○ The Domain Policy attribute value SHALL be: *urn:marlin:bbsd:domain-*  
221 *policy:organization:<orgid>\**, where
  - 222 • <orgid> is the organization-specific identifier assigned from  
223 Marlin to the organization that manages the Domain Node.  
224 Note this identifier can include suborganization identifiers  
225 which are managed by the organization itself.
  - 226 • \* is any specific string within the given <orgid>.

227  
228 A Domain Node also includes the following attributes:  
229

Attribute Identifier	Requirement	Type	Attribute Value
urn:marlin:core:node:attribute:friendly-name	REQUIRED	String	The human-readable friendly name for the Broadband Shared Domain, encoded as a UTF-8 string.
urn:marlin:bbsd:node:attribute:domain-manager-alias	REQUIRED	String	User friendly name for the Broadband Shared Domain Manager device / service
urn:marlin:bbsd:node:attribute:upnp-uuid	OPTIONAL	String	UPnP UUID found in the UPnP Device description of the Broadband Shared Domain Manager device.
urn:marlin:bbsd:node:attribute:domain-url	OPTIONAL	String	A URI Template that can be transformed into an HTTP URL

230  
231 A device MAY use these aliases to communicate to the user which Broadband  
232 Shared Domain must be joined in order to access content bound to it. If the  
233 Broadband Shared Domain Manager is local, the attribute

234 “urn:marlin:bbsd:node:attribute:upnp-uuid” SHALL be specified and the attribute is  
 235 used to look up the address of the Broadband Shared Domain Manager. Each UPnP  
 236 device has a UDN which is a Universally Unique Identifier (UUID) in its device  
 237 description. The Broadband Shared Domain Manager can then be contacted by  
 238 sending a HTTP GET request to the URL obtained from the <presentationURL> of  
 239 the respective UPnP Description. Additionally, Marlin specific method calls as  
 240 specified in Section 5 can be invoked in order to join the Broadband Shared Domain.

241  
 242 If the Broadband Shared Domain Manager is located in the Internet, the attribute  
 243 “urn:marlin:bbsd:node:attribute:domain-url” SHALL be present and this attribute  
 244 contains a URI template (as specified in [MURIT10]) that can be transformed into an  
 245 HTTP URL referencing an Action Token document containing the information needed  
 246 by a client to engage in a Registration Service interaction as specified in [MBB]. A  
 247 client that supports and understands this attribute MUST convert the URI template  
 248 into a URL as specified in [MURIT10] and perform an HTTP GET request for that  
 249 URL to acquire a document. The document obtained by the HTTP GET request  
 250 MUST have a MIME type signaled in the Content-Type HTTP response header. If the  
 251 document obtained as a response to this request contains an Action Token, the  
 252 MIME type MUST be application/vnd.marlin.drm.actiontoken+xml as specified in  
 253 [MBB]. If the response to the request is an error, or is a document with a different  
 254 MIME type, the client’s behavior is unspecified (for example, if the server cannot  
 255 respond with an Action Token document, it MAY respond with an HTML document  
 256 which the client MAY display in its user interface).

257  
 258 If a service supports the Broadband Shared Domain Topology, then all Service  
 259 Provider Nodes, Service Provider Links and Marlin License objects it issues SHALL  
 260 include a “ContextTag” attribute as specified in [MCS]. The value of the ContextTag  
 261 attribute SHALL be:

- 262 1. equal for all service specific objects that relate to the instance of a Broadband  
 263 Shared Domain Topology.
- 264 2. *urn:marlin:bbsd:user-account:organization:<orgid>.\**; where:
  - 265 • <orgid> is the organization-specific identifier assigned from Marlin to  
 266 the organization that manages the service. Note this identifier can  
 267 include suborganization identifiers which are managed by the  
 268 organization itself.
  - 269 • \* is any specific string within the given <orgid>.

270  
 271 If issued as part of a Broadband Shared Domain Topology, a User Link:

- 272 1. SHALL include the [MCS] Domain ID attribute with the Attribute Value equal  
 273 to the Domain Node ID.
- 274 2. MAY NOT include a [MCS] Domain Policy Attribute.  
 275 (These requirement overrule similar requirements in [MBB])

276  
 277 If issued as part of Broadband Shared Domain Topology, the User Node SHALL also  
 278 include the following attributes:

279

Attribute Identifier	Type	Attribute Value
urn:marlin:bbsd:node:attribute:url	String	A URI Template that can be transformed into an HTTP URL
urn:marlin:core:node:attribute:friendly-name	String	The human-readable friendly name or User ID for the user account, encoded as a UTF-8 string.
urn:marlin:bbsd:node:attribute:service-friendly-name	String	User friendly name for the service.

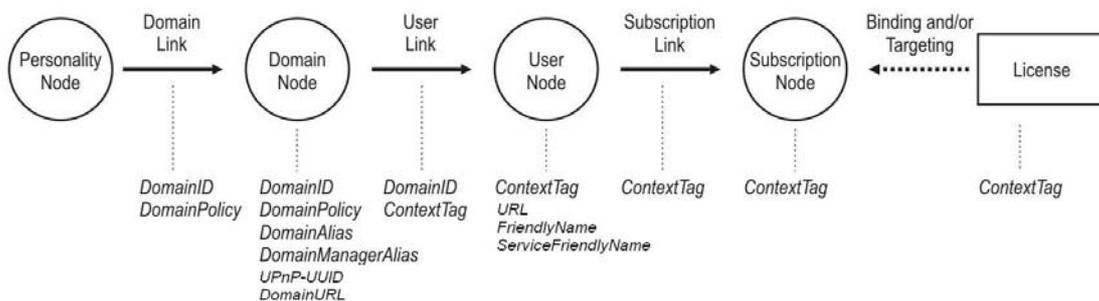
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A device MAY use these aliases to communicate with the Service Provider to indicate the Broadband Shared Domain that must be linked to the User Node, thus enabling devices that are members of the Broadband Shared Domain to access content bound to the User Node.

The “urn:marlin:bbsd:node:attribute:url” attribute, when present indicates the URI template (as specified in [MURIT10]) that can be transformed into an HTTP URL to enable a device to contact the Service Provider. A client that supports and understands this attribute MUST convert the URI template into a URL as specified in [MURIT10] and perform an HTTP GET request for that URL to acquire a document.

The “urn:marlin:core:node:attribute:friendly-name” attribute, when present indicates the human-readable friendly name or the User ID of the user account with the Service Provider represented by the User Node.

The use of attributes is illustrated below:



298

Figure 3: Use of attributes

## 299 **5 Extensions to the [MUPnP] specification**

300 DMS that support Broadband Shared Domain Topology SHALL implement in its  
301 CDS:

- 302 • Broadband Shared Domain specific attributes in <res> elements.
- 303 • X\_GetMarlinNodeLinks() action
- 304 • X\_PutMarlinNodeLinks() action

305  
306 DMS that support Broadband Shared Domain Topology SHALL implement in its  
307 CMS:

- 308 • X\_GetMarlinActionToken() action
- 309 • X\_PutMarlinActionToken() action

310  
311 DMR and DMP that support Broadband Shared Domain Topology SHALL implement  
312 in its CMS:

- 313 • X\_JoinDomain() action
- 314 • X\_PutMarlinActionToken() action

315  
316 The invocation of X\_JoinDomain() action on the DMR SHALL trigger the  
317 X\_GetMarlinActionToken() action on the DMS in which the input parameter of  
318 X\_JoinDomain() action also serves as the input parameter for  
319 X\_GetMarlinActionToken() action.

320  
321 The additions to the <res> elements enable DMP and DMR devices to retrieve the  
322 required Octopus Node and Links in addition to the Marlin License and the Content.

323  
324 The non-standard actions enable a Broadband Shared Domain Manager device to  
325 proactively join devices to a Broadband Shared Domain and provide them with the  
326 user account information they will require.

327

### 328 **5.1 Broadband Shared Domain specific attributes in <res>** 329 **elements**

330 Marlin specific attributes for <res> element are defined to expose Marlin License  
331 related information.

#### 332 **5.1.1 res@marlin:nodeLinksURI**

333 **Namespace:** marlin

334 **Property Data Type:** xsd:anyURI

335 **Multi-Valued:** NO

336

337 **Description:** The marlin:nodeLinksURI attribute in <res> element is introduced to  
338 indicate the location of Octopus Nodes and Links that are needed for the Marlin  
339 License that is applicable to the content objects this <res> element is referring to.  
340 When a res@marlin:licenseFileURI is exposed as specified in [MUPnP], then also  
341 the res@marlin:nodeLinksURI MUST be exposed to indicate the URI from which  
342 User, Domain and Subscription Nodes and Links can be downloaded.

343

344 In this case, the HTTP response SHALL be an Octopus bundle with:

- 345 1. all the Octopus Nodes and Links that carry the same "ContextTag" as the  
346 Marlin License objects

347 2. all the Domain Nodes that are referenced by a Domain ID attribute in one of  
 348 the Octopus Links in point 1.

349

350 The response SHALL use the appropriate MIME type (for Octopus Nodes and Links,  
 351 this is “application/vnd.marlin.drm.nodelink+xml”).

352

353 Note that URI value for the res@marlin:nodeLinksURI MUST follow the guideline  
 354 defined in [DLNA] §7.3.24.

355

356 **Default Value:** None

357

### 358 **5.1.2 res@marlin:importNodeLinksURI**

359 **Namespace:** marlin

360 **Property Data Type:** xsd:anyURI

361 **Multi-Valued:** NO

362

363 **Description:** The marlin:importNodeLinksURI attribute in a <res> element is  
 364 introduced to indicate the location of Octopus Nodes and Links to be uploaded. It is  
 365 used as a return parameter in the content object’s metadata when invoking the  
 366 createObject() call to upload content to the media server. When a  
 367 res@marlin:importLicenseFileURI is exposed as specified in [MUPnP] for Broadband  
 368 Shared Domain, then also a res@marlin:importNodeLinksURI MUST be used to  
 369 indicate the location of the Octopus Nodes and Links to be uploaded using HTTP  
 370 POST. The Octopus Nodes and Links are uploaded as an Octopus bundle. A copy of  
 371 the Octopus Nodes and Links is created in the media server. After the transfer has  
 372 finished successfully, the Octopus Nodes and Links are automatically associated with  
 373 the content and Marlin License as specified in the <res> element, where the  
 374 res@marlin:nodeLinksURI is set, which MAY or MAY NOT be the same URI as the  
 375 one specified in the res@importNodeLinksURI property depending on the CDS  
 376 implementation.

377

378 Note that the URI value for the res@marlin:importNodeLinksURI MUST follow the  
 379 guideline defined in [DLNA] §7.3.24.

380

381 **Default Value:** None

382

## 383 **5.2 X\_GetMarlinActionToken() action**

384 This is a non standard function to allow a content access device to initiate the  
 385 registration process of joining a Broadband Shared Domain. The content access  
 386 device discovers all Broadband Shared Domains that have been created in the home  
 387 network via UPnP by invoking X\_GetMarlinNodeLinks() with the “ContextTag” value  
 388 equals to “\*” as specified in Section 5.5. Based on the attributes of the Domain  
 389 Nodes returned from the X\_GetMarlinNodeLinks() call, the content access device  
 390 can determine all the Broadband Shared Domains in the home network and the  
 391 corresponding UUID of their respective Broadband Shared Domain Manager. This  
 392 allows the content access device to invoke the method X\_GetMarlinActionToken() on  
 393 the designated Broadband Shared Domain Manager in order to obtain an Action  
 394 Token. This Action Token triggers a series of actions on the content access device to  
 395 join the designated Broadband Shared Domain and obtain the corresponding Domain  
 396 Nodes and Domain Links.

## 397 5.2.1 Arguments

398

Argument	Direction
Domain ID (String)	IN
actionToken (bsa:ActionToken)	OUT

399

## 400 5.3 *X\_JoinDomain()* action

401 This is a non standard function to allow a DMC to trigger a content access device to  
 402 join a Broadband Shared Domain. The *X\_JoinDomain()* method should be  
 403 implemented by the content access device, such as a DMR. The content access  
 404 device discovers all Broadband Shared Domains that have been created in the home  
 405 network via UPnP by invoking *X\_GetMarlinNodeLinks()* with the "ContextTag" value  
 406 equals to "\*" as specified in Section 5.5. Based on the attributes of the Domain  
 407 Nodes returned from the *X\_GetMarlinNodeLinks()* call, the content access device  
 408 can determine all Broadband Shared Domains in the home network. The DMC then  
 409 selects the Broadband Shared Domain in which the content access device is  
 410 instructed to join.

### 411 5.3.1 Arguments

412

Argument	Direction
Domain ID (String)	IN

413

## 414 5.4 *X\_PutMarlinActionToken()* action

415 This is a non standard function to allow the Broadband Shared Domain Manager to  
 416 trigger the registration of content access devices into a Broadband Shared Domain.  
 417 When the Broadband Shared Domain Manager discovers a new device in the home  
 418 network, it prompts the user to which Broadband Shared Domain this new device  
 419 should be added. The Broadband Shared Domain Manager then uses  
 420 *X\_PutMarlinActionToken()* to trigger a series of actions on the new device to join the  
 421 designated Broadband Shared Domain and obtain the corresponding Domain Nodes  
 422 and Domain Links.

### 423 5.4.1 Arguments

424

Argument	Direction
actionToken (bsa:ActionToken)	IN

425

## 426 5.5 *X\_GetMarlinNodeLinks()* action

427 This is a non standard function that enables devices such as a PMP to obtain the  
 428 required Octopus Nodes and Octopus Links that carry the same "ContextTag" from  
 429 the DMS, domain manager or other devices before it attempts to play the content.  
 430 When a new device is added to the Broadband Shared Domain, it will need the  
 431 required User Nodes and User Links for playing content which have already been  
 432 shared in the Broadband Shared Domain.

### 433 5.5.1 Arguments

434

Argument	Direction
contextTag (string)	IN
nodeLinks (oct:Bundle)	OUT

435

436 The returned nodeLinks oct:Bundle MUST include:

- 437 1. all the Octopus Nodes and Links that carry a “ContextTag” attribute of which  
 438 the value is equal to the value of the contextTag attribute in the request. If the  
 439 value of the contextTag attribute in the request is “\*”, then all Octopus Nodes  
 440 and Links that carry a “ContextTag” attribute SHALL be included in the  
 441 response.
- 442 2. all the Domain Nodes that are referenced by a Domain ID attribute in one of  
 443 the Octopus Links in point 1.

444

### 445 5.6 X\_PutMarlinNodeLinks() action

446 This is a non standard function that enables the Broadband Shared Domain Manager  
 447 to proactively push the Octopus Nodes and Links to the devices such as PMP when  
 448 it first joins the Broadband Shared Domain, thus ensuring that they have the required  
 449 Octopus Nodes and Links when playing content. Additionally, when the Octopus  
 450 Nodes and Links have been updated, e.g., a new user account has been associated  
 451 with the domain (a new User Node and User Link to the Domain Node is acquired),  
 452 the Broadband Shared Domain Manager may use this function to update the  
 453 Octopus Nodes and Links in the devices.

#### 454 5.6.1 Arguments

455

Argument	Direction
nodeLinks (oct:Bundle)	IN

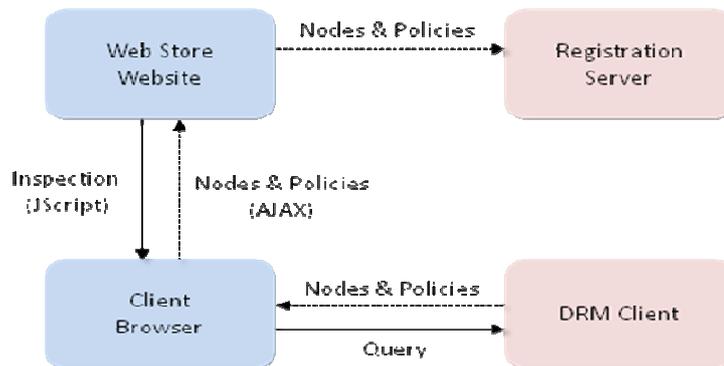
456

457 The parameter nodeLinks oct:Bundle contains all Octopus Nodes and Links that  
 458 have the same “ContextTag” attribute. This “ContextTag” is used to identify the  
 459 required Octopus Nodes and Links to be updated.

460

## 461 6 Selection of a Broadband Shared Domain 462 (Informative)

463 A Marlin DRM Client can be a member of multiple Broadband Shared Domains and  
464 each domain is governed by a domain policy. However, only one Broadband Shared  
465 Domain Node can be supplied in the Link Acquisition Request and then linked to a  
466 User Node. Therefore, one Broadband Shared Domain must be selected and  
467 communicated to the Service Provider in order to establish the link. This can be  
468 achieved as follows:  
469



470

Figure 4: Selection of a Broadband Shared Domain

471

472 Application level tools can be developed to facilitate the selection of a Broadband  
473 Shared Domain. The selection of a Broadband Shared Domain occurs as part of the  
474 browsing session with the Service Provider, and not in the existing [MBB] protocols.  
475 When the user has decided to buy content from a web store, the tool is used to  
476 perform an inspection on the client browser to query the Marlin DRM Client for all the  
477 Broadband Shared Domain Nodes in which it is a member of and their corresponding  
478 domain policies. The Domain Nodes together with their domain policies are returned  
479 and then forwarded to the Registration Server to check for compliancy of their  
480 domain policies. A list of compliant Broadband Shared Domains is shown to the user  
481 on the browser; this enables the user to select a Broadband Shared Domain to be  
482 associated with the user account at the Service Provider.

483

484 The selected Broadband Shared Domain is communicated to the Registration Server.  
485 A Link Acquisition Action Token is then issued by the Registration Server and  
486 delivered to the Marlin DRM Client. As the Registration Server has information about  
487 the selected Domain Node, the <uid>s of the Domain Node and User Node are  
488 specified in the License Acquisition Action Token. The Marlin DRM Client then uses  
489 the Action Token to trigger Link Acquisition process. Based on the <uid> in the Action  
490 Token, the Marlin DRM Client knows which Domain Node should be sent to the  
491 Registration Server in the Link Acquisition Request.

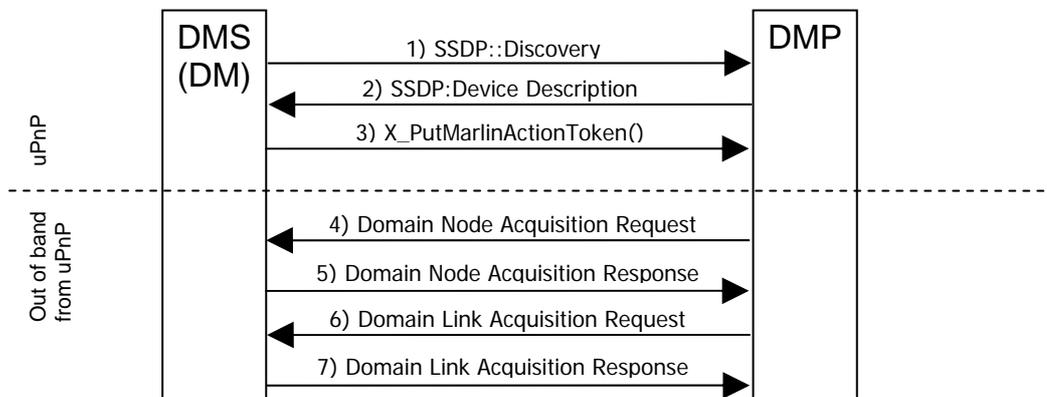
## 492 7 System Usage of Local Domain Management 493 (Informative)

494 This section describes the use of UPnP extensions defined in Section 5 in the  
495 context of local domain management in which a Broadband Shared Domain Manager  
496 is present in a local network. In Section 7.1, we describe the use of UPnP extensions  
497 to enable devices to join a Broadband Shared Domain, while Section 7.2 describes  
498 the distribution of Service Provider Nodes and Links in the local network.

### 499 7.1 *Joining a Broadband Shared Domain*

#### 500 7.1.1 Domain Manager discovers new devices

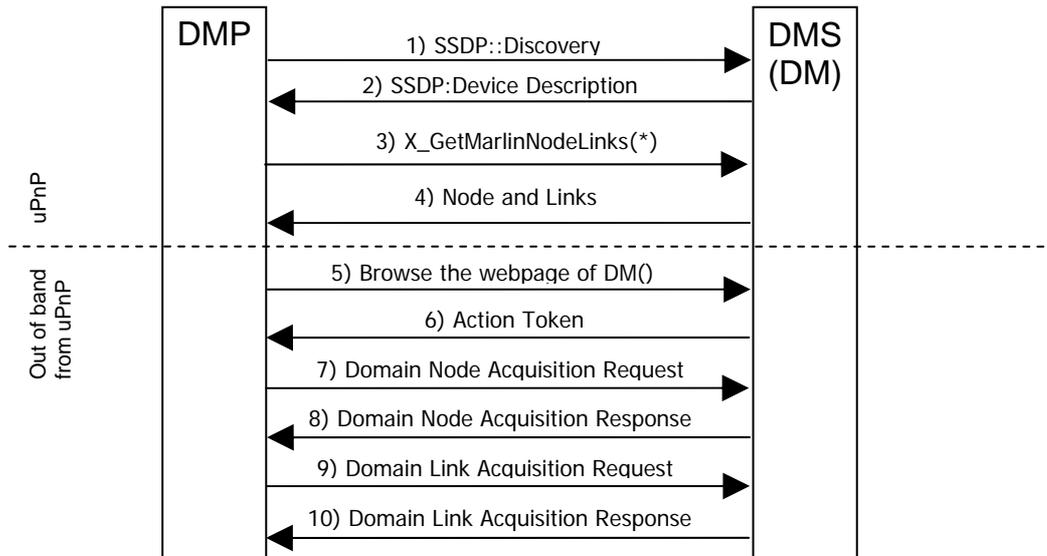
501 This section describes the use of UPnP extensions to enable a Broadband Shared  
502 Domain Manager in the home network to add new devices into the Broadband  
503 Shared Domain upon device discovery.  
504



- 505
- 506 1. The DMS (Broadband Shared Domain Manager) discovers the DMP using Simple  
507 Service Discovery Protocol (SSDP) of UPnP.  
508
  - 509 2. The DMP sends its UPnP device description to the DMS. Based on the DMP's  
510 device description and its service description, the DMS can examine a list of  
511 Marlin Broadband Shared Domain specific actions implemented by the DMP, thus  
512 knowing that the DMP is a Marlin device supporting Broadband Shared Domain  
513 Topology.  
514
  - 515 3. In order to add the DMP into the Broadband Shared Domain, the DMS can invoke  
516 X\_PutMarlinActionToken() to deliver an Action Token to the DMP.  
517
  - 518 4. Using the Action Token, the DMP triggers the Node Acquisition and Link  
519 Acquisition protocols (as illustrated in Step 4 to Step 7).

#### 520 7.1.2 Devices discover Domain Manager

521 This section describes a use case where a DMP discovers a Broadband Shared  
522 Domain Manager in a local area network, and it requests to join a Broadband Shared  
523 Domain managed by the Domain Manager.

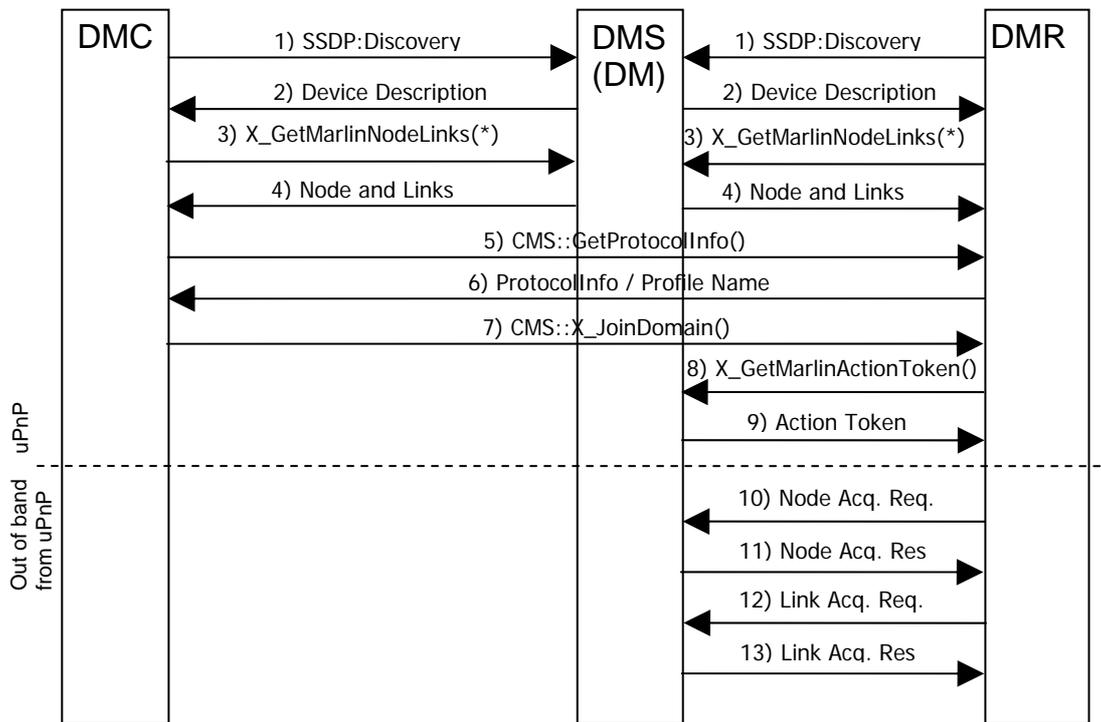


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1. DMP discovers the DMS (Broadband Shared Domain Manager) using Simple Service Discovery Protocol (SSDP) of UPnP.
2. The DMS sends its device description and service description to the DMP. Based on the device description, the DMP can examine a list of Marlin Broadband Shared Domain specific actions implemented by the DMS, thus knowing that the DMS is a Marlin device.
3. The DMP invokes X\_GetMarlinNodeLinks() with "\*" as the parameter to all devices in the local area network.
4. All Octopus Nodes and Links are returned to the DMP, thus enabling the DMP to check the attributes of Domain Nodes, and construct a mapping of Domain ID and the corresponding Broadband Shared Domain Manager's UUID, which can be used to obtain the address of the Domain Manager.
5. The DMP obtains the <presentationURL> of the Domain Manager's device description and sends a HTTP GET to it. On the web interface, the user can select the Broadband Shared Domain to join.
6. An Action Token is then sent to the DMP to enable it to join the Broadband Shared Domain. Step 7 to Step 10 indicates the Node and Link Acquisition protocols.

### 560 7.1.3 DMC instructs a DMR to join Broadband Shared Domain

561 This use case illustrates a 3-box scenario, where the DMC can add a DMR to the  
562 Broadband Shared Domain.



- 563  
564 1. The DMC and DMR discover the DMS (Broadband Shared Domain Manager)  
565 using Simple Service Discovery Protocol (SSDP) of UPnP.  
566  
567 2. The DMS sends the device description and service description to the DMC and  
568 DMR. Based on the device description, the DMC and DMR can examine a list of  
569 Marlin Broadband Shared Domain specific actions implemented by the DMS, thus  
570 knowing that the DMS is a Marlin device.  
571  
572 3. The DMC and DMR invoke X\_GetMarlinNodeLinks(\*) on all devices in the local  
573 area network.  
574  
575 4. In response to X\_GetMarlinNodeLinks(\*), all Octopus Nodes and Links are sent  
576 back to the DMC and DMR. By checking the attributes of Domain Nodes, the DMR  
577 can construct a mapping of Domain ID and the corresponding Broadband Shared  
578 Domain Manager's UUID which can be used to obtain the address of the Domain  
579 Manager.  
580  
581 5. The DMC invokes CMS:GetProtocolInfo to retrieve supported protocols and PN  
582 (Profile Name) from DMR.  
583  
584 6. DMR sends the <res@protocolInfo> to DMC, indicating the supported Marlin  
585 protocols.  
586  
587 7. Once the user has selected the Broadband Shared Domain to join, the DMC  
588 invokes X\_JoinDomain() on the DMR by using the Domain ID as its parameter.  
589

- 590 8. The DMR then invokes the `X_GetMarlinActionToken()` on the DMS by specifying  
 591 the given Domain ID from DMC in order to obtain an Action Token to join the  
 592 designated Broadband Shared Domain.  
 593  
 594 9. An Action Token is delivered to the DMR and this enables the DMR to acquire the  
 595 corresponding Domain Node and Domain Link as shown in Step 10 to Step 13.  
 596

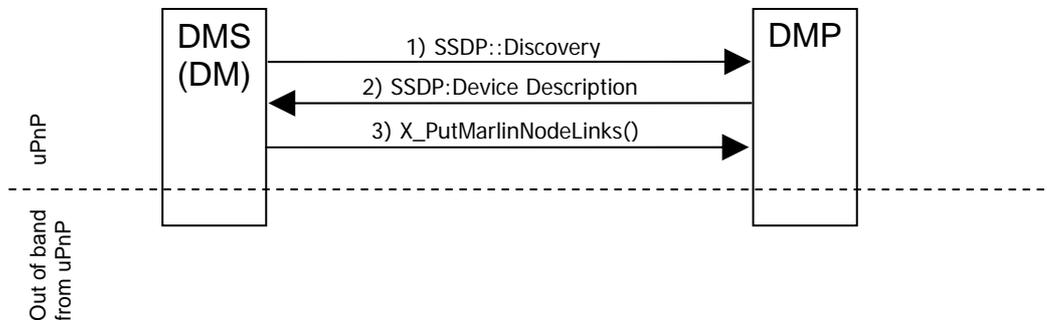
## 597 **7.2 Distribution of Nodes and Links**

### 598 **7.2.1 Push nodes and links after joining the Shared Domain**

599 This use case describes the need for the Broadband Shared Domain Manager to  
 600 pro-actively push Service Provider Nodes and Links to a new Marlin device that has  
 601 joined the Broadband Shared Domain. Assuming that the use case of joining the  
 602 Broadband Shared Domain as illustrated in Section 7.1.1 has occurred. After  
 603 successful completion of the Domain Node and Link Acquisition protocols, the  
 604 Broadband Shared Domain Manager can invoke `X_PutMarlinNodeLinks()` to pro-  
 605 actively push Service Provider Nodes and Links to the newly joined Marlin device if  
 606 the Domain Manager has stored the Service Provider Nodes and Links locally.

### 607 **7.2.2 Push nodes and links**

608 This use case describes the need to update the Service Provider Links when the  
 609 user account has been renewed, thus obtaining a renewed User Link. Assuming that  
 610 the user account with a Service Provider has expired, the DMS using its browser visit  
 611 the webpage of the Service Provider and renew its account. Thus, the User Link  
 612 which has expired is updated with a new User Link. This User Link must be conveyed  
 613 to other devices in the local area network.



- 614  
 615  
 616 1. The DMS (Broadband Shared Domain Manager) discovers the devices in the local  
 617 area network using Simple Service Discovery Protocol (SSDP) of UPnP.  
 618  
 619 2. The DMP sends its device description and service description to the DMS. Based  
 620 on the device description, the DMS can examine a list of Marlin Broadband  
 621 Shared Domain specific actions implemented by the DMP, thus knowing that the  
 622 DMP is a Marlin device that implements Broadband Shared Domain.  
 623  
 624 3. New User Links have been obtained by the DMS and it needs to pro-actively push  
 625 them to the Marlin devices supporting Broadband Shared Domain in the local area  
 626 network. DMS invokes `X_PutMarlinNodeLinks()` on the DMP (assuming that the  
 627 DMP is also a DMS that stores the Service Provider Nodes and Links).