• The project you loaded has reached the state Analyzed. Therefore you have been directed to the subsequent workflow step.

Report for Digital Preservation of Console Video Games (SNES)

Report creation date: 17.07.2008 11:09:56

Display Changelogs

Plan name Digital Preservation of Console Video Games (SNES)

Current state Analyzed

Plan description Data for SNES preservation from the diploma thesis "Digital Preservation of Console Video Games"

Responsible planners Mark Guttenbrunner

Organization Vienna University of Technology

- Basis
- Sample Records
- Requirements
- Alternatives
- Go-Decision
- Experiments
- Evaluation & Transformation
- Results: Weighted multiplication
- Results: Weighted sum
- Recommendation

Identification code

Document types Digital Data from Cartridges of Super Nintendo Entertainment System (SNES) video games (Binary Streams)

Mandate

Planning purpose The library has the legal obligation to preserve every published console video game like national libraries are obliged to

preserve publications on paper and offer possibilities to display these games to the public.

Designated community The target audience are visitors of the library. It is not necessary to publish the collection online. Access to games from the

library collection to experience the games original look & feel should be possible for the public. Access to original media shall

not be necessary to avoid damage to rare specimen.

Applying policies For legal reasons only games physically in the possession of the library are preserved.

Relevant organisational procedures and workflows

Contracts and agreements specifying preservation rights

Reference to agreements of maintenance and access

Plan relations

No previous attempts to preserve these kinds of documents have been made.

Triggers

Trigger	Comment
Changed Environment	New formed legal obligation to preserve video games.

Samples description:

3 games are selected for every system: - One of the best selling games for the system, as those are usually of the biggest public interest. This should be a standard game without special enhancements like overlays, special controllers or specially needed accessories. - A game with special overlays or special controllers, as it is more difficult to preserve the look & feel for these kind of games than for others. - A game using an accessory expanding the capabilities of the system. This additional hardware can either be applied to the system itself or on the media. If no hardware extensions are available, one of the last games for the system is selected. Those are usually the hardest to preserve as developers are able to utilize a system most at the end of its product cycle.

Collection profile

Collection ID:

Description: Physical collection of Cartridges for the Nintendo SNES which have been transferred to binary

streams.

Type of objects: Digital Data from Cartridges of Super Nintendo Entertainment System (SNES) video games

(Binary Streams).

Number of objects: 1000

Expected growth rate: Slow. Occasionally new games can be added to the librarie's collection.

Name	Short name	Description	Original environment	Data	Object-format
Super Mario World	SMW	A popular game selected for the system. It was the first game for the system with Nintendo's famous character the plumber "Mario". It was also one of the	Super Nintendo Entertainment System (SNES) (PAL)	No data	PUID: Name: Version: mime-type:

Name	Short name	Description	Original environment	Data	Object-format
		best sold games for the system.			
Super Scope	Super Scope	No games for this system used overlays, so a game with a special controller was selected. Super Scope is a game which was shipped with a light gun shaped like a rocket launcher.	Super Nintendo Entertainment System (SNES) (PAL)	No data	PUID: Name: Version: mime-type:
Star Fox	Star Fox	Various games for the Nintendo SNES used special hardware on the cartridges to support the systems processing power. This game uses a chip that assists the systems central processing unit with 3D calculations.	Super Nintendo Entertainment System (SNES) (PAL)	No data	PUID: Name: Version: mime-type:

Expand All | Collapse All

▼Process Characteristics	0.1	0.1			
▶Usability	0.4	0.04			
▶ Configurability	0.6	0.06			
▼ Costs	0.1	0.1			
▶ costs for preserving media	0.3	0.03	\checkmark	Ordinal	industry standard optical drive, non-optical direct connect, non-ind
▶ fraction of games supported	0.3	0.03	\checkmark	Positive number	er
▶total number of games supported	0.4	0.04	4	Ordinal	less than 10, 10-100, 101-500, 500-2000 or more than 2000
▼Object Characteristics	0.4	0.4			
▶object interpretable	0.1	0.04		Boolean	Yes or No
▶speed	0.15	0.06		Positive number	er
▶Interactivity	0.2	0.08			
▶ Sound	0.2	0.08			
Graphics	0.25	0.1			
► Network Support	0.1	0.04			
▼Context and Data Characteristics	0.2	0.2			
▶Metadata	0.4	0.08			
▶reference to console video game system	0.3	0.06	V	Boolean	Yes or No
▶reference to application	0.3	0.06	\checkmark	Ordinal	not available, without system configuration or with system configu
▼Infrastructure	0.2	0.2			
▶ Scalability	0.25	0.05			
► Stability	0.3	0.06			
▶Legality	0.1	0.02			
▶Media	0.25	0.05			
► Additional Accessories	0.1	0.02			
Importance factors					

comments:

Description:

Attached files:

Name	Description	Reason for considering	Config settings	Necessary resources
ZSNES 1.51	SNES Emulator	Only emulators that have seen at least one release in the last 6 month or that have been released in stable final versions are evaluated. If no emulator exists which meets this criterion, the latest released emulator is evaluated. Only emulators for personal computers running on a Microsoft Windows or Linux operating system or on a virtual machine on one of these operating systems are evaluated. For every system a maximum of 3 emulators are evaluated. If more than 3 emulators meet the criteria defined here,	default configuration like in release package of ZSNES 1.51	

Name	Description			Reason for considering		Config settings	Necessary resources
		selected world w than one	I by using the p ide web researd e system are ch commercial gam	en in development longest are considered ublicly most popular and best rated emula h. Dedicated emulators as well as emulatosen if available. Only emulators that are see selected. ZSNES is one of the most	ators according to a ors supporting more known to be able to		
SNES9X 1.51	SNES Emulator	released criterion compute machine of 3 em the ones selected world w than one	d in stable final in, the latest relears running on a comment of the sulators are evaluators are evaluators the poide web researce system are chommercial games.	we seen at least one release in the last 6 reversions are evaluated. If no emulator exits ased emulator is evaluated. Only emulator a Microsoft Windows or Linux operating systemed experating systems are evaluated. For experience of the more than 3 emulators meet the properties of the most popular and best rated emulated the control of the most popular are selected. SNES9X is one of the most popular are selected. SNES9X is one of the most popular are selected.	ists which meets this ors for personal stem or on a virtual very system a maximum e criteria defined here, d. Alternatives are ators according to a ors supporting more known to be able to	default configuration like in release package of SNES9X 1.51	
MESS 0.119	Multisystem Emulator	released criterion compute machine of 3 emit the ones selected world w than one launch of	d in stable final n, the latest rele ers running on a e on one of thes ulators are eval s which have be I by using the p ide web researd e system are ch	we seen at least one release in the last 6 reversions are evaluated. If no emulator exit ased emulator is evaluated. Only emulator a Microsoft Windows or Linux operating systemedia e operating systems are evaluated. For evaluated. If more than 3 emulators meet the linen in development longest are considered ablicly most popular and best rated emulated. Dedicated emulators as well as emulators if available. Only emulators that are less are selected. MESS is the multi systemedia emust other systems as well.	ists which meets this ors for personal stem or on a virtual very system a maximum e criteria defined here, d. Alternatives are ators according to a ors supporting more known to be able to	default configuration like in release package of MESS 0.119	
VLC 0.8.6c	Video Approch - making videos of the games running on original hardware	frame ra MP4) is	ate that the sys used as it allow	n the original resolution as used on a stand tem produces. As a container format MPEC s the use of metadata tags and is a commer 1 release 0.8.6c is used to play-back the	G-4 Part 14 (or short non standard. The open		
Museum approach	keeping original hardware and software						
	De	ecision:	GO				
			As the original and will not be no action needs		ia are not available, the n	nuseum approach is	not applicable
	Action	iecucu.	Alternative	Experiment description	Run des	cription	Experiment

			data uploaded
ZSNES 1.51	Each experiment is carried out on a HP Compaq Business Notebook nc6120 personal computer for running the simulation or emulation programs. A system without dedicated graphic card was used to test the independence of special hardware. Hardware specifications of the used personal computer: - Intel Pentium M 750 1.86 GHZ Processor - Mobile Intel 915GM Express chipset for graphic and sound system - 1.5 GigaBytes main memory - DVD-ROM drive - serial, parallel, FireWire, USB2.0 and Ethernet network interfaces - 15" TFT-active matrix display with a maximal resolution of 1024 x 768 and 24 bit color resolution (16.7 million colors) - digital joystick connected to USB-port configuration options: The Windows 32bit versions of alternatives are tested, if more than one version exist that would run on the system used for the experiments. For every sample record the default settings of the tested preservation alternative are used to carry out the experiment. The default settings are the settings as set in the release version downloaded from the alternative's homepage listed in the tables in Appendix D. Game settings are set according to the region and video display frequency needed by the game. Necessary add-ons for the sample record are activated (if necessary and possible).	For every alternative menu options and configuration possibilities are reviewed for the usability aspects of the requirements. Next a short review of the source code (if available) is performed to evaluate the figures concerning the infrastructure aspects. Selection screens, 3D and 2D game sequences (if applicable) are tested for the audible and visible aspects. The preserved alternative is compared to either the original image on a TV screen produced by the original system if available or to a video recording of the original game. The test is performed using the standard PC controls (mouse, keyboard) as well as the digital or analog PC joystick (whichever resembles best the original controller of the system) to evaluate the interactivity aspects of the game. Every game is played at least 5 minutes to detect glitches along the playing progress. The same tests are performed on the original system to compare the gaming experience.	No
SNES9X 1.51	same as for ZSNES 1.51	see ZSNES 1.51	No
MESS 0.119	same as for ZSNES 1.51	see ZSNES 1.51	No
VLC 0.8.6c		For the video approach the visible and audible aspects of a recorded sample of the gameplay is compared with the original system.	No

Evaluation	& Transforma	tion Results				
Usability > ga	me start					
Results				Transformed I	Results	
Alternatives	Single			Alternatives	Single (=Aggregated)	Comments
ZSNES 1.51	only through user interface			ZSNES 1.51 SNES9X 1.51	1	
SNES9X 1.51	only through user interface	Transformer	Towart	MESS 0.119	5	
MESS 0.119	through command line or user interface	Ordinal Value	Target Value	VLC 0.8.6c	5	
VLC 0.8.6c	through command line or user interface					
Alternatives	Single	only through command line	-> 3.0			
		only through user interface	-> 1.0			
		through command line or user interface	-> 5.0			

Results				Transformed I	Results	
Alternatives	Single	Transformer		Alternatives	Single (=Aggregated)	Comments
ZSNES 1.51	encapsulation not supported	Ordinal Value	Target Value	ZSNES 1.51 SNES9X 1.51	1	
SNES9X 1.51	encapsulation not supported	encapsulation no supported	ot -> 1.0	MESS 0.119	1	
MESS 0.119	encapsulation not supported	no yes	-> 3.0 -> 5.0	VLC 0.8.6c	3	
VLC 0.8.6c	no	Š				
Configurabilit	y > game configur	ation				
Results		Transformer		Transformed I	Results	
Alternatives	Single	Ordinal Value		Alternatives	Single (=Aggregated)	Comment
ZSNES 1.51	auto-detection by		Value	ZSNES 1.51	3	
	preservation solution	menu only command line	-> 1.0	SNES9X 1.51	3	
SNES9X 1.51	auto-detection by	auto-detection l	-> 2.0	MESS 0.119	2	
	preservation solution	preservation solution	by -> 3.0	VLC 0.8.6c	5	
MESS 0.119 VLC 0.8.6c	command line encapsulation in	configuration fil- for record	e -> 4.0			
	record	encapsulation ir record	n -> 5.0			
Configurabilit	y > global system	preferences				
Results				Transformed I	Results	
Alternatives	Single	Transformer		Alternatives	Single (=Aggregated)	Comments
ZSNES 1.51	configuration	Ordinal	Target	ZSNES 1.51	5	
CNECOV 1 F1	file	Value	Value	SNES9X 1.51	5	
SNES9X 1.51	configuration file	•	> 1.0	MESS 0.119	5	
MESS 0.119	configuration file	configuration -:	> 3.0 > 5.0	VLC 0.8.6c	5	
VLC 0.8.6c	configuration	file				

Results						Tran	sformed I	Results			
Alternatives	Single	Tran	sformer			Alternatives		Single (=Agg	gregated)	Comments	
ZSNES 1.51	processin hardware		Ordinal Valu	ae	Target Value		ES 1.51 S9X 1.51	1			
SNES9X 1.51	on media processing hardware	g drive	industry standard optical -> 5.0 drive non-optical direct connect -> 4.0			MES	S 0.119 0.8.6c	1 5			
MESS 0.119	on media processing hardware	non- 9 optic	industry stand al drive	dard	-> 3.0						
\#\C\Q\Q\\	on media	non-	non-processing-hardware -> 2.0 on media								
VLC 0.8.6c	industry standard optical drive	proc med	essing hardwa ia	ire on	-> 1.0						
Costs > fraction	on of gam										
Results	0	Transfor	-		Transform						
Alternatives	Single	Thresho		alue	Alternat			Aggregated)	Comment	S	
ZSNES 1.51	100.0	0.0 perce			ZSNES 1		5				
SNES9X 1.51	100.0	20.0 pero			SNES9X		5				
MECC 0 110											
MESS 0.119	100.0	40.0 perd			MESS 0.1		5				
MESS 0.119 VLC 0.8.6c	100.0	60.0 per	cent -> 4		WESS 0.1		5 5				
		60.0 perc	cent -> 4	ear							
VLC 0.8.6c	100.0	60.0 perc 80.0 perc Threshold	cent -> 4 cent -> 5 I stepping: Lin	ear							
VLC 0.8.6c Costs > total	100.0	60.0 perc 80.0 perc Threshold	cent -> 4 cent -> 5 I stepping: Lin	ear		oC .		Results			
VLC 0.8.6c Costs > total (Results	100.0	60.0 perc 80.0 perc Threshold f games s	cent -> 4 cent -> 5 d stepping: Lin cupported Transformer Ordinal	Т	VLC 0.8.6	Tran	5	Results Single (=Agg	gregated)	Comments	
VLC 0.8.6c Costs > total a Results Alternatives	100.0	60.0 perc 80.0 perc Threshold f games s	cent -> 4 cent -> 5 d stepping: Lin cupported Fransformer Ordinal Value	T	VLC 0.8.6 arget /alue	Tran Alte	5 sformed I		gregated)	Comments	
Costs > total Results Alternatives ZSNES 1.51	100.0 number of	60.0 perc 80.0 perc Threshold f games s	cent -> 4 cent -> 5 d stepping: Lin cupported fransformer Ordinal Value ess than 10	-> 1.	VLC 0.8.6 arget /alue	Tran Alte	5 sformed I	Single (=Agg	gregated)	Comments	
Costs > total at Results Alternatives ZSNES 1.51 SNES9X 1.51	100.0 number of Single 500-2000 500-2000 more than	60.0 perc 80.0 perc Threshold f games s	cent -> 4 cent -> 5 d stepping: Lin cupported Fransformer Ordinal Value ess than 10	-> 1. -> 2.	vLC 0.8.6	Tran Alte ZSN SNE	sformed I ernatives ES 1.51 S9X 1.51	Single (=Agg 4 4 5	gregated)	Comments	
VLC 0.8.6c Costs > total of the costs and the costs are costs as a cost of the cost of th	100.0 number of Single 500-2000 500-2000	60.0 perd 80.0 perd Threshold f games s	cent -> 4 cent -> 5 d stepping: Lin cupported fransformer Ordinal Value ess than 10	-> 1.	vLC 0.8.6	Tran Alte ZSN SNE	sformed I ernatives ES 1.51 S9X 1.51	Single (=Agg	gregated)	Comments	

Results						Tran	sformed F	Res	ults					
Alternatives	1	2	3 -	Transformer		Alte	ernatives	1	2	3	Aggı	regated	Comm	ents
ZSNES 1.51	Yes	Yes	Yes	Ordinal Value	Target Valu	ZSN	ES 1.51	5	5	5	5			
SNES9X 1.51	Yes	Yes	Yes		-> 5.0		S9X 1.51	5	5	5	5			
MESS 0.119	Yes	Yes	No		-> 0.0	MES	S 0.119	5	5	0	0			
VLC 0.8.6c	Yes	Yes		110	-> 0.0	VLC	0.8.6c	5	5	5	5			
						Aggr	egation mo	de:	Wo	rst ı	result			
Object Charac	teris	tics >	speed											
Results			•	Transformer		Tran	nsformed	D۵۵	:::Ita					
Alternatives	1	2	3	Threshold	Target val		ernatives	1	2	3	Λαα	regated	Comn	nente
ZSNES 1.51	0.0	0.0	0.0	100.0 deviation	_		NES 1.51	5	5	5	5	regateu	COIIII	ilents
SNES9X 1.51	0.0		0.0	in percent	1-/ 1		S9X 1.51	5	5	5	5			
MESS 0.119	0.0	0.0	100.0	80.0 deviation	-> 2		SS 0.119	5	5	1	3.67			
VLC 0.8.6c	0.0	0.0		in percent			0.8.6c	5	5	5	5.07			
VLC 0.0.0C	0.0	0.0	0.0	40.0 deviation	-> 3		egation mo					nean		
				in percent	4	, 1991	ogation in	540	. ,		10110 11	ilouii		
				20.0 deviation in percent	-> 4									
				0.0 deviation in	n -> 5									
				percent										
				Threshold stepp	oing: Steps									
Recreated Co	ntrols	with	Standa	ard Personal Co	mputer Har	dware > 0	controls re	ese	mbl	e Ic	ok of	f original	contro	oller
Results					Transforn	ner	Transfor	me	d Re	esul	ts			
Alternatives		1	2	3	Ordinal	Target	Alternat	tive	s	1 2	2 3	Aggrega	ated (Comments
ZSNES 1.51	N		N	N	Value	Value	ZSNES 1	.51	•	1 1	1 1	1		
SNES9X 1.51	N		N	N	Υ	-> 5.0	SNES9X	1.5	1 '	1 1	1 1	1		
MESS 0.119	N		N	N	N	-> 1.0	MESS 0.	119		1 1	1 1	1		
VLC 0.8.6c	no		no	no		-> 0.0	VLC 0.8.	6с	() C	0 0	0		
	cont	rols	contro		controls		Aggregati	on i	mod	e: V	Vorst	result		
	supp	ortec	d suppo	orted supported	supported									

Alternatives	1	2	3			Alternatives	1	2	3	Aggregated	Comments
ZSNES 1.51	short	short	short			ZSNES 1.51	3	3	3	3	
	delay	delay	delay			SNES9X 1.51	3	3	3	3	
SNES9X 1.51	short delay	short delay	short delay	Ordinal	Target	MESS 0.119	3	3	5	3	
MESS 0.119	short delay	short delay	not applicable	Value	Value	VLC 0.8.6c Aggregation mo		5 Wo			
VLC 0.8.6c	not applicable	not applicable	not applicable								

Results				Transfo	rmer	Transformed	Re	esu	lts			
Alternatives	1	2	3	Ordina		Alternatives	5	1	2	3	Aggregated	d Comment
ZSNES 1.51	well	well	well	Value		ZSNES 1.51		4	4	4	4	
CNECOV 4 E4	playable	playable	playable	not acceptal	-> 1.0 ole	SNES9X 1.51		4	4	4	4	
SNES9X 1.51	well playable	well playable	well playable	fairly	-> 2.0	MESS 0.119		4	4	1	1	
MESS 0.119	well	well	not	playable		VLC 0.8.6c		•	1	1	1	
	playable	playable	acceptable	well	-> 4.0	Aggregation n	nod	le: ۱	Nor	st r	esult	
VLC 0.8.6c	not	not	not	playable perfectly								
	acceptable	acceptable	acceptable	recreate								
Controller Fee	dback > au	dible										
Results						Transformed R	esı	ults				
Alternatives	1	2	3	Transform	ner	Alternatives	1	2	3	Αç	ggregated	Comments
ZSNES 1.51	not		not	Ordinal Value	Target Value	ZSNES 1.51	5	5	5	5		
CNECOV 4 E4	applicable		applicable	not	-> 5.0	SNES9X 1.51	5	5	5	5		
SNES9X 1.51	not applicable		not applicable	applicable	-> 3.0	MESS 0.119	5	5	5	5		
MESS 0.119	not		not	not	-> 1.0		5	5	5	5		
	applicable	applicable	applicable	supported		Aggregation mod	de:	Wo	rst	resi	ult	
VLC 0.8.6c	not applicable	not applicable	not applicable	supported	-> 5.0							
Controller Fee	dback > vis	sual										
Results						Transformed R	esı	ults				
Alternatives	1	2	3	Transform		Alternatives	1	2	3	Αç	ggregated	Comments
ZSNES 1.51	not		not	Ordinal Value	Target Value	ZSNES 1.51	5	5	5	5		
CNECOV 1 F1	applicable		applicable		-> 5.0	SNES9X 1.51	5	5	5	5		
SNES9X 1.51	not applicable		not applicable	not applicable		MESS 0.119	5	5	5	5		
MESS 0.119	not		not	not	-> 1.0			5				
	applicable		applicable	supported		Aggregation mod	de:	Wo	rst	resi	ult	
VLC 0.8.6c	not	not	not	supported	-> 5.0							

Results						Tra	nsformed I	Res	ults					
Alternatives	1	2	3	Transform	mer	Alt	ernatives	1	2	3	Ag	gregated	Com	ments
ZSNES 1.51	not		not	Ordinal	Target	ZS	NES 1.51	5	5	5	5			
	applicable		applicable	Value	Value	SN	ES9X 1.51	5	5	5	5			
SNES9X 1.51	not applicable		not applicable	not applicable	-> 5.0	ME	SS 0.119	5	5	5	5			
MESS 0.119	not		not	not	-> 1.0	VL	C 0.8.6c	5	5	5	5			
W.200 0.117	applicable		applicable	supported		Agg	regation mo	ode:	Wo	rst ı	resu	ult		
VLC 0.8.6c	not		not	supported	l -> 5.0									
	applicable	applicable	applicable											
Recreated Cor	ntrols with (Game Hardv	vare > look											
Results	sults						Transform	ed I	Res	ults	;			
Alternatives	1	2	3				Alternativ	/es	1	2	3	Aggregat	ed C	Comments
ZSNES 1.51	controllers	controllers	controllers	i i ai isi	ormer		ZSNES 1.5	51	5	1	5	1		
	resembling original	resembling original	resembling original	Ordir	nal Targ	et	SNES9X 1	.51	5	1	5	1		
	controller	controller	controller	Valu	_		MESS 0.11	9	5	1	5	1		
	supported	not	supported		lers -> 1.0)	VLC 0.8.60	;	3	1	3	1		
SNES9X 1.51	controllers	available controllers	controllers	resemk origina	•		Aggregatior	n mo	ode:	Wc	rst	result		
3NE39X 1.31	resembling	resembling	resembling	-, ,										
	original	original	original	not	1-									
	controller	controller not	controller	availab										
	supported	available	supported	resemb	lers -> 3.0 olina)								
MESS 0.119	controllers	controllers	controllers	origina	I									
	resembling	resembling	resembling		ler									
	original controller	original controller	original controller	not suppor	ted									
	supported	not	supported		lers -> 5.0)								
		available		resemb										
VLC 0.8.6c		controllers												
	resembling original	resembling original	resembling original	control suppor										
	controller	controller	controller		-									
	not	not	not											

Results				Transforme	er	Transformed I	Res	ults	5		
Alternatives	1	2	3	Ordinal	Target	Alternatives	1	2	3	Aggregated	Comments
ZSNES 1.51		short	Value	Value	ZSNES 1.51	3	1	3	1		
	delay	delay	delay	not	-> 5.0	SNES9X 1.51	3	1	3	1	
SNES9X 1.51	short	considerable	short	applicable	4.0	MESS 0.119	3	1	3	1	
	delay	delay	delay	considerable delay	e-> 1.0	VLC 0.8.6c	5	5	5	5	
MESS 0.119	short delay	considerable delay	short delay	short delay	-> 3.0	Aggregation mo				_	
VLC 0.8.6c	not applicable	not applicable	not applicable	delay not noticeable	-> 5.0						

Doculto							Transform	ا لم	Doo.				
Results Alternatives	1	2	3				Transform Alternativ		Res	uits 2	3	Aggregato	ed Comment
ZSNES 1.51	controllers	controllers	controllers				ZSNES 1.5		5	1	5	Aggregate	Commen
ZSINES 1.51	resembling original	resembling original	resembling original	Transfo Ordin Value	al Targ		SNES9X 1.	51	5	1	5	1	
	controller supported	controller not	controller supported		ers -> 1.0		MESS 0.11 VLC 0.8.60		5 1	1	5	1	
	Supported	available	Supported	resemb		,	Aggregation		-	-	ı orst i	result	
SNES9X 1.51	controllers resembling original controller supported	controllers resembling original controller not available	controllers resembling original controller supported	not availabl	e ers -> 3.0)	33 3 3						
MESS 0.119	controllers resembling original controller supported	controllers resembling original controller not available	controllers resembling original controller supported	not support controll resemb	ed ers -> 5.0)							
VLC 0.8.6c	controllers resembling original controller not available	controllers resembling original controller not available	controllers resembling original controller not available	original controll support									
Controller Fee	edback > au	dible											
Results						Tra	nsformed F	Res	ults				
Alternatives	1	2	3	Transforn	ner	Αl	ternatives	1	2	3	Ag	gregated	Comments
ZSNES 1.51	not applicable		not applicable	Ordinal Value	Target Value		NES 1.51 IES9X 1.51	5 5	5 5	5 5	5 5		
SNES9X 1.51	not applicable	not applicable	not applicable	not applicable	-> 5.0		ESS 0.119	5	5	5	5		
MESS 0.119	not applicable		not applicable	supported	-> 1.0		C 0.8.6c gregation mo		5 Wo			lt	
VLC 0.8.6c	not	not	not	supported	-> 5.0								

Results						Transformed Re	sul	ts			
Alternatives	1	2	3	Transforn		Alternatives 1	: ا	2 :	3	Aggregated	Comments
ZSNES 1.51 SNES9X 1.51	not applicable not	not applicable not	not applicable not		Target Value	ZSNES 1.51 5 SNES9X 1.51 5 MESS 0.119 5	5 5	5 !	5 !	5 5 5	
MESS 0.119	applicable not applicable	applicable not applicable	applicable not applicable	supported		VLC 0.8.6c 5	5 5	5 !	5 !	5 esult	
VLC 0.8.6c	not applicable	not applicable	not applicable	supported	-> 5.0						
Controller Fee	dback > fo	rce									
Results						Transformed Re	sul	ts			
Alternatives	1	2	3	Transforn	ner	Alternatives 1	2	2	3	Aggregated	Comments
ZSNES 1.51	not applicable	not applicable	not applicable	Ordinal Value	Target Value	ZSNES 1.51 5 SNES9X 1.51 5			-	5	
SNES9X 1.51	not applicable	not applicable	not applicable	not applicable	-> 5.0	MESS 0.119 5				5	
MESS 0.119	not applicable	not applicable	not applicable	not supported	-> 1.0	VLC 0.8.6c 5 Aggregation mode				5 esult	
VLC 0.8.6c	not applicable	not applicable	not applicable	supported	-> 5.0						
Overlay Suppo	ort > respo	nse delay									
Results				Transform	ner	Transformed	Res	ult	s		
Alternatives	1	2	3	Ordinal	3	Alternatives	1	2	3	Aggregated	Comments
ZSNES 1.51	not applicable	not applicable	not applicable	Value not	-> 5.0	ZSNES 1.51 SNES9X 1.51	5 5	5 5	5 5	5 5	
SNES9X 1.51	not applicable	not applicable	not applicable	applicable considerat	ole -> 1.0	MESS 0.119	5	5	5	5	
MESS 0.119	not applicable	not applicable	not applicable	delay short delay	y -> 3.0	VLC 0.8.6c Aggregation me			5 orst		
VLC 0.8.6c	not	not applicable	not applicable	delay not noticeable	-> 5.0						

Results				Transforr	ner	Transformed F	Res	ults	5		
Alternatives	1	2	3	Ordinal		Alternatives	1	2	3	Aggregated	Comments
ZSNES 1.51 SNES9X 1.51 MESS 0.119 VLC 0.8.6c	not applicable not applicable not applicable	not applicable not applicable not applicable not	not applicable not applicable not applicable not	not applicable not supported but necessary for game play	Value -> 5.0 -> 1.0 -> 2.0 -> 4.0	ZSNES 1.51 SNES9X 1.51 MESS 0.119 VLC 0.8.6c Aggregation mo	5 5 5 5	5 5 5 5	5 5 5 5	5 5 5 5	Comments

Overlay Suppo	ort > teel											
Results				Transform	mer	Transformed	Res	ults	s			
Alternatives	1	2	3	Ordinal	Target	Alternatives	1	2	3	A	ggregated	Comments
ZSNES 1.51	not	not	not	Value	Value	ZSNES 1.51	5	5	5	5		
	applicable	applicable	applicable	not applicable	-> 5.0	SNES9X 1.51	5	5	5	5		
SNES9X 1.51	not applicable	not applicable	not applicable	not	-> 1.0	MESS 0.119	5	5	5	5		
MESS 0.119	not	not	not	supported		VLC 0.8.6c	5	5	5	5		
200 07	applicable	applicable	applicable	not	-> 3.0	Aggregation m	ode:	: Wo	orst	res	ult	
VLC 0.8.6c	not	not	not	usable								
	applicable	applicable	applicable	usable	-> 5.0							
Standard Conf	troller > su	pported										
Results						Transformed	Res	ults	S			
Alternatives	1	2	3	Transforr	mer	Alternatives	1	2	3	A	ggregated	Comments
ZSNES 1.51	supported	supported	supported	Ordinal	Target	ZSNES 1.51	3	3	3	3		
	with special	with special	with special	Value	Value	SNES9X 1.51	3	3	3	3		
	hardware	hardware	hardware	not	-> 1.0	MESS 0.119	3	3	3	3		
SNES9X 1.51	supported	supported	supported	supported		VLC 0.8.6c	1	1	1	1		
	with special	with special	with special	supported with	-> 3.0	Aggregation m	ode:	: Wo	orst	res	ult	
	hardware	hardware	hardware	special								
MESS 0.119	supported	supported	supported	hardware supported	. E O							
	with special	with special	with special	without	-> 5.0							
	hardware	hardware	hardware	special								
VLC 0.8.6c	not	not	not	hardware								
	supported	supported	supported									
Standard Conf	troller > re	sponse dela	ау									
Results				Transfor	mer	Transform	ed F	Resi	ults			
Alternatives	1	2	3	Ordina	I Targe	et Alternativ	es	1	2	3	Aggregate	ed Commen
ZSNES 1.51	delay not	delay not	delay not	Value		ZSINES 1.5	1	5	5	5	5	
	noticeable	noticeable	noticeable	not	-> 5.0	SNES9X 1.	51	5	5	5	5	
SNES9X 1.51	delay not	delay not	delay not	applicable	e ble -> 1.0	MESS 0.11	9	5	5	5	5	
	noticeable	noticeable	noticeable	delay	wie -> 1.0	VLC 0.8.6c		5	5	5	5	

Alternatives	1	2	3	Ordina			mo	de:	ıoW	rst result	
MESS 0.119	delay not	delay not	not	Value	Value						
	noticeable	noticeable	applicable	short dela	y -> 3.0						
VLC 0.8.6c	not applicable	not applicable	not applicable	delay not noticeable	-> 5.0						
Controller Fee	edback > au	udible									
Results						Transformed I	Res	ults	;		
Alternatives	1	2	3	Transforn	ner	Alternatives	1	2	3	Aggregated	Comments
ZSNES 1.51	not applicable	not applicable	not applicable	Ordinal Value	Target Value	ZSNES 1.51	5	5	5	5	
SNES9X 1.51	not applicable	not applicable	not applicable	not applicable	-> 5.0	SNES9X 1.51 MESS 0.119	5 5	5 5	5 5	5 5	
MESS 0.119	not applicable	not applicable	not applicable		-> 1.0	VLC 0.8.6c Aggregation mo	5 ode:	5 Wo	5 orst	5 result	
VLC 0.8.6c	not applicable	not applicable	not applicable	supported	-> 5.0						
Controller Fee	edback > vi	sual									
	edback > vi	sual				Transformed I	Res	ults	•		
	edback > vi	sual 2	3	Transforn		Transformed I	Res	ults 2	3	Aggregated	Comments
Results			3 not applicable	Transforn Ordinal Value	ner Target Value	Alternatives ZSNES 1.51	1 5	2 5	3	5	Comments
Results Alternatives	1 not	2 not	not	Ordinal Value	Target	Alternatives ZSNES 1.51 SNES9X 1.51 MESS 0.119	1 5 5 5	2 5 5 5	3 5 5 5	5 5 5	Comments
ZSNES 1.51	1 not applicable not	2 not applicable not	not applicable not	Ordinal Value not applicable	Target Value	Alternatives ZSNES 1.51 SNES9X 1.51	1 5 5 5 5	5 5 5 5	5 5 5 5	5 5 5 5	Comments
Results Alternatives ZSNES 1.51 SNES9X 1.51	not applicable not applicable not	not applicable not applicable not	not applicable not applicable not	Ordinal Value not applicable not	Target Value -> 5.0 -> 1.0	ZSNES 1.51 SNES9X 1.51 MESS 0.119 VLC 0.8.6c	1 5 5 5 5	5 5 5 5	5 5 5 5	5 5 5 5	Comments
Results Alternatives ZSNES 1.51 SNES9X 1.51 MESS 0.119	not applicable not applicable not applicable not applicable	not applicable not applicable not applicable not applicable	not applicable not applicable not applicable not	Ordinal Value not applicable not supported	Target Value -> 5.0 -> 1.0	ZSNES 1.51 SNES9X 1.51 MESS 0.119 VLC 0.8.6c	1 5 5 5 5	5 5 5 5	5 5 5 5	5 5 5 5	Comments
Results Alternatives ZSNES 1.51 SNES9X 1.51 MESS 0.119 VLC 0.8.6c	not applicable not applicable not applicable not applicable	not applicable not applicable not applicable not applicable	not applicable not applicable not applicable not	Ordinal Value not applicable not supported	Target Value -> 5.0 -> 1.0 -> 5.0	ZSNES 1.51 SNES9X 1.51 MESS 0.119 VLC 0.8.6c	1 5 5 5 5 5 ode:	5 5 5 5 Wo	5 5 5 5 5 orst	5 5 5 5	Comments
Results Alternatives ZSNES 1.51 SNES9X 1.51 MESS 0.119 VLC 0.8.6c Controller Fee	not applicable not applicable not applicable not applicable	not applicable not applicable not applicable not applicable	not applicable not applicable not applicable not	Ordinal Value not applicable not supported supported Transform Ordinal	Target Value -> 5.0 -> 1.0 -> 5.0	Alternatives ZSNES 1.51 SNES9X 1.51 MESS 0.119 VLC 0.8.6c Aggregation mo	1 5 5 5 5 5 ode:	2 5 5 5 Wo	3 5 5 5 5 orst	5 5 5 5	
Results Alternatives ZSNES 1.51 SNES9X 1.51 MESS 0.119 VLC 0.8.6c Controller Fee	not applicable not applicable not applicable not applicable edback > for appli	not applicable not applicable not applicable not applicable	not applicable not applicable not applicable not applicable	Ordinal Value not applicable not supported supported Transform Ordinal Value not	Target Value -> 5.0 -> 1.0 -> 5.0	Alternatives ZSNES 1.51 SNES9X 1.51 MESS 0.119 VLC 0.8.6c Aggregation model Transformed I Alternatives ZSNES 1.51	1 5 5 5 5 5 ode:	2 5 5 5 5 Wc	3 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	5 5 5 result Aggregated 5	
Results Alternatives ZSNES 1.51 SNES9X 1.51 MESS 0.119 VLC 0.8.6c Controller Fee Results Alternatives	not applicable not applicable not applicable not applicable edback > for appli	not applicable not applicable not applicable not applicable rce	not applicable not applicable not applicable not applicable	Ordinal Value not applicable not supported supported Transform Ordinal Value not applicable	Target Value -> 5.0 -> 1.0 -> 5.0 mer Target Value	Alternatives ZSNES 1.51 SNES9X 1.51 MESS 0.119 VLC 0.8.6c Aggregation mo	1 5 5 5 5 ode:	2 5 5 5 Wo	3 5 5 5 5 5 orst	5 5 5 result	

Alternatives	1	2	3			Aggregation m	node:	: Wc	orst	result	
MESS 0.119	not applicable	not applicable	not applicable	Ordinal Value	Target Value						
VLC 0.8.6c	not applicable	not applicable	not applicable	supported	-> 5.0						
Special Contro	oller > supp	oorted									
Results				Transforn	ner	Transformed	Res	ults	5		
Alternatives	1	2	3	Ordinal	Target	Alternatives	1	2	3	Aggregated	Comments
ZSNES 1.51 SNES9X 1.51	not applicable not	not supported not	not applicable not	Nalue not applicable	Value -> 5.0	ZSNES 1.51 SNES9X 1.51		1	5 5	1	
MESS 0.119	applicable not applicable	supported not supported	applicable not applicable	not supported supported	-> 1.0 -> 4.0	MESS 0.119 VLC 0.8.6c Aggregation m	5 5 node:	1 1 : Wc	5 5 orst	1 1 result	
VLC 0.8.6c	not applicable	not supported	not applicable	with special hardware supported without							
				special hardware							
-	oller > resp	onse delay		Transforn	ner	Transform	ed R	esu	lts		
-	oller > resp	onse delay 2	3	Transforn Ordinal	ner Target					3 Aggregate	d Comment
ZSNES 1.51 SNES9X 1.51 MESS 0.119	not applicable not applicable not applicable	not applicable not applicable not applicable	not applicable not applicable not applicable	Ordinal Value not applicable consideral delay short delay	Target Value -> 5.0 ole -> 1.0	Alternativ	7 es 1 51	5 5 5 5	2 5 5 5 5	5 5 5 5 5 5 5 5	d Comment
Results Alternatives ZSNES 1.51 SNES9X 1.51 MESS 0.119 VLC 0.8.6c	not applicable not applicable not applicable not applicable	not applicable not applicable not applicable not applicable	not applicable not applicable not applicable	Ordinal Value not applicable consideral delay	Target Value -> 5.0 ole -> 1.0	ZSNES 1.5 SNES9X 1. MESS 0.11 VLC 0.8.60	7 es 1 51	5 5 5 5	2 5 5 5 5	5 5 5 5 5 5 5 5	d Comment
Results Alternatives ZSNES 1.51 SNES9X 1.51 MESS 0.119	not applicable not applicable not applicable not applicable	not applicable not applicable not applicable not applicable	not applicable not applicable not applicable	Ordinal Value not applicable consideral delay short delay delay not	Target Value -> 5.0 ole -> 1.0	ZSNES 1.5 SNES9X 1. MESS 0.11 VLC 0.8.60	7 es 1 51	5 5 5 5	2 5 5 5 5	5 5 5 5 5 5 5 5	d Comment
Results Alternatives ZSNES 1.51 SNES9X 1.51 MESS 0.119 VLC 0.8.6c	not applicable not applicable not applicable not applicable	not applicable not applicable not applicable not applicable	not applicable not applicable not applicable	Ordinal Value not applicable consideral delay short delay delay not	Target Value -> 5.0 ole -> 1.0 y -> 3.0 -> 5.0	ZSNES 1.5 SNES9X 1. MESS 0.11 VLC 0.8.60	1 51 9 n mod	5 5 5 5 de: '	2 5 5 5 Wor	5 5 5 5 5 5 5 5	d Comment

Alternatives	1	2	3			Alternatives	1	2	3	Aggregated	Comments
ZSNES 1.51	not	not	not	Ordinal		ZSNES 1.51	5	5	5	5	
	applicable	applicable	applicable	Value	Value	SNES9X 1.51	5	5	5	5	
SNES9X 1.51	not applicable	not applicable	not applicable	not applicable	-> 5.0	MESS 0.119	5	5	5	5	
MESS 0.119	not applicable	not applicable	not applicable	not supported	-> 1.0	VLC 0.8.6c Aggregation mo	_	5 Wo	_	_	
VLC 0.8.6c	not applicable	not applicable	not applicable	supported	l -> 5.0						

Controller Fee	edback > vi	sual									
Results						Transformed F	Resu	ılts	5		
Alternatives	1	2	3	Transforn	ner	Alternatives	1	2	3	Aggregated	Comments
ZSNES 1.51	not applicable	not applicable	not applicable	Ordinal Value	Target Value	ZSNES 1.51 SNES9X 1.51	5 5	5 5	5 5	5 5	'
SNES9X 1.51	not applicable	not applicable	not applicable	not applicable	-> 5.0	MESS 0.119	5	5	5	5	
MESS 0.119	not applicable	not applicable	not applicable	not supported	-> 1.0	VLC 0.8.6c Aggregation mo	-	5 Wo	5 orst	5 result	
VLC 0.8.6c	not applicable	not applicable	not applicable	supported	-> 5.0						
Controller Fee	dback > fo	rce									
Results						Transformed F	Resu	ılts	5		
Alternatives	1	2	3	Transforn	ner	Alternatives	1	2	3	Aggregated	Comments
ZSNES 1.51	not applicable	not applicable	not applicable	Ordinal Value	Target Value	ZSNES 1.51 SNES9X 1.51	5 5	5 5	5 5	5 5	
SNES9X 1.51	not applicable	not applicable	not applicable	not applicable	-> 5.0	MESS 0.119	5	5	5	5	
MESS 0.119	not applicable	not applicable	not applicable	not supported	-> 1.0	VLC 0.8.6c Aggregation mo		5 Wo	5 orst	5 result	
VLC 0.8.6c	not applicable	not	not applicable	supported	-> 5.0						
Interactivity	> additiona	l items sup	ported								
Results						Transformed F	Resu	ılts	5		
Alternatives	1	2	3	Transforn	ner	Alternatives	1	2	3	Aggregated	Comments
ZSNES 1.51	not	not	not	Ordinal Value	Target Value	ZSNES 1.51	5	5	5	5	
CNECOV 4 E4	applicable	applicable	applicable		-> 5.0	SNES9X 1.51	5	5	5	5	
SNES9X 1.51	not applicable	not applicable	not applicable	applicable	-> 5.0	MESS 0.119		5	5	5	
MESS 0.119	not applicable	not	not applicable	not supported	-> 1.0	VLC 0.8.6c Aggregation mo			5 orst		
VLC 0.8.6c	not	not	not	supported	-> 5.0						

Results				Transform	ner	Transformed I	Res	ults	•		
Alternatives	1	2	3	Ordinal	Target	Alternatives	1	2	3	Aggregated	Comments
ZSNES 1.51	like	like	near	Value	Value	ZSNES 1.51	5	5	4	4	
	original	original	perfect	no music	-> 1.0	SNES9X 1.51	5	5	5	5	
SNES9X 1.51	like original	like original	like original	supported errors not	-> 2.0	MESS 0.119	5	5	1	1	
MESS 0.119	like	like	no music	acceptable		VLC 0.8.6c		5			
	original	original	supported	errors	-> 3.0	Aggregation mo	ode:	Wc	rst	result	
VLC 0.8.6c	like	like	like	acceptable							
	original	original	original	near perfect	-> 4.0						
				like original	-> 5.0						

Music > synch	ronous to	video									
Results				Transfor	mer	Transformed	Resu	lts			
Alternatives	1	2	3	Ordinal	_	Alternatives	1	2	3	Aggregated	Comments
ZSNES 1.51 SNES9X 1.51 MESS 0.119 VLC 0.8.6c	no errors noticeable no errors noticeable no errors noticeable	e noticeable no errors e noticeable no errors e noticeable	no errors noticeable not applicable no errors	noticeable	-> 1.0 -> 3.0	ZSNES 1.51 SNES9X 1.51 MESS 0.119 VLC 0.8.6c Aggregation m	5 5 5	5 5 5 5 Wor	5 5 5 5 st i	5 5 5 5 result	
Sound Effects	> guality	,		no errors noticeable							
Results	, 4			Transforme	er	Transformed Ro	esult	s			
Alternatives	1	2	3		Target	Alternatives	1 2	3	Δ	Aggregated	Comments
ZSNES 1.51 SNES9X 1.51	like	acceptable errors	near perfect near	no sound - effects supported	Value > 1.0	SNES9X 1.51	5 3 5 3 5 5	4 4 1	3 3 1		
MESS 0.119	like	like original	perfect no sound effects supported	errors not - acceptable errors -		VLC 0.8.6c Aggregation mod	5 5 le: Wo	5 orst	5 re:		
VLC 0.8.6c			like original	perfect	> 4.0 > 5.0						
Sound Effects Results	> synchr	onous to vic	leo	Transfor	mor	Transformed	Resu	Its			
Alternatives	1	2	3	Ordinal		Alternatives	1	2	3	Aggregated	Comments
ZSNES 1.51	no errors noticeable		no errors noticeable	Value	Value -> 5.0	ZSNES 1.51 SNES9X 1.51		5 5	5 5	5 5	

Alternatives	1	2	3	Ordinal	Target	Alternatives	1	2	3	Aggregated	Comments
MESS 0.119	no errors	no errors	not	Value	Value	VLC 0.8.6c	5	5	5	5	
	noticeable	noticeable	applicable	severe	-> 1.0	Aggregation mo	de:	Wc	rst	result	
VLC 0.8.6c	no errors noticeable	no errors noticeable	no errors noticeable	errors apparent							
	Tioticeable	Hoticeable	Tioticeable	small	-> 3.0						
				errors noticeable							
				no errors noticeable							
Graphics > im	age quality	,									
Results				Transforn	ner	Transformed F	Resi	ults	;		
Alternatives	1	2	3	Ordinal	Target	Alternatives	1	2	3	Aggregated	Comments
ZSNES 1.51	no	no	no	Value	Value	ZSNES 1.51	5	5	5	5	
	difference to original	difference to original	difference to original	nothing displayed	-> 0.0	SNES9X 1.51	4	4	4	4	
	noticeable	noticeable	noticeable	severe	-> 1.0	MESS 0.119	1	1	0	0	
SNES9X 1.51	near	near	near	errors on		VLC 0.8.6c	5	5	5	5	
	perfect	perfect	perfect	whole image		Aggregation mo	de:	Wc	rst i	result	
MESS 0.119	severe errors on	severe errors on	nothing displayed	errors	-> 3.0						
	whole	whole	aispiayea	noticeable							
	image	image		but do not affect							
VLC 0.8.6c	no difference	no difference	no difference	gameplay							
	to original	to original	to original	near	-> 4.0						
	noticeable	noticeable	noticeable	perfect							
				no difference	-> 5.0						
				to original							
				noticeable							
Graphics > scr	een overla	У									
Results		-				Transform	ed I	D_c	ults	:	
Alternatives	1	2	3	Transform	ner	Alternativ		1	2		ted Comme
ZSNES 1.51	not	not	not	Ordina		et 70NEC 1 E		5	5	5 5	
_3.123 1.01	applicable	applicable	applicable	Value		CNECOV 1		5	5	5 5	
SNES9X 1.51	not applicable	not	not	not applica not suppor		MECC 0 11		5	5	5 5	
		applicable	applicable	not cupper	+ ~ ~ . 1 ^		,	_	9		

		1	2		3	Ordina		arget	Aggre	gatio	on r	node	: Wc	rst result	t	
MESS 0.119	not		not		not	Value		/alue								
	appl	icable		ble	applicable	supported manually k		3.0								
VLC 0.8.6c	not	ملطمط	not		not	loading im										
	арріі	icable	applica	bie	applicable	supported	by ->	4.0								
						auto-detec		F 0								
						supported through encapsulat		5.0								
Graphics > fra	ıme r	ate														
Results				Trar	sformer		Т	ransfo	rmed R	esu	lts					
Alternatives	1	2	3	Tŀ	reshold	Target val	ue	Altern	atives	1	2	3	Aggr	egated	Com	ments
ZSNES 1.51	0.0	0.0	0.0		0 deviation	-> 1		ZSNES	1.51	5	5	5 5	5			
SNES9X 1.51	0.0	0.0	0.0	•	ercent			SNES92	X 1.51	5	5	5 5	5			
MESS 0.119	0.0	0.0	100.0		deviation	-> 2		MESS C).119	5	5	1 3	3.67			
VLC 0.8.6c	0.0	0.0	0.0	•	ercent deviation	. 2		VLC 0.8	3.6c	5	5	5 5	5			
					ercent	-> 3	A	Aggrega	tion mod	de: .	Arit	hmet	tic m	ean		
				20.0	deviation	-> 4										
				in ne	ercent											
				p												
				0.0	deviation in	-> 5										
				0.0 o	deviation in ent											
Sanakia OD				0.0 operc	deviation in											
-) colli	sion (0.0 operc	deviation in ent	ng: Steps		Te	ancform	nod.	Do	culte				
Graphics > 2D Results			detection	0.0 operc	deviation in ent shold steppi	ng: Steps Transform			ansforn					Aggrega	ated	Comment
Results Alternatives		1	detection 2	0.0 operc	deviation in ent shold steppi	ng: Steps	ner Targe Value	et A	Iternati	ives	1	2	3	Aggrega	ated	Comment
Results	no e	1	detection 2 not	0.0 (perc Thre	deviation in ent shold steppi	ng: Steps Transform Ordinal	Targe	et A	Iternati SNES 1.	ives 51	5	2 5	3 5	5	ated	Comment
Results Alternatives	no e	1 rrors	detection 2 not	0.0 (perc Thre	deviation in ent shold steppi 3 not	rransform Ordinal Value no 2D objects	Targe Value	et A e Z	Iternati SNES 1. NES9X 1	ives 51 1.51	5	2 5 5 5	3 5 5	5	ated	Comment
Results Alternatives ZSNES 1.51	no e notic	1 rrors ceable	detection 2 not applica not	0.0 (perc Thre	deviation in ent shold steppi 3 not applicable	Transform Ordinal Value no 2D objects displayed	Targe Value	et e Z	Iternati SNES 1. NES9X 1 ESS 0.1	ives 51 1.51 19	5 5	2 5 5 5 5 5 5	5 5 0	5 5 0	ated	Comment
Results Alternatives ZSNES 1.51	no e notic no e note	rrors ceable rrors ceable rrors	2 not applica not applica not	0.0 c perc Thre	abeviation in ent shold steppi 3 not applicable not applicable no 2D	rransform Ordinal Value no 2D objects displayed not	Targe Value -> 0.0	et e Z S M	Iternati SNES 1. NES9X 1 ESS 0.1 LC 0.8.6	ives 51 1.51 19	5 5 5	2 5 5 5 5 5 5 5 5	5 5 0 5	5 5 0 5	ated	Comment
Results Alternatives ZSNES 1.51 SNES9X 1.51	no e notic no e note	rrors ceable rrors ceable rrors	2 not applica not applica	0.0 c perc Thre	a deviation in ent shold steppi a deviation in applicable not applicable no 2D objects	rransform Ordinal Value no 2D objects displayed not applicable	Targe Value -> 0.0	et e Z S M V Ag	Iternati SNES 1. NES9X 1 ESS 0.1	ives 51 1.51 19	5 5 5	2 5 5 5 5 5 5 5 5	5 5 0 5	5 5 0 5	ated	Comment
Results Alternatives ZSNES 1.51 SNES9X 1.51	no e notic no e notic	rrors ceable rrors ceable rrors	2 not applica not applica not	0.0 c perc Thre	abeviation in ent shold steppi 3 not applicable not applicable no 2D	rransform Ordinal Value no 2D objects displayed not	Targe Value -> 0.0	et e Z S M V Ag	Iternati SNES 1. NES9X 1 ESS 0.1 LC 0.8.6	ives 51 1.51 19	5 5 5	2 5 5 5 5 5 5 5 5	5 5 0 5	5 5 0 5	ated	Comment

				Ordinal Value not affect gameplay no errors noticeable	Target Value						
Graphics > 2D	object pos	sition place	ment								
Results				Transforn		Transformed I	Resu		5		
Alternatives	1	2	3	Ordinal Value	Target Value	Alternatives	1	2	3	Aggregated	Comments
ZSNES 1.51	no errors noticeable	no errors noticeable	no errors noticeable	no 2D	-> 0.0	ZSNES 1.51 SNES9X 1.51	5 5	5 5	5 5	5 5	
SNES9X 1.51	no errors noticeable	no errors noticeable	no errors noticeable	objects displayed		MESS 0.119	1	5	0	0	
MESS 0.119 VLC 0.8.6c	severe errors on whole image no errors noticeable	no errors noticeable no errors noticeable	no 2D objects displayed no errors noticeable	applicable	-> 5.0	VLC 0.8.6c Aggregation mo	5 ode:	5 Wo	5 prst	5 result	
Graphics > 2D	object lay	er placeme	nt								
Results				Transforn	ner	Transformed I	Resu	ults	\$		
Alternatives	1	2	3	Ordinal	Target	Alternatives	1	2	3	Aggregated	Comments
ZSNES 1.51	no errors noticeable	no errors noticeable	no errors noticeable	no 2D	-> 0.0	ZSNES 1.51 SNES9X 1.51	5 5	5 5	5 5	5 5	
SNES9X 1.51	no errors noticeable	no errors noticeable	no errors noticeable	objects displayed	- 0	MESS 0.119 VLC 0.8.6c	1 5	5 5	0 5	0 5	
MESS 0.119	severe errors on whole image	no errors noticeable	no 2D objects displayed	not applicable severe errors on whole	-> 5.0 -> 1.0	Aggregation mo					

Alternatives VLC 0.8.6c	1 no errors noticeable	2 no errors noticeable	3 no errors noticeable	Ordinal Value image errors noticeable but do not affect gameplay no errors noticeable	-> 5.0						
Graphics > 2D	backgrour	nd scrolling		T		Turneformed	D				
Results				Transforn	-	Transformed I					
Alternatives ZSNES 1.51	1	2	3	Ordinal Value	Target Value	Alternatives ZSNES 1.51	1	2	3	Aggregated 5	Comments
ZSINES 1.51	no errors noticeable	no errors noticeable	no errors noticeable	no 2D	-> 0.0	SNES9X 1.51	5 5	5 5	5 5	5	
SNES9X 1.51	no errors	no errors	no errors	objects		MESS 0.119	5	5	0	0	
	noticeable	noticeable	noticeable	displayed not	-> 5.0	VLC 0.8.6c	5	5	5	5	
MESS 0.119 VLC 0.8.6c	no errors noticeable no errors noticeable	no errors noticeable no errors noticeable	no 2D objects displayed no errors noticeable	applicable	-> 1.0	Aggregation mo					
				_	-> 3.0						
				no errors noticeable							
Graphics > 3D	object cal	culation									
Results				Transform	ner	Transformed F	Resu	ılts			
Alternatives	1	2	3	Ordinal	Target	Alternatives	1	2	3	Aggregated	Comments
ZSNES 1.51	not	not	no errors	Value	Value	ZSNES 1.51	5	5	5	5	
SNES9X 1.51	applicable	applicable	noticeable		-> 0.0	SNES9X 1.51	5	5	5	5	
SINESAY 1.21	not applicable	not applicable	no errors noticeable	objects displayed		MESS 0.119	5	5	0	0	
				Siopiayou		VLC 0.8.6c	5	5	5	5	

Alternatives MESS 0.119 VLC 0.8.6c	not applicable not applicable	not applicable not applicable	no 3D objects displayed no errors noticeable	ordinal Value not applicable severe errors on whole image errors noticeable but do not affect gameplay no errors noticeable	-> 1.0 -> 3.0	Aggregation mo	ode.	Wo	orst	result	
Graphics > 3D	object clip	ping									
Results				Transform	ner	Transformed I	Res	ult	s		
Alternatives	1	2	3	Ordinal	Target	Alternatives	1	2	3	Aggregated	Comments
ZSNES 1.51	not applicable	not applicable	no errors noticeable	no 3D	Value -> 0.0	ZSNES 1.51 SNES9X 1.51	5 5	5 5	5 5	5 5	
SNES9X 1.51 MESS 0.119 VLC 0.8.6c	not applicable not applicable not applicable	not applicable not applicable not applicable	no errors noticeable no 3D objects displayed no errors noticeable	applicable severe errors on whole image errors noticeable but do not affect gameplay no errors	-> 5.0	MESS 0.119 VLC 0.8.6c Aggregation mo	5 5	5 5	0 5 porst	0 5 result	
MESS 0.119	applicable not applicable not applicable	applicable not applicable not applicable	noticeable no 3D objects displayed no errors	not applicable severe errors on whole image errors noticeable but do not affect gameplay	-> 1.0 -> 3.0 -> 5.0	MESS 0.119 VLC 0.8.6c	5 5 ode:	5 W	5 porst	5	

Alternatives	1	2	3	Ordinal	Target	Alternatives	1	2	3	Aggregated	Comments
ZSNES 1.51	not	not	no errors	Value	Value	ZSNES 1.51	5	5	5	5	
	applicable	applicable	noticeable		-> 0.0	SNES9X 1.51	5	5	5	5	
SNES9X 1.51	not applicable	not applicable	no errors noticeable	objects displayed		MESS 0.119	5	5	0	0	
MESS 0.119	not	not	no 3D	not	-> 5.0	VLC 0.8.6c	5	5	5	5	
WE33 0.119	applicable	applicable	objects	applicable		Aggregation mo	ode:	Wo	rst	result	
	арриосия	аррисавие	displayed	severe	-> 1.0						
VLC 0.8.6c	not applicable	not applicable	no errors noticeable	errors on whole image							
				errors noticeable but do not affect gameplay	-> 3.0						
				no errors noticeable							

Results				Transfo	rmer	Transformed I	Resu	ılts		
Alternatives	1	2	3	Ordina	_		1	2	3 Aggregate	d Comment
ZSNES 1.51	no	no	no	Value		ZSNES 1.51	5	5	5 5	
	differences noticeable	differences noticeable	differences noticeable	no objec displaye	cts -> 0.0 d	SNES9X 1.51	5		5 5	
SNES9X 1.51	no	no	no	not	-> 5.0	MESS 0.119	5		0 0	
	differences noticeable	differences noticeable	differences noticeable	• • •	le -> 1.0	VLC 0.8.6c Aggregation mo	5 ode:		5 5 st result	
MESS 0.119	no	no	no objects	severe differenc		riggi ogation me	Juo.		31103411	
	differences		•	to origin						
VLC 0.8.6c	noticeable no	noticeable no	no	small differenc	-> 3.0					
VLC 0.0.00		differences								
	noticeable	noticeable	noticeable	no differenc noticeab						
Results Alternatives	1	2	3	Transform	ner	Transformed Res Alternatives 1		3	Aggregated	Comments
ZSNES 1.51	not	not	not	Ordinal	Target	ZSNES 1.51 5	5	5	5	
	applicable	applicable	applicable	Value	Value			-	-	
SNES9X 1.51	applicable not	applicable not	applicable not	not -	_	SNES9X 1.51 5	5	5	5	
	not applicable	not applicable	not applicable	not applicable	Value -> 5.0	SNES9X 1.51 5 MESS 0.119 5		5 5	-	
SNES9X 1.51 MESS 0.119	not	not applicable not	not	not applicable	Value -> 5.0 -> 1.0	SNES9X 1.51 5 MESS 0.119 5	5 5 5	5 5 5	5 5 5	
	not applicable not	not applicable not	not applicable not applicable not	not applicable not	Value -> 5.0 -> 1.0	SNES9X 1.51 5 MESS 0.119 5 VLC 0.8.6c 5	5 5 5	5 5 5	5 5 5	
MESS 0.119 VLC 0.8.6c	not applicable not applicable not applicable	not applicable not applicable not applicable	not applicable not applicable not applicable	not applicable not supported	Value -> 5.0 -> 1.0	SNES9X 1.51 5 MESS 0.119 5 VLC 0.8.6c 5	5 5 5	5 5 5	5 5 5	
MESS 0.119 VLC 0.8.6c Network Supp	not applicable not applicable not applicable	not applicable not applicable not applicable	not applicable not applicable not applicable	not applicable not supported	Value -> 5.0 -> 1.0 -> 5.0	SNES9X 1.51 5 MESS 0.119 5 VLC 0.8.6c 5	5 5 Wo	5 5 5 rst r	5 5 5	
MESS 0.119 VLC 0.8.6c Network Supp Results	not applicable not applicable not applicable	not applicable not applicable not applicable	not applicable not applicable not applicable	not applicable not supported supported	Value -> 5.0 -> 1.0 -> 5.0 ner Target	SNES9X 1.51 5 MESS 0.119 5 VLC 0.8.6c 5 Aggregation mode:	5 5 Wo	5 5 5 rst r	5 5 5 esult	d Comments
MESS 0.119 VLC 0.8.6c Network Supp	not applicable not applicable not applicable port > lag for 1	not applicable not applicable not applicable or network processing applicable	not applicable not applicable not applicable play	not applicable not supported supported Transform Ordinal Value	Value -> 5.0 -> 1.0 -> 5.0 ner Target Value	SNES9X 1.51 5 MESS 0.119 5 VLC 0.8.6c 5 Aggregation mode: Transformed R Alternatives	5 5 Wo esu l	5 5 5 rst r	5 5 5 esult B Aggregated	d Comments
MESS 0.119 VLC 0.8.6c Network Supplements Alternatives ZSNES 1.51	not applicable not applicable not applicable port > lag for applicable	not applicable not applicable not applicable or network protection applicable applicable applicable applicable	not applicable not applicable not applicable play 3 not applicable	not applicable not supported supported . Transform Ordinal Value not	Value -> 5.0 -> 1.0 -> 5.0 ner Target	SNES9X 1.51 5 MESS 0.119 5 VLC 0.8.6c 5 Aggregation mode: Transformed R Alternatives ZSNES 1.51 SNES9X 1.51	5 5 Wo esul 1	5 5 5 rst r	5 5 esult Aggregated 5 5	d Comments
MESS 0.119 VLC 0.8.6c Network Supp Results Alternatives	not applicable not applicable not applicable port > lag for 1	not applicable not applicable or network protable not applicable not applicable not applicable not	not applicable not applicable not applicable play 3 not applicable not applicable not	not applicable not supported supported Transform Ordinal Value	Value -> 5.0 -> 1.0 -> 5.0 Target Value -> 5.0	SNES9X 1.51 5 MESS 0.119 5 VLC 0.8.6c 5 Aggregation mode: Transformed R Alternatives ZSNES 1.51	5 5 5 Woo	5 5 5 rrst r	5 5 5 5 5 5	d Comments

Alternatives	1	2	3	Ordinal		Aggregation r	node	e: Wo	orst res	ult	
MESS 0.119	not		not	Value	Value						
	applicable		applicable	short delay	^						
VLC 0.8.6c	not applicable		not applicable	delay not noticeable	-> 5.0						
Network Supp	ort > use	of original se	ervers								
Results						Transformed F	Resu	lts			
Alternatives	1	2	3	Transforn	ner	Alternatives	1	2 3	B Agg	regated	Comments
ZSNES 1.51	not applicable		not applicable	Ordinal Value	Target Value	ZSNES 1.51 SNES9X 1.51		5 5 5 5		-	
SNES9X 1.51	not applicable		not applicable	not applicable	-> 5.0	MESS 0.119	5	5 5	5 5		
MESS 0.119	not applicable		not applicable	not supported	-> 1.0	VLC 0.8.6c Aggregation mo		5 5 Nors		:	
VLC 0.8.6c	not applicable		not applicable	supported	-> 5.0						
Documentatio	n > box ar	twork availa	ble								
	n > box ar	twork availa	ble	Tr	ansforme	d Results					
		twork availa Transformer	ble			d Results es Single (=A	ggre	gate	ed) Co	omments	
Results				P		es Single (=A	ggre	gate	ed) Co	omments	
Results Alternatives	Single No	Transformer		Value Z	Alternative	es Single (=A	ggre	gate	ed) Co	omments	
Results Alternatives ZSNES 1.51	Single No No	Transformer Ordinal Valu	ue Target	Value Z	Alternative (SNES 1.51	s Single (=A	ggre	gate	ed) Co	omments	
Results Alternatives ZSNES 1.51 SNES9X 1.51	Single No No	Transformer Ordinal Valu Yes	ue Target	t Value Z	Alternative SNES 1.51 SNES9X 1.5	s Single (=A	ggre	gate	ed) Co	omments	
Results Alternatives ZSNES 1.51 SNES9X 1.51 MESS 0.119	No No No Yes	Transformer Ordinal Valu Yes No	ue Target	t Value Z	Alternative SNES 1.51 SNES9X 1.5 MESS 0.119	2s Single (=A) 1 1 1	ggre	gate	ed) Co	omments	
Results Alternatives ZSNES 1.51 SNES9X 1.51 MESS 0.119 VLC 0.8.6c Documentatio	No No No Yes	Transformer Ordinal Valu Yes No	ue Target	t Value Z	Alternative SNES 1.51 SNES9X 1.5 MESS 0.119	2s Single (=A) 1 1 1 1 1 5	ggre	gate	ed) Co	omments	
Results Alternatives ZSNES 1.51 SNES9X 1.51 MESS 0.119 VLC 0.8.6c Documentatio	Single No No No Yes n > manua	Transformer Ordinal Valu Yes No	ue Target	t Value Z	SNES 1.51 SNES9X 1.5 MESS 0.119 /LC 0.8.6c	2s Single (=A) 1 1 1 1 1 5				omments	
Results Alternatives ZSNES 1.51 SNES9X 1.51 MESS 0.119 VLC 0.8.6c Documentatio Results	Single No No No Yes n > manua	Transformer Ordinal Valu Yes No al available	-> 5.0 -> 1.0	t Value Z	SNES 1.51 SNES9X 1.5 MESS 0.119 /LC 0.8.6c	s Single (=Ag					
Results Alternatives ZSNES 1.51 SNES9X 1.51 MESS 0.119 VLC 0.8.6c Documentation Results Alternatives	Single No No No Yes n > manua Single No	Transformer Ordinal Valu Yes No al available Transformer	-> 5.0 -> 1.0	Value Z	SNES 1.51 SNES 1.51 SNES9X 1.5 MESS 0.119 (LC 0.8.6c	s Single (=Ag 1 1 1 5 d Results s Single (=Ag 1					
Results Alternatives ZSNES 1.51 SNES9X 1.51 MESS 0.119 VLC 0.8.6c Documentatio Results Alternatives ZSNES 1.51	No No No Yes n > manua Single No No	Transformer Ordinal Valu Yes No al available Transformer Ordinal Valu	-> 5.0 -> 1.0	t Value Z	Alternative CSNES 1.51 ENES9X 1.5 MESS 0.119 ALC 0.8.6c Tansformed Alternative CSNES 1.51	1 1 1 5 Single (=Ag 1 1 1 1 5 Single (=Ag 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1					
Results Alternatives ZSNES 1.51 SNES9X 1.51 MESS 0.119 VLC 0.8.6c Documentation Results Alternatives ZSNES 1.51 SNES9X 1.51	No No No Yes n > manua Single No No	Transformer Ordinal Valu Yes No al available Transformer Ordinal Valu Yes	-> 5.0 -> 1.0	t Value Z S N V Tr A t Value Z S N	SNES 1.51 SNES9X 1.5 MESS 0.119 MLC 0.8.6c Cansformed Alternative SNES 1.51	1 1 1 5 Single (=Ag 1 1 1 1 5 Single (=Ag 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1					
Results Alternatives ZSNES 1.51 SNES9X 1.51 MESS 0.119 VLC 0.8.6c Documentatio Results Alternatives ZSNES 1.51 SNES9X 1.51 MESS 0.119	No No No Yes n > manua Single No No No No Yes	Transformer Ordinal Valu Yes No al available Transformer Ordinal Valu Yes No	-> 5.0 -> 1.0 Target -> 5.0 -> 1.0	t Value Z S N V Tr A t Value Z S N	SNES 1.51 SNES 9X 1.5 MESS 0.119 MC 0.8.6c Tansformed SNES 1.51 SNES 1.51 MESS 0.119	28 Single (=A) 1 1 1 5 2 d Results 2 Single (=A) 1 1 1 1 1					

SNES 1.51 No							
NESPX 1.51	Alternatives	J	<u> </u>			0 00 0	Comments
No	ZSNES 1.51	No				1	
VIC 0.8.6c Ves	SNES9X 1.51	No	Yes	-> 5.0		1	
coumentation > originally supplied additional items available sesults Alternatives Single Transformer SNES 1.51 No	MESS 0.119	No	No	-> 1.0		1	
	VLC 0.8.6c	Yes			VLC 0.8.6c	5	
Alternatives Single Single Comments Single Single Single Comments Single Single Single Comments Single Single Single Single Single Comments Single Singl	Documentatio	n > origii	nally supplied ad	lditional items a	vailable		
	Results				Transformed I	Results	
SNES9X 1.51	Alternatives	Single	Transformer		Alternatives	Single (=Aggregated)	Comments
No	ZSNES 1.51	No	Ordinal Value	Target Value	ZSNES 1.51	1	
VLC 0.8.6c Yes VLC 0.8.6c 5	SNES9X 1.51	No	Yes	-> 5.0	SNES9X 1.51	1	
retadata > TV standard information available secults Transformed Results Alternatives Single Transformer Alternatives Single (=Aggregated) Comments SNES 9X 1.51 No Yes -> 5.0 SNES 9X 1.51 1 Alternatives Single (=Aggregated) SNES 0.119 1 Alternatives Single Transformer Alternatives Single Transformer Alternatives Single Transformer Alternatives Single (=Aggregated) Comments SNES 9X 1.51 No Ordinal Value Target Value ZSNES 1.51 1 Alternatives Single (=Aggregated) Comments SNES 1.51 No Yes -> 5.0 SNES 9X 1.51 1 SNES 9X 1.51 No Yes -> 5.0 SNES 9X 1.51 1 SNES 9X 1.51 No Yes -> 5.0 SNES 9X 1.51 1 Alternatives Single (=Aggregated) Comments Alternatives Single Transformer Alternatives Single (=Aggregated) Transformer Alternatives Single SNES 0.119 1 Alternatives Single Transformer Alternatives Single SNES 0.119 1 Alternatives Single SNES 0.119 1 Alternatives Single Single (=Aggregated) Comments	MESS 0.119	No	No	-> 1.0	MESS 0.119	1	
Alternatives Single Transformer Alternatives Single Eaggregated Comments SNES 9X 1.51 No Yes -> 5.0 SNES 9X 1.51 1 MESS 0.119 No No -> 1.0 MESS 0.119 1 MESS 0.119 VLC 0.8.6c 5 MESS 0.119 No Ordinal Value Target Value Transformed Results Matternatives Single Transformer Transformed Results MESS 0.119 No No -> 1.0 MESS 0.119 1 MESS 0.119 No Ordinal Value Target Value ZSNES 1.51 1 SNES 1.51 No Ordinal Value Target Value ZSNES 1.51 1 SNES 0.119 No No -> 1.0 MESS 0.119 1 MESS 0.119 No No No -> 1.0 MESS 0.119 1 MESS 0.119 No No No -> 1.0 MESS 0.119 1 MESS 0.119 No No No No No No No N	VLC 0.8.6c	Yes			VLC 0.8.6c	5	
Alternatives Single Transformer Alternatives Single (=Aggregated) Comments ZSNES 1.51 No Yes -> 5.0 SNES9X 1.51 1 No Yes -> 1.0 MESS 0.119 1 No Ves VLC 0.8.6c 5 No Ves VLC 0.8.6c 5 No Ves VLC 0.8.6c 5 No VLC 0.8.6c 5 No VLC 0.8.6c 5 No No VLC 0.8.6c SUBS 1.51 No No No VLC 0.8.6c SUBS 1.51 No No VLC 0.8.6c SUBS 1.51 No No VLC 0.8.6c SUBS 1.51 No VLC 0.8.6c SUBS 1.51 No VLC 0.8.6c SUBS 0.119 No No No -> 1.0 MESS 0.119 1 No VLC 0.8.6c SUBS 0.119 No No No No No No No N	Metadata > T\	/ standar	d information av	ailable			
Comments	Results				Transformed I	Results	
SNES9X 1.51	Alternatives	Single	Transformer		Alternatives	Single (=Aggregated)	Comments
MESS 0.119 No No -> 1.0 MESS 0.119 1 VLC 0.8.6c Yes Video display frequency information available esults Transformed Results Alternatives Single ZSNES 1.51 No Ordinal Value Target Value ZSNES 1.51 No Yes -> 5.0 SNES9X 1.51 1 MESS 0.119 No No -> 1.0 MESS 0.119 1 VLC 0.8.6c Yes VLC 0.8.6c 5 Retadata > region lock-out information available esults Transformed Results Alternatives Single (=Aggregated) Comments ZSNES 1.51 No Yes -> 5.0 SNES9X 1.51 1 MESS 0.119 No No -> 1.0 MESS 0.119 1 VLC 0.8.6c Yes VLC 0.8.6c 5 Retadata > region lock-out information available esults Transformer Transformed Results Alternatives Single (=Aggregated) Comments Alternatives Single (=Aggregated) Comments	ZSNES 1.51	No	Ordinal Value	Target Value	ZSNES 1.51	1	
VLC 0.8.6c Yes VLC 0.8.6c 5	SNES9X 1.51	No	Yes	-> 5.0	SNES9X 1.51	1	
results Alternatives Single Transformer SNES 1.51 No Ordinal Value Target Value ZSNES 1.51 1 SNES9X 1.51 No No No -> 5.0 SNES9X 1.51 1 MESS 0.119 No No No -> 1.0 MESS 0.119 1 MLC 0.8.6c Yes VLC 0.8.6c 5 Transformed Results Alternatives Single (=Aggregated) Comments VLC 0.8.6c Yes VLC 0.8.6c 5 Transformed Results Alternatives Single (=Aggregated) Comments Alternatives Single (=Aggregated) Comments Alternatives Single (=Aggregated) Comments	MESS 0.119	No	No	-> 1.0	MESS 0.119	1	
Alternatives Single Transformer ZSNES 1.51 No Ordinal Value Target Value ZSNES 1.51 No SNES9X 1.51 No Yes -> 5.0 MESS 0.119 No No -> 1.0 MESS 0.119 1 VLC 0.8.6c Yes Alternatives Single (=Aggregated) Comments VLC 0.8.6c Transformer Transformed Results Alternatives Single (=Aggregated) Comments ZSNES 1.51 1 SNES9X 1.51 1 MESS 0.119 1 VLC 0.8.6c 5 Alternatives Single (=Aggregated) Comments Alternatives Single (=Aggregated) Comments Alternatives Single (=Aggregated) Comments	VLC 0.8.6c	Yes			VLC 0.8.6c	5	
Alternatives Single Transformer SNES 1.51 No Ordinal Value Target Value SNES 9X 1.51 No N	Metadata > vi	deo displ	ay frequency inf	ormation availa	ble		
ZSNES 1.51 No Ordinal Value Target Value ZSNES 1.51 1 SNES9X 1.51 No Yes -> 5.0 SNES9X 1.51 1 MESS 0.119 No No -> 1.0 MESS 0.119 1 VLC 0.8.6c Yes VLC 0.8.6c 5 Tetadata > region lock-out information available Sesults Transformer Transformed Results Alternatives Single Ordinal Value Target Value Alternatives Single (=Aggregated) Comments	Results				Transformed I	Results	
SNES9X 1.51 No Yes -> 5.0 SNES9X 1.51 1 MESS 0.119 No No -> 1.0 MESS 0.119 1 VLC 0.8.6c Yes VLC 0.8.6c 5 Letadata > region lock-out information available Lesults Transformer Transformed Results Alternatives Single Ordinal Value Target Value Alternatives Single (=Aggregated) Comments	Alternatives	Single	Transformer		Alternatives	Single (=Aggregated)	Comments
MESS 0.119 No No -> 1.0 MESS 0.119 1 VLC 0.8.6c Yes VLC 0.8.6c 5 Retadata > region lock-out information available Results Transformer Transformed Results Alternatives Single Ordinal Value Target Value Alternatives Single (=Aggregated) Comments	ZSNES 1.51	No	Ordinal Value	Target Value	ZSNES 1.51	1	
VLC 0.8.6c Yes VLC 0.8.6c 5 etadata > region lock-out information available esults Transformer Transformed Results Alternatives Single Ordinal Value Target Value Alternatives Single (=Aggregated) Comments	SNES9X 1.51	No	Yes	-> 5.0	SNES9X 1.51	1	
etadata > region lock-out information available esults	MESS 0.119	No	No	-> 1.0	MESS 0.119	1	
esults Transformer Transformed Results Alternatives Single Ordinal Value Target Value Alternatives Single (=Aggregated) Comments	VLC 0.8.6c	Yes			VLC 0.8.6c	5	
Alternatives Single Ordinal Value Target Value Alternatives Single (=Aggregated) Comments	Metadata > re	gion lock	-out information	available			
	Results		Transformer		Transformed I	Results	
ZSNES 1.51 No Yes -> 5.0 ZSNES 1.51 1	Alternatives	Single	Ordinal Value	Target Value	Alternatives	Single (=Aggregated)	Comments
	ZSNES 1.51	No	Yes	-> 5.0	ZSNES 1.51	1	

Alternatives	Singlo			Altorpotivos	Single (- Aggregated)	Commonts
SNES9X 1.51	Single No	Ordinal Value	Target Value	Alternatives SNES9X 1.51	Single (=Aggregated)	Comments
MESS 0.119	No	No	-> 1.0	MESS 0.119	1	
VLC 0.8.6c	Yes	140	7 1.0	VLC 0.8.6c	5	
VLO 0.0.00	103			V EC 0.0.00	<u> </u>	
Metadata > de	escription	n of original med	ia available			
Results				Transformed F	Results	
Alternatives	Single	Transformer		Alternatives	Single (=Aggregated)	Comments
ZSNES 1.51	No	Ordinal Value	Target Value	ZSNES 1.51	1	
SNES9X 1.51	No	Yes	-> 5.0	SNES9X 1.51	1	
MESS 0.119	No	No	-> 1.0	MESS 0.119	1	
VLC 0.8.6c	Yes			VLC 0.8.6c	5	
Metadata > co	ntext de	tails available				
	mext de	tans available				
Results				Transformed F		l -
Alternatives	3	Transformer			Single (=Aggregated)	Comments
ZSNES 1.51	No	Ordinal Value		ZSNES 1.51	1	
SNES9X 1.51	No	Yes	-> 5.0	SNES9X 1.51	1	
MESS 0.119	No	No	-> 1.0	MESS 0.119	1	
VLC 0.8.6c	Yes			VLC 0.8.6c	5	
Metadata > ne	ecessary	system configura	ation available			
Results				Transformed F	Results	
Alternatives	Single	Transformer		Alternatives	Single (=Aggregated)	Comments
ZSNES 1.51	No	Ordinal Value	Target Value	ZSNES 1.51	1	
SNES9X 1.51	No	Yes	-> 5.0	SNES9X 1.51	1	
MESS 0.119	No	No	-> 1.0	MESS 0.119	1	
VLC 0.8.6c	Yes			VLC 0.8.6c	5	
Context and D	ata Char	acteristics > refe	erence to consol	e video game s	ystem	
Results		Transformer		Transformed F	Results	
	Single	Ordinal Value	Target Value	Alternatives	Single (=Aggregated)	Comments
Alternatives	9					
ZSNES 1.51	No	Yes	-> 5.0	ZSNES 1.51	1	

Alternatives	Single		Alt	ernatives	Single	e (=Aggregated)	Comm	ents
MESS 0.119	No		ME	SS 0.119	1			
VLC 0.8.6c	Yes		VLC	C 0.8.6c	5			
Context and D	ata Characterist	ics > reference to a	pplication					
Results		Transformer		Transfo	rmed l	Results		
Alternatives	Single	Ordinal Value	Target	Alterna	atives	Single (=Aggreg	ated)	Comment
ZSNES 1.51	not available		Value	ZSNES	1.51	1		
SNES9X 1.51	not available	not available	-> 1.0	SNES92	X 1.51	1		
MESS 0.119	not available	without system	-> 3.0	MESS C).119	1		
VLC 0.8.6c	with system	configuration	F 0	VLC 0.8	3.6c	5		
	configuration	with system configuration	-> 5.0	120 0.0.00				
Scalability > p	olug-in system							
Results		Transformer		Transfo	rmed l	Results		
Alternatives	Single	Ordinal Value	Target	Alterna	atives	Single (=Aggreg	ated)	Comment
ZSNES 1.51	not available		Value	ZSNES	1.51	1		
SNES9X 1.51	not available	not available	-> 1.0	SNES92	X 1.51	1		
MESS 0.119	not available	available, closed specifications	-> 3.0	MESS C).119	1		
VLC 0.8.6c	available, open specifications	available, open specifications	-> 5.0	VLC 0.8	3.6c	5		
Scalability > r	nodular design							
Results		Transformer		Transfo	rmed l	Results		
Alternatives	Single	Ordinal Value	Target	Altern	atives	Single (=Aggreg	ated)	Comment
ZSNES 1.51	code modular an		Value	ZSNES	1.51	4		
	one system	code not available	e -> 1.0	SNES92	X 1.51	2		
CNECOV 1 F1	supported	code not modular	-> 2.0	MESS C).119	5		
SNES9X 1.51	code not modula	code modular and	d -> 4.0	VLC 0.8	3.6c	5		
MESS 0.119	code modular and different systems supported	u one system						
VLC 0.8.6c	code modular an different systems supported							

Results		Transformer		Transformed I	Results		
Alternatives	Single	Ordinal Value	Target	Alternatives	Single (=Aggregated)	Comments	
ZSNES 1.51	platform dependent code	code not	Value -> 1.0	ZSNES 1.51 SNES9X 1.51	2		
SNES9X 1.51	platform independent code	available platform	-> 2.0	MESS 0.119	4		
MESS 0.119	platform independent code	dependent code	-> 4.0	VLC 0.8.6c	2		
VLC 0.8.6c	platform	independent code					
	dependent code	Virtual Machine used	-> 5.0				
Scalability > h	nardware depende	ncies					
Results				Transformed I	Results		
Alternatives	Single			Alternatives	Single (=Aggregated)	Comments	
ZSNES 1.51	platform	Transformer		ZSNES 1.51	3		
	dependent libraries are used	Ordinal Value	Target Value	SNES9X 1.51	5		
SNES9X 1.51	platform	code not available		MESS 0.119	5		
	dependent	dependent	platform 2.0		VLC 0.8.6c	3	
	libraries are not used	dependent	> 0.0				
MESS 0.119	platform	libraries are used					
	dependent libraries are not	platform dependent libraries are not	-> 5.0				
VLC 0.8.6c	used platform	used					
VLC 0.8.0C	dependent libraries are used						
Stability > dev	velopment procedu	ıre					
Results				Transformed I	Results		
Alternatives	Single	Transformer		Alternatives	Single (=Aggregated)	Comments	
ZSNES 1.51	not commercial	Ordinal Value	Target Value	ZSNES 1.51	4		
SNES9X 1.51	but open source not commercial	commercial and	-> 5.0	SNES9X 1.51	4		
SINES/A 1.51	but open source	open source		MESS 0.119	4		
	•			VLC 0.8.6c	4		

Alternatives	Single	Ordinal Value	Target			
MESS 0.119	not commercial but open source	not commercial	Value -> 4.0			
VLC 0.8.6c	not commercial but open source	but open source commercial but	-> 2.0			
		closed source not commercial	-> 1.0			
		but closed source				
Stability > in	active developme	ent				
Results		Transformer		Transformed I	Results	
Alternatives	Single	Ordinal Value	Target	Alternatives	Single (=Aggregated)	Comments
ZSNES 1.51	new version in	new version in	Value -> 5.0	ZSNES 1.51	3	
SNES9X 1.51	last year new version in	last 3 month	-> 3.0	SNES9X 1.51 MESS 0.119	4	
	last 6 month	new version in last 6 month	-> 4.0	VLC 0.8.6c	5 4	
MESS 0.119	new version in last 3 month		-> 3.0			
VLC 0.8.6c	new version in	last year				
	last 6 month	no release in last year	-> 1.0			
Stability > cor	mmunity					
Results		Transformer		Transformed I	Results	
Alternatives	Single	Ordinal Value	Target	Alternatives	Single (=Aggregated)	Comments
ZSNES 1.51	official forum	- #1-1-1	Value	ZSNES 1.51	5	
	>200 active users	official forum >200 active users	-> 5.0	SNES9X 1.51	5	
SNES9X 1.51	official forum	unofficial forum	-> 4.0	MESS 0.119	5	
	>200 active users	available >200 active users		VLC 0.8.6c	5	
MESS 0.119	official forum >200 active users	official forum available <200 active users	-> 3.0			
VLC 0.8.6c	official forum	unofficial forum < 200 active users	-> 2.0			
VLC 0.8.6C	>200 active					

Results		Transformer		Transformed Results			
Alternatives	Single	Ordinal Value	Target	Alternatives	Single (=Aggregated)	Comments	
ZSNES 1.51	low level and no		Value	ZSNES 1.51	4		
	BIOS is needed	high level and no BIOS is needed	-> 5.0	SNES9X 1.51	4		
SNES9X 1.51	low level and no		-> 4.0	MESS 0.119	4		
	BIOS is needed	low level and no BIOS is needed		VLC 0.8.6c	5		
MESS 0.119	low level and no BIOS is needed	high level and BIOS is needed	-> 2.0	V 20 0.0.00			
VLC 0.8.6c	high level and no BIOS is needed	low level and BIOS is needed	-> 1.0				

Results				Transformed I	Results	
Alternatives	Single	Transformer		Alternatives	Single (=Aggregated)	Comments
ZSNES 1.51	manufacturer in video game business	Ordinal Value manufacturer out	Target Value	ZSNES 1.51 SNES9X 1.51 MESS 0.119	3 3 3	
SNES9X 1.51	manufacturer in video game business	of business manufacturer in	-> 3.0	VLC 0.8.6c	3	
MESS 0.119	manufacturer in video game business	video game business manufacturer no	-> 5.0			
VLC 0.8.6c	manufacturer in video game business	longer in video game business				
Media > supp	orted media type					
Results		Transformer		Transformed I	Results	
Alternatives	Single	Ordinal Value	Target Value	Alternatives	Single (=Aggregated)	Comments
ZSNES 1.51	byte stream but		value	7CNFC 1 F1	4	
SNES9X 1.51	no original media supported byte stream but	not applicable neither byte-stream nor	-> 5.0 -> 0.0	ZSNES 1.51 SNES9X 1.51 MESS 0.119	4 4 4	
SNES9X 1.51	no original media supported byte stream but no original	neither		SNES9X 1.51	4	
SNES9X 1.51 MESS 0.119	no original media supported byte stream but	neither byte-stream nor original media	-> 0.0	SNES9X 1.51 MESS 0.119	4	
	no original media supported byte stream but no original media supported byte stream but no original	neither byte-stream nor original media supported original media but no byte stream	-> 0.0 -> 1.0	SNES9X 1.51 MESS 0.119	4	
MESS 0.119	no original media supported byte stream but no original media supported byte stream but no original media supported	neither byte-stream nor original media supported original media but no byte stream supported byte stream but no original media	-> 0.0 -> 1.0	SNES9X 1.51 MESS 0.119	4	
MESS 0.119	no original media supported byte stream but no original media supported byte stream but no original media supported not applicable	neither byte-stream nor original media supported original media but no byte stream supported byte stream but no original media supported byte stream and original media	-> 0.0 -> 1.0 -> 4.0	SNES9X 1.51 MESS 0.119	4	

Alternatives	Single		Value	Alternatives	Single (=Aggregated)	Comments
ZSNES 1.51	supported as	not applicable	-> 5.0	ZSNES 1.51	3	
	stand-alone file	not supported	-> 1.0	SNES9X 1.51	3	
SNES9X 1.51	supported as stand-alone file	supported as	-> 3.0	MESS 0.119	3	
MESS 0.119	supported as stand-alone file	stand-alone file supported encapsulated in	-> 5.0	VLC 0.8.6c	5	
VLC 0.8.6c	not applicable	file				

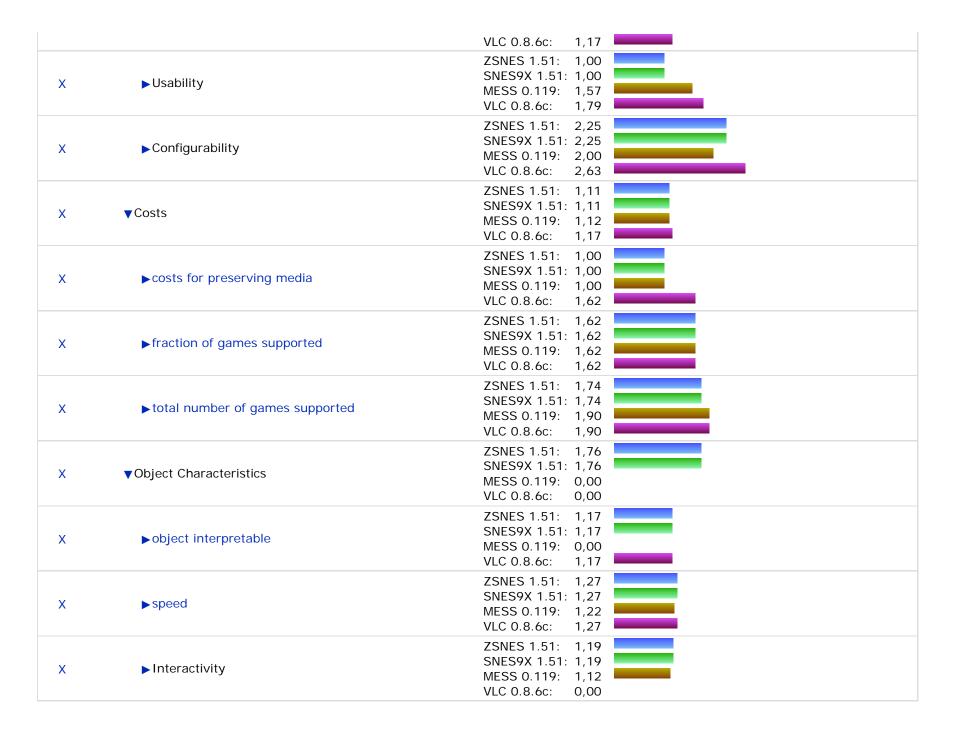
_	nal media							
Results Transformer					Transformed Results			
Alternatives	Single		ordinal Value	Target	Alternatives	Single (=Aggregated)	Comments	
ZSNES 1.51	not			Value	ZSNES 1.51	1		
	supported	not applicable -> 5.0		-> 5.0	SNES9X 1.51	1		
SNES9X 1.51	not supported	not s	upported	-> 1.0	MESS 0.119	1		
MESS 0.119	not supported	supported with spec hardware		-> 3.0	VLC 0.8.6c	5		
VLC 0.8.6c	not applicable	supported without -> 5.0 special hardware						
Media > logica	al layer inform	ation						
Results					Transformed Results			
Alternatives	Single		Transformer		Alternatives	Single (=Aggregated)	Comments	
ZSNES 1.51	hard-coded in		Ordinal Value	e Target Value	ZSNES 1.51	1		
	preservation solution		not applicable	-> 5.0	SNES9X 1.51	1		
SNES9X 1.51	hard-coded in		hard-coded in	-> 1.0	MESS 0.119	1		
	preservation solution		preservation solution		VLC 0.8.6c	5		
MESS 0.119	hard-coded in		plug-in system	-> 3.0				
	preservation solution		encapsulation	-> 5.0				
VLC 0.8.6c	not applicable		supported					
Media > speci	al hardware o	n phy	sical media					
Results		Trans	sformer		Transformed F	Results		
Alternatives	Single		ordinal Value	Target	Alternatives	Single (=Aggregated)	Comments	
ZSNES 1.51	not		ramar value	Value	ZSNES 1.51	5		
	applicable	not a	pplicable	-> 5.0	SNES9X 1.51	5		
SNES9X 1.51	not applicable		coded in	-> 1.0	MESS 0.119	5		
MFSS 0 119		•	rvation solution	_	VLC 0.8.6c	5		
MESS 0.119 not		plug-	in system	-> 3.0				
	applicable		sulation	-> 5.0				

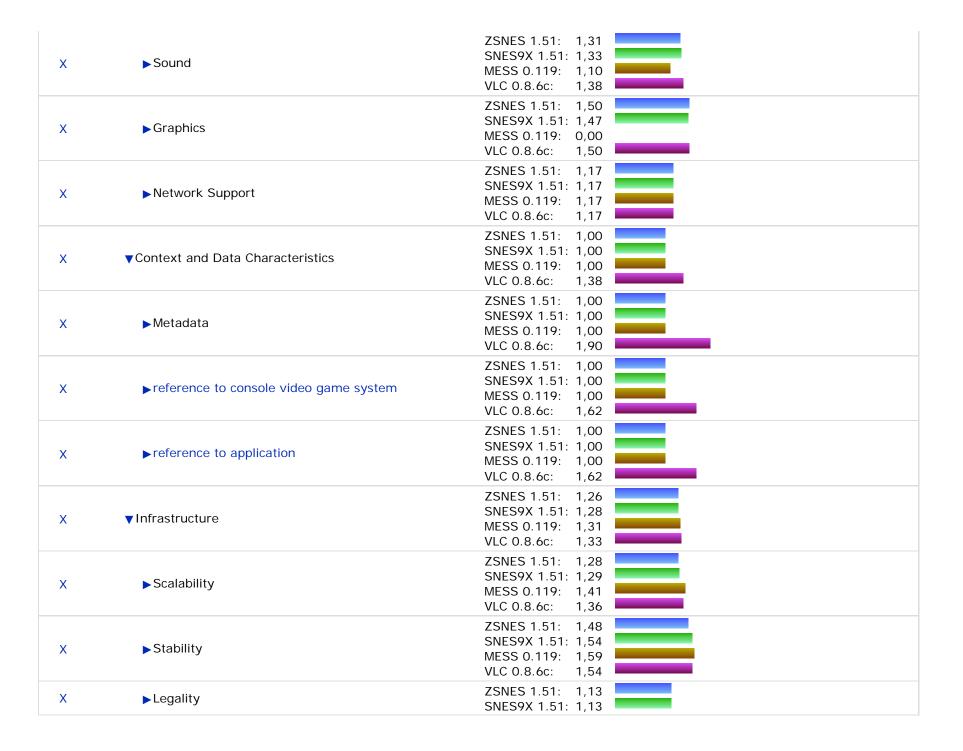
Results		Transformer		Transformed	Results			
Alternatives	Single	Ordinal Value	Target	Alternatives	Single (=Aggregated)	Comments		
ZSNES 1.51	not	oramar raids	Value	ZSNES 1.51	5			
	applicable	not applicable	-> 5.0	SNES9X 1.51	5			
SNES9X 1.51	not applicable	not supported	-> 1.0	MESS 0.119	5			
MESS 0.119	not applicable	supported with special hardware	al -> 3.0	VLC 0.8.6c	5			
VLC 0.8.6c	not applicable	supported without -> 5.0 special hardware						
Results		cessary accessories Transformer	supported	Transformed F				
	Single		arget Value	Alternatives	Single (=Aggregated)	Comments		
Alternatives	Single	Ordinal Value T	aruct value					
	not applicable			ZSNES 1.51	5			
Alternatives ZSNES 1.51 SNES9X 1.51		not applicable ->	> 5.0	ZSNES 1.51 SNES9X 1.51	5 5			
ZSNES 1.51	not applicable	not applicable ->	> 5.0 > 5.0		_			
ZSNES 1.51 SNES9X 1.51	not applicable not applicable	not applicable -> Y -> N ->	> 5.0	SNES9X 1.51	5			

Result-Tree with all Alternatives, Aggregation method: Weighted multiplication Expand All | Collapse All

Objectives

Focus	Name	Result
	▼ Objectives	ZSNES 1.51: 2,68 SNES9X 1.51: 2,70 MESS 0.119: 0,00 VLC 0.8.6c: 0,00
X	▼Process Characteristics	ZSNES 1.51: 1,08 SNES9X 1.51: 1,08 MESS 0.119: 1,12



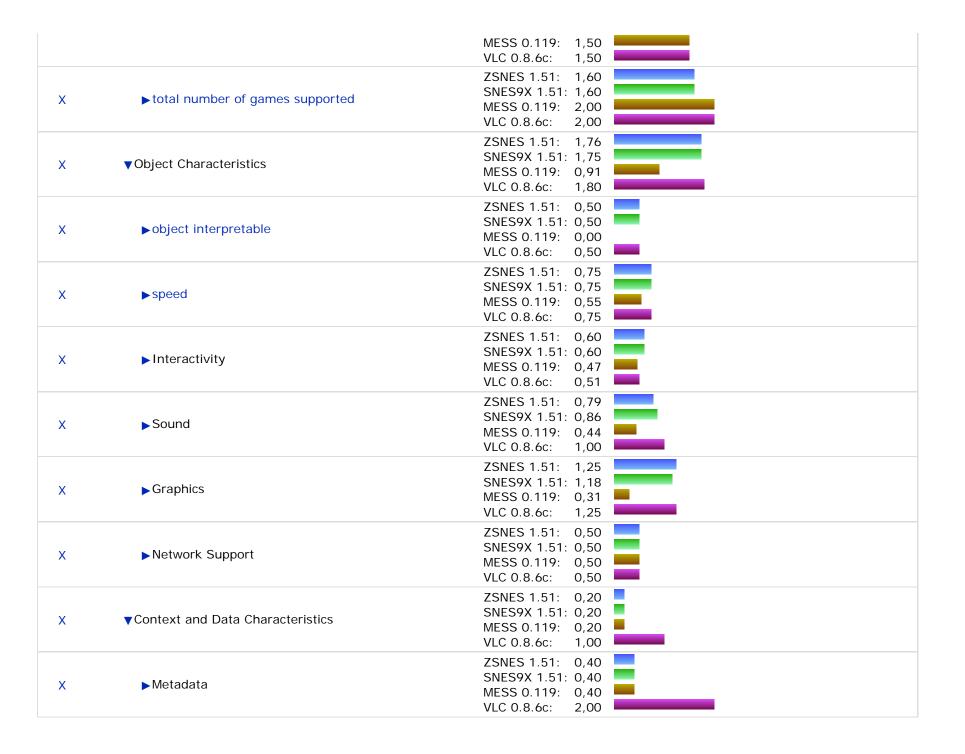


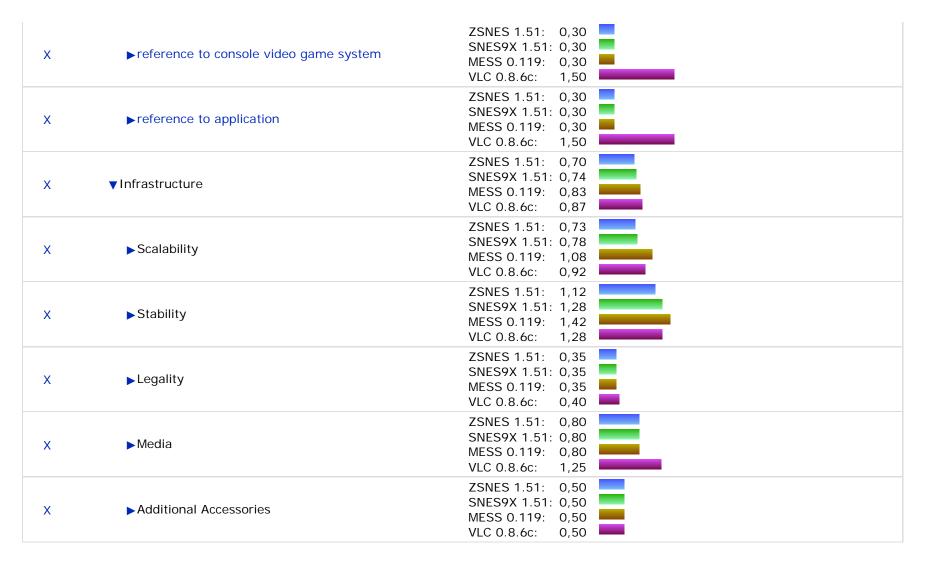


Result-Tree with all Alternatives, Aggregation method: Weighted sum Expand All | Collapse All

Objectives

Focus	Name	Result
	▼ Objectives	ZSNES 1.51: 3,28 SNES9X 1.51: 3,31 MESS 0.119: 2,68 VLC 0.8.6c: 4,65
X	▼ Process Characteristics	ZSNES 1.51: 0,28 SNES9X 1.51: 0,28 MESS 0.119: 0,36 VLC 0.8.6c: 0,48
X	▶Usability	ZSNES 1.51: 0,40 SNES9X 1.51: 0,40 MESS 0.119: 1,52 VLC 0.8.6c: 1,76
X	▶ Configurability	ZSNES 1.51: 2,40 SNES9X 1.51: 2,40 MESS 0.119: 2,10 VLC 0.8.6c: 3,00
X	▼ Costs	ZSNES 1.51: 0,34 SNES9X 1.51: 0,34 MESS 0.119: 0,38 VLC 0.8.6c: 0,50
X	▶costs for preserving media	ZSNES 1.51: 0,30 SNES9X 1.51: 0,30 MESS 0.119: 0,30 VLC 0.8.6c: 1,50
Х	▶fraction of games supported	ZSNES 1.51: 1,50 SNES9X 1.51: 1,50





Recommended alternative for this preservation plan:

SNES9X 1.51

Reasoning:

SNES9X has the best result if Weighted Sum AND Weighted Multiplication are considered, VLC and MESS have to be discarded (no interaction on VLC and not all objects interpretable on MESS)

Release 1.3 beta - Institute of Software Technology and Interactive Systems: « off-ice bears »

