

# ISO/IEC 23090-8:2020-12 (E)

## Information technology - Coded representation of immersive media - Part 8: Network based media processing

---

<b>Contents</b>		<b>Page</b>
Foreword .....		vii
Introduction .....		viii
<b>1</b>	<b>Scope .....</b>	<b>1</b>
<b>2</b>	<b>Normative references .....</b>	<b>1</b>
<b>3</b>	<b>Terms, definitions and abbreviated terms .....</b>	<b>1</b>
<b>3.1</b>	<b>Terms and definitions .....</b>	<b>1</b>
<b>3.2</b>	<b>Abbreviated terms .....</b>	<b>4</b>
<b>4</b>	<b>Conventions .....</b>	<b>4</b>
<b>5</b>	<b>Overview .....</b>	<b>5</b>
<b>5.1</b>	<b>General .....</b>	<b>5</b>
<b>5.2</b>	<b>Architecture .....</b>	<b>5</b>
<b>5.3</b>	<b>NBMP workflow .....</b>	<b>6</b>
<b>5.3.1</b>	<b>General .....</b>	<b>6</b>
<b>5.3.2</b>	<b>Workflow processing model .....</b>	<b>6</b>
<b>5.3.3</b>	<b>Task allocation and distribution .....</b>	<b>8</b>
<b>5.3.4</b>	<b>Workflow graph .....</b>	<b>8</b>
<b>5.4</b>	<b>Relationship between logical definitions, data objects and REST resources .....</b>	<b>9</b>
<b>5.5</b>	<b>Description of the defined entities in this document .....</b>	<b>10</b>
<b>5.5.1</b>	<b>NBMP APIs .....</b>	<b>10</b>
<b>5.5.2</b>	<b>Content format .....</b>	<b>10</b>
<b>5.5.3</b>	<b>Definitions .....</b>	<b>10</b>
<b>5.5.4</b>	<b>Functional behaviour .....</b>	<b>11</b>
<b>6</b>	<b>NBMP descriptions .....</b>	<b>11</b>
<b>6.1</b>	<b>NBMP function description (FD) .....</b>	<b>11</b>
<b>6.1.1</b>	<b>General .....</b>	<b>11</b>
<b>6.1.2</b>	<b>Description .....</b>	<b>11</b>
<b>6.1.3</b>	<b>Function group .....</b>	<b>12</b>
<b>6.2</b>	<b>NBMP task description (TD) .....</b>	<b>13</b>
<b>6.2.1</b>	<b>General .....</b>	<b>13</b>
<b>6.2.2</b>	<b>Description .....</b>	<b>13</b>
<b>6.2.2</b>	<b>Task lifecycle .....</b>	<b>14</b>
<b>6.3</b>	<b>NBMP workflow description (WD) .....</b>	<b>15</b>
<b>6.3.1</b>	<b>General .....</b>	<b>15</b>
<b>6.3.2</b>	<b>Description .....</b>	<b>15</b>
<b>6.3.3</b>	<b>Workflow lifecycle .....</b>	<b>16</b>
<b>7</b>	<b>NBMP interfaces .....</b>	<b>17</b>
<b>7.1</b>	<b>General .....</b>	<b>17</b>
<b>7.2</b>	<b>Workflow APIs .....</b>	<b>18</b>
<b>7.2.3</b>	<b>Workflow API operations .....</b>	<b>18</b>
<b>7.3</b>	<b>Task APIs .....</b>	<b>20</b>
<b>7.3.1</b>	<b>General .....</b>	<b>20</b>
<b>7.3.2</b>	<b>Task resource .....</b>	<b>20</b>
<b>7.3.3</b>	<b>Task API operations .....</b>	<b>21</b>

7.4	Function discovery APIs .....	22
7.4.1	General .....	22
7.4.2	Function discovery queries .....	22
7.4.3	Function discovery API operations .....	23
7.5	Supported protocols .....	25
8	NBMP descriptors .....	25
8.1	Scheme descriptor .....	25
8.1.1	General .....	25
8.1.2	JSON schema .....	26
8.2	General descriptor .....	27
8.2.1	General .....	27
8.2.2	JSON schema .....	28
8.3	Input descriptor .....	32
8.3.1	General .....	32
8.3.2	JSON schema .....	33
8.3.3	General .....	38
8.3.4	JSON schema .....	39
8.4	Processing descriptor .....	43
8.4.1	General .....	43
8.4.2	JSON schema .....	46
8.5	Requirements descriptor .....	53
8.5.1	General .....	53
8.5.2	JSON schema .....	55
8.6	Configuration descriptor .....	59
8.6.1	General .....	59
8.6.2	JSON schema .....	60
8.7	Startup-delay descriptor .....	63
8.7.1	General .....	63
8.7.2	JSON schema .....	64
8.8	Client-Assistance descriptor .....	64
8.8.1	General .....	64
8.8.2	JSON schema .....	65
8.9	Failover descriptor .....	66
8.9.1	General .....	66
8.9.2	JSON schema .....	66
8.10	Events descriptor .....	67
8.10.1	General .....	67
8.10.2	JSON schema .....	68
8.11	Variables descriptor .....	68
8.11.1	General .....	68
8.11.2	JSON schema .....	69
8.12	Monitoring descriptor .....	70
8.12.1	General .....	70
8.12.2	JSON schema .....	70
8.13	Reporting descriptor .....	71
8.13.1	General .....	71
8.13.2	JSON schema .....	72
8.14	Notification descriptor .....	74
8.14.1	General .....	74
8.14.2	JSON schema .....	74
8.15	Assertion descriptor .....	76
8.15.1	General .....	76
8.15.2	JSON schema .....	78
8.16	Request Descriptor .....	81
8.16.1	General .....	81
8.16.2	JSON schema .....	81
8.17	Acknowledge descriptor .....	82
8.17.1	General .....	82
8.17.2	JSON schema .....	82
8.18	Repository descriptor .....	83
8.18.1	General .....	83

8.18.2	JSON schema .....	84
8.19	Security descriptor .....	85
8.19.1	General .....	85
8.19.1	JSON schema .....	86
8.20	Step descriptor .....	87
8.20.1	General .....	87
8.20.2	JSON schema .....	87
9	NBMP parameters .....	88
9.1	General .....	88
9.2	Scheme descriptor parameters .....	88
9.3	General descriptor parameters .....	89
9.4	Input descriptor parameters .....	90
9.5	Output descriptor parameters .....	92
9.6	Processing descriptor parameters .....	94
9.7	Requirements descriptor parameters .....	95
9.7.1	Flow control parameters .....	95
9.7.2	Hardware parameters .....	95
9.7.3	Security requirements .....	96
9.7.4	Workflow/task requirements .....	97
9.7.5	Resource estimator parameters .....	97
9.8	Startup-Delay descriptor parameters .....	97
9.9	Client-Assistant parameters .....	98
9.10	Failover parameters .....	98
9.11	Events parameters .....	99
9.12	Variables parameters .....	99
9.13	Monitoring parameters .....	100
9.14	Reporting parameters .....	100
9.15	Notification parameters .....	101
9.16	Assertion parameters .....	101
9.17	Request parameters .....	103
9.18	Acknowledge parameters .....	103
9.19	Repository parameters .....	104
9.20	Security parameters .....	104
9.21	Step Descriptor parameters .....	105
9.22	Configuration descriptor parameters .....	106
9.22.1	Generic parameter representation .....	106
9.22.2	Example of parameter representation .....	107
10	Workflow manager, task and function repository requirements .....	110
10.1	Workflow manager requirements .....	110
10.2	Function repository requirements .....	111
10.3	Task requirements .....	111
11	NBMP support for media formats and metadata .....	112
11.1	General .....	112
11.2	Media formats .....	112
11.3	Application formats .....	112
11.4	Metadata formats .....	112
12	Security considerations in NBMP .....	112
12.1	Overview .....	112
12.2	Secure and authenticated channels between NBMP source and NBMP workflow manager .....	113
12.2.1	General .....	113
12.2.2	Secure communication channel between NBMP source and NBMP workflow manager ...	113
12.2.3	NBMP source authentication to workflow manager .....	113
12.2.4	Workflow manager authentication to NBMP source .....	113
12.2.5	Secure channels for task communication .....	113
12.2.6	NBMP source authentication/authorization to workflow task .....	114
12.2.7	Workflow task authentication to NBMP source .....	114
12.2.8	Secure channel for NBMP source and task communication .....	114

<b>12.2.9</b>	<b>MPE security .....</b>	<b>114</b>
<b>12.2.10</b>	<b>Network security .....</b>	<b>114</b>
<b>Annex A (normative)</b>	<b>JSON schemas .....</b>	<b>115</b>
<b>Annex B (normative)</b>	<b>NBMP workflow management .....</b>	<b>116</b>
<b>Annex C (informative)</b>	<b>Schema for identifying MPEG compatible functions .....</b>	<b>119</b>
<b>Annex D (normative)</b>	<b>NBMP MIME types .....</b>	<b>120</b>
<b>Annex E (informative)</b>	<b>Interface for managing function descriptions in function repository .....</b>	<b>123</b>
<b>Bibliography .....</b>		<b>124</b>