DOMAIN-SPECIFIC PICTOGRAMS FOR MOBILE WEB APPLICATIONS

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1. A CORNUCOPIA OF SYMBOLS

Pictograms are small images representing states, objects and actions, stored locally on a terminal, and that can appear in any Web application. Several norms (WAP by the Open Mobile Alliance; UNICODE by ISO) and proprietary standards (Openwave icons; Japanese operators' emojis) specify catalogues of pre-defined pictograms and the syntax to embed them in (X)HTML pages. A companion article surveys these approaches, evaluates their advantages and shortcomings, and reviews their portability with respect to major mobile browsers and operating systems (see: http://areppim.com/b2evolution/usrblogs/technotes/?p=37).

That same article includes correspondence tables between 94 symbols from the core and emoticon dictionaries of major pictographic standards used outside Japan. These symbols are the most widely implemented in mobile phones ranging from low-end devices to high-end terminals, from legacy handsets to modern smartphones; they also are serviceable for all common Web applications.

However, tourism portals, e-commerce stores, news sites or on-line discussion forums must convey quite different information in iconic form to their visitors. The following sections present compatibility matrices for domain-specific pictograms of UNICODE, WAP and Openwave. Their organization follows the WAP nomenclature, thus keeping the number of symbols to consider within reason. All icons available in the Openwave browser are included as well, because this is still a relevant platform when catering for feature phones. Tables reference code points in the UNICODE space through hexadecimal values and follow the conventions hereafter:

1. No direct match; entry is a proposed surrogate.
2. Symbol relies upon UNICODE combining character sequences.
3. Openwave or WAP-specific symbol without equivalent in UNICODE.
4. Pictogram specific to Japan and with little relevance in other countries.
5. Already available in Android version 1.5.
6. In iOS, monochrome character instead of multicolour emoji.
7. Already available in Android version 2.3.

Currently, Windows Phone 8.0 provides the most comprehensive set of ISO pictographs; iOS exhibits the least consistent style, mixing polychrome emoji-like

images and monochrome, flat graphical characters. The default font in Android oddly omits several pictographs scattered throughout UNICODE blocks.

2. PORTRAITS AND ROLES

These images complement emoticons; sometimes, UAProf files unreliably advertise them as being implemented in WAP 2 devices (notably Nokia S40 phones).

WAP	Openwave		ISO	WP	Android	iOS
Class – name	Nr	Name	Code	8.0	4.1 - 4.2	5.0 - 6.0
human/age						
baby		✗	1F6BC	✓	✓	✓
✗	163	family	1F46A	✓	✓	✓
human/body						
eye		✗	1F440	✓	✓	✓
ear		✗	1F442	✓	✓	✓
rock		✗	270A	✓	✓	✓
scissors		✗	270C	✓	[7] ✓	[6] ✓
paper		✗	270B	✓	✓	✓
foot		✗	1F463	✓	✓	✓
shoes	124	shoe	1F45E	✓	✓	✓
spectacles	116	glasses	1F453	✓	✓	✓
wheelchair		✗	267F	✓	✓	[6] ✓
human/gender						
man	**80**	**[1]head1**	1F6B9	✓	✓	✓
woman	**50**	**[1]smallface**	1F6BA	✓	✓	✓
humanoid						
devil		✗	1F47F	✓	✓	✓
skull		✗	1F480	✓	✓	✓
alien		✗	1F47D	✓	✓	✓
ghost		✗	1F47B	✓	✓	✓

WAP	Openwave		ISO	WP	Android	iOS
Class – name	Nr	Name	Code	8.0	4.1 - 4.2	5.0 - 6.0
angel		✗	1F47C	✓	✓	✓

3. ASTROLOGY

The signs of the horoscope are only partially implemented in Android, inconsistently in iOS, and not at all in Openwave – and in practice neither are they in WAP devices.

WAP	Openwave		ISO	WP	Android	iOS
Class – name	Nr	Name	Code	8.0	4.1 - 4.2	5.0 - 6.0
chineseZodiac						
rat		✗	1F400	✓	✗	✓
ox		✗	1F402	✓	✗	✓
tiger		✗	1F405	✓	✗	✓
rabbit		✗	1F407	✓	✗	✓
dragon		✗	1F409	✓	✗	✓
snake		✗	1F40D	✓	✓	✓
horse		✗	1F40E	✓	✓	✓
sheep		✗	1F40F	✓	✗	✓
monkey		✗	1F412	✓	✓	✓
cock		✗	1F413	✓	✓	✓
dog	74	dog	1F415	✓	✗	✓
boar		✗	1F417	✓	✓	✓
horoscope						
aries		✗	2648	✓	✓	[6] ✓
taurus		✗	2649	✓	✓	[6] ✓
gemini		✗	264A	✓	✓	[6] ✓
cancer		✗	264B	✓	✓	[6] ✓
leo		✗	264C	✓	✓	[6] ✓

WAP	Openwave		ISO	WP	Android	iOS
Class – name	Nr	Name	Code	8.0	4.1 - 4.2	5.0 - 6.0
virgo		✗	264D	✓	✓	[6] ✓
libra		✗	264E	✓	✓	[6] ✓
scorpio		✗	264F	✓	✓	[6] ✓
sagittarius		✗	2650	✓	✓	[6] ✓
capricorn		✗	2651	✓	✓	[6] ✓
aquarius		✗	2652	✓	✓	[6] ✓
pisces		✗	2653	✓	✓	[6] ✓
ophiuchus		✗	26CE	✓	✓	✓

4. TIME AND WEATHER

Many weather and time symbols can be found in analogous form amongst all pictographic standards. A number of signs are specific to Japan and are of no interest to developers in the rest of the world.

WAP	Openwave		ISO	WP	Android	iOS
Class – name	Nr	Name	Code	8.0	4.1 - 4.2	5.0 - 6.0
time/event						
anniversary	105	day	[1]**1F388**	✓	✓	✓
holiday		✗	[4]1F38C	✓	✓	✓
xmas		✗	1F384	✓	✓	✓
birthday		✗	1F382	✓	✓	✓
party		✗	1F389	✓	✓	✓
[3]newYearsEve		✗	✗	✗	✗	✗
newYearsDay		✗	[4]1F38D	✓	✓	✓
time/schedule						
3oclock	**46**	[1]**clock**	1F552	✓	✓	✓
calendar	67	calendar	1F4C5	✓	✓	✓

WAP	Openwave		ISO	WP	Android	iOS
Class – name	Nr	Name	Code	8.0	4.1 - 4.2	5.0 - 6.0
✗	57	hourglass1	23F3	✓	✓	✓
✗	58	hourglass2	231B	✓	✓	[6] ✓
time/season						
[3]spring		✗	[4]1F026	✓	✗	✗
[3]summer		✗	[4]1F027	✓	✗	✗
[3]autumn		✗	[4]1F028	✓	✗	✗
[3]winter		✗	[4]1F029	✓	✗	✗
weather						
sunny	44	sun	2600	✓	✓	[6] ✓
rainy	95	rain	2614	✓	✓	✓
cloudy	107	cloud	2601	✓	✓	[6] ✓
snow	60	snowflake	2744	✓	[7] ✓	[6] ✓
thunder	16	bolt	26C8	✓	✓	[6] 26A1
foggy		✗	1F301	✓	✓	✓
wave		✗	1F30A	✓	✓	✓
✗	167	partlycloudy	26C5	✓	✓	✓

5. NATURE

Icons for astronomy and plants are more or less available in all device classes, but only modern smartphones offer a large menagerie of animal symbols.

WAP	Openwave		ISO	WP	Android	iOS
Class – name	Nr	Name	Code	8.0	4.1 - 4.2	5.0 - 6.0
astronomy						
sun	44	sun	1F31E	✓	✗	✓
moon	47	moon2	1F31B	✓	✓	✓
earth		✗	1F30D	✓	1F30F	✓

WAP	Openwave		ISO	WP	Android	iOS
Class – name	Nr	Name	Code	8.0	4.1 - 4.2	5.0 - 6.0
star	69	star2	1F31F	✓	✓	✓
✗	15	moon1	1F31C	✓	✗	✓
✗	75	star3	2605	✓	[5] ✓	[6] ✓
✗	76	sparkle	2728	✓	✓	✓
✗	28	star1	2734	✓	[7] ✓	[6] ✓
animal						
octopus		✗	1F419	✓	✓	✓
monkey		✗	1F435	✓	✓	✓
pig		✗	1F437	✓	✓	✓
cat		✗	1F431	✓	✓	✓
dog	134	hound	1F436	✓	✓	✓
bear		✗	1F43B	✓	✓	✓
whale		✗	1F433	✓	✓	✓
penguin		✗	1F427	✓	✓	✓
tiger		✗	1F42F	✓	✓	✓
rabbit		✗	1F430	✓	✓	✓
rat		✗	1F400	✓	✗	✓
ladybird		✗	1F41E	✓	✓	✓
[3]beetle		✗	✗	✗	✗	✗
fish		✗	1F41F	✓	✓	✓
✗	78	bird	1F426	✓	✓	✓
plant						
fourLeafClover		✗	1F340	✓	✓	✓
flower	113	flower	1F337	✓	✓	✓
✗	53	bud	1F338	✓	✓	✓

WAP	Openwave		ISO	WP	Android	iOS
Class – name	Nr	Name	Code	8.0	4.1 - 4.2	5.0 - 6.0
✗	133	leaf	1F342	✓	✓	✓

6. COMMERCE AND ENTERTAINMENT

Handsets support this hodgepodge of signs unevenly.

WAP	Openwave		ISO	WP	Android	iOS
Class – name	Nr	Name	Code	8.0	4.1 - 4.2	5.0 - 6.0
food						
beer		✗	1F37A	✓	✓	✓
forkKnife	146	meal1	1F374	✓	✓	✓
cocktail	52	martini	1F378	✓	✓	✓
cake		✗	1F370	✓	✓	✓
coffeeCup	93	cup	2615	✓	✗	✓
✗	12	wineglass	1F377	✓	✓	✓
entertainment						
[3]prize		✗	✗	✗	✗	✗
slotMachine		✗	1F3B0	✓	✓	✓
horserace		✗	1F3C7	✓	✗	✓
motorboatRace		✗	1F6A4	✓	✓	✓
bicycleRace		✗	1F6B4	✓	✗	✓
heart		✗	2665	✓	[5] ✓	[6] ✓
diamond		✗	2666	✓	[5] ✓	[6] ✓
spade		✗	2660	✓	[5] ✓	[6] ✓
clover		✗	2663	✓	[5] ✓	[6] ✓
hitDart		✗	1F3AF	✓	✓	✓
crown		✗	1F451	✓	✓	✓

WAP	Openwave		ISO	WP	Android	iOS
Class – name	Nr	Name	Code	8.0	4.1 - 4.2	5.0 - 6.0
✗	170	dice	1F3B2	✓	✓	✓
music						
quarterNote		✗	2669	✓	[5] ✓	[6] 1F3B5
G-clef		✗	1F3BC	✓	✓	[6] ✓
rest		✗	1D13B	✗	✗	✗
guitar		✗	1F3B8	✓	✓	✓
dress						
highHeels		✗	1F460	✓	✓	✓
dress		✗	1F457	✓	✓	✓
✗	25	wristwatch	231A	✓	✓	[6] ✓
misc						
giftBox	144	present	1F381	✓	✓	✓
fire		✗	1F525	✓	✓	✓
snowman		✗	26C4	✓	✓	[6] ✓
work		✗	[1] 1F477	✓	✓	✓
money	139	dollar	1F4B5	✓	✓	✓
✗	109	[3] check	✗	✗	✗	✗
✗	165	package	1F4E6	✓	✓	✓
✗	86	voiceballoon	1F4AC	✓	✓	✓

7. SPORTS

Sport symbols are only reasonably implemented in recent high-end terminals. A number of pictograms specified in WAP were never carried over to UNICODE.

WAP	Openwave		ISO	WP	Android	iOS
Class – name	Nr	Name	Code	8.0	4.1 - 4.2	5.0 - 6.0
sport						

WAP	Openwave		ISO	WP	Android	iOS
Class – name	Nr	Name	Code	8.0	4.1 - 4.2	5.0 - 6.0
sport		✗	[1]1F3BD	✓	✓	✓
baseball	45	baseball	26BE	✓	✓	✓
soccer		✗	26BD	✓	✓	✓
basketball		✗	1F3C0	✓	✓	✓
ski		✗	1F3BF	✓	✓	✓
camp		✗	26FA	✓	✓	✓
motorSport		✗	[1]1F3C1	✓	✓	✓
checkerFlag		✗	1F3C1	✓	✓	✓
golf		✗	26F3	✓	✓	✓
surfing		✗	1F3C4	✓	✓	✓
fishing		✗	1F3A3	✓	✓	✓
horseriding		✗	1F3C7	✓	✗	✓
americanFootball	96	football	1F3C8	✓	✓	✓
swimming		✗	1F3CA	✓	✓	✓
[3]scuba		✗	✗	✗	✗	✗
ranking						
trophy		✗	1F3C6	✓	✓	✓
[3]gold		✗	✗	✗	✗	✗
[3]silver		✗	✗	✗	✗	✗
[3]bronze		✗	✗	✗	✗	✗

8. TOOLS AND OFFICE SUPPLIES

A large number of interesting, generic icons are built in smartphones and in low-end mobile phones featuring the Openwave browser. There are few equivalent symbols in WAP, but these optional dictionaries (like all others listed in this document) have rarely, if ever, been implemented in commercial WAP handsets anyway.

WAP	Openwave		ISO	WP	Android	iOS
Class – name	Nr	Name	Code	8.0	4.1 - 4.2	5.0 - 6.0
appliance						
pager		✗	1F4DF	✓	✓	✓
antenna		✗	1F4E1	✓	✓	✓
camera	94	camera1	1F4F7	✓	✓	✓
phone	85	phone1	1F4DE	✓	✓	✓
mobilePhone	161	phone3	1F4F1	✓	✓	✓
fax	166	fax	1F4E0	✓	✓	✓
pc		✗	1F4BB	✓	✓	✓
✗	111	camcorder	1F4F9	✓	✓	✓
tool						
hammer		✗	1F528	✓	✓	✓
✗	145	[3]tag	✗	✗	✗	✗
✗	83	briefcase	1F4BC	✓	✓	✓
✗	59	floppy1	1F4BE	✓	✓	✓
✗	126	floppy2	[1]**1F4BE**	✓	✓	✓
✗	84	folder2	1F4C2	✓	✓	✓
✗	103	document2	1F4C3	✓	✓	✓
✗	131	rolocard	1F4C7	✓	✓	✓
✗	159	graph2	1F4C8	✓	✓	✓
✗	128	graph1	1F4C9	✓	✓	✓
✗	127	chart	1F4CA	✓	✓	✓
✗	92	clipboard	1F4CB	✓	✓	✓
✗	49	pushpin	1F4CC	✓	✓	✓
✗	137	thumbtack	1F4CD	✓	✓	✓
✗	157	ruler1	1F4CF	✓	✓	✓

WAP	Openwave		ISO	WP	Android	iOS
Class – name	Nr	Name	Code	8.0	4.1 - 4.2	5.0 - 6.0
✗	158	ruler2	1F4D0	✓	✓	✓
✗	142	[3]tablet	✗	✗	✗	✗
✗	121	note1	1F4D3	✓	✓	✓
✗	122	note2	1F4D4	✓	✓	✓
✗	97	book1	1F4D7	✓	✓	✓
✗	102	book4	1F4D8	✓	✓	✓
✗	100	book2	1F4D9	✓	✓	✓
✗	147	books	1F4DA	✓	✓	✓
✗	136	scroll	1F4DC	✓	✓	✓
✗	91	note3	[1]**1F4DD**	✓	✓	✓
✗	135	battery	1F50B	✓	✓	✓
✗	162	plug	1F50C	✓	✓	✓
✗	48	bell	1F514	✓	✓	✓
✗	130	flashlight	1F526	✓	✓	✓
✗	153	wrench	1F527	✓	✓	✓
✗	123	boltnut	1F529	✓	✓	✓
✗	114	knife	1F52A	✓	✓	✓
✗	104	scissors	2702	✓	[7]✓	[6]✓
✗	151	envelope2	2709	✓	[7]✓	[6]✓
✗	149	pencil	270F	✓	[7]✓	[6]✓
weapon						
gun		✗	1F52B	✓	✓	✓
bomb		✗	1F4A3	✓	✓	✓

9. TRANSPORT AND MAPS

Pictograms dealing with places and modes of transport are highly relevant in all Web sites manipulating location-based information. Fortunately, the coverage is fairly good amongst all device classes.

WAP	Openwave		ISO	WP	Android	iOS
Class – name	Nr	Name	Code	8.0	4.1 - 4.2	5.0 - 6.0
map						
signal	99	trafficlight	1F6A5	✓	✓	✓
parking		✗	1F17F	✓	✓	✓
busStop		✗	1F68F	✓	✓	✓
restroom		✗	1F6BB	✓	✓	✓
policeStation		✗	[1]**1F46E**	✓	✓	✓
postOffice	129	mailbox	1F3E4	✓	[4]1F3E3	✓
bank		✗	1F3E6	✓	✓	✓
atm		✗	1F3E7	✓	✓	✓
hospital		✗	1F3E5	✓	✓	✓
convenienceStore		✗	1F3EA	✓	✓	✓
school		✗	1F3EB	✓	✓	✓
park		✗	26F2	✓	✓	✓
hotel		✗	1F3E8	✓	✓	✓
gasStation		✗	26FD	✓	✓	✓
house	112	house	1F3E0	✓	✓	✓
cross		✗	26EA	✓	✓	✓
restaurant	160	meal2	1F374	✓	✓	✓
store		✗	1F3EC	✓	✓	✓
cafe		✗	[1]**1F375**	✓	✓	✓
fastfood		✗	1F354	✓	✓	✓
pub	65	mug	[1]**1F37B**	✓	✓	✓

WAP	Openwave		ISO	WP	Android	iOS
Class – name	Nr	Name	Code	8.0	4.1 - 4.2	5.0 - 6.0
movie	110	videocam	1F3A6	✓	✓	✓
karaoke		✗	1F3A4	✓	✓	✓
spa		✗	2668	✓	[5] ✓	✓
amusementPark		✗	1F3A1	✓	✓	✓
[3]zoo		✗	✗	✗	✗	✗
building		✗	1F3E2	✓	✓	✓
ticket	106	ticket	1F3AB	✓	✓	✓
noSmoking		✗	1F6AD	✓	✓	✓
smoking		✗	1F6AC	✓	✓	✓
✗	156	factory	1F3ED	✓	✓	✓
✗	31	circleslash	1F6AB	✓	✓	✓
✗	13	speaker	1F4E2	✓	✓	✓
✗	11	isymbol	2139	✓	✓	[6] ✓
✗	90	usa	[2]1F1FA 1F1F8	✓	✗	✓
vehicle						
bus		✗	1F68C	✓	✓	✓
train	172	train	1F686	✓	✗	✓
expressTrain	**172**	**[1]train**	1F684	✓	✓	✓
car	125	car	1F697	✓	✓	✓
taxi	**125**	**[1]car**	1F695	✓	✓	✓
plane	168	plane	2708	✓	[7] ✓	[6] ✓
ship	169	boat	1F6A2	✓	✓	✓
onFoot		✗	1F6B6	✓	✓	✓
subway		✗	1F687	✓	✓	✓

WAP	Openwave		ISO	WP	Android	iOS
Class – name	Nr	Name	Code	8.0	4.1 - 4.2	5.0 - 6.0
rocket		✗	1F680	✓	✓	✓
✗	148	truck	1F69A	✓	✓	✓

10. MISCELLANEOUS

Openwave defines a number of geometric, typographical and user-interface icons that have no equivalent in WAP, but map directly to well-supported UNICODE characters. The vendor-specific *logo* and *pclogo* icons appear to be redundant.

WAP	Openwave		ISO	WP	Android	iOS
Class – name	Nr	Name	Code	8.0	4.1 - 4.2	5.0 - 6.0
Internet user interface						
✗	500	pclogo	✗	✗	✗	[6] F8FF
✗	501	lockcertificate	1F510	✓	✓	✓
✗	502	caps	1F520	✓	✓	✓
✗	503	lower	1F521	✓	✓	✓
✗	504	numbers	1F522	✓	✓	✓
✗	505	symbols	1F523	✓	✓	✓
✗	506	accept	2714	✓	[5] ✓	[6] ✓
✗	507	checkbox	2611	✓	✗	[6] ✓
✗	508	edit	2712	✓	[7] ✓	[6] ✓
✗	509	radio	1F518	✓	✓	✓
✗	510	view	1F50E	✓	✓	✓
✗	512	bookmarks	1F516	✓	✓	✓
✗	513	exit	[1] **1F4F2**	✓	✓	✓
✗	514	home	[1] **1F3E0**	✓	✓	✓
✗	515	inbox	1F4EB	✓	✓	✓
✗	516	mark	1F4D1	✓	✓	✓

WAP	Openwave		ISO	WP	Android	iOS
Class – name	Nr	Name	Code	8.0	4.1 - 4.2	5.0 - 6.0
✗	518	reload	1F503	✓	✓	[6] ✓
✗	519	arrow	27B2	✓	✓	[6] ✓
Typography						
✗	150	logo	✗	✗	✗	[6] F8FF
✗	173	blankfull	2003	✓	✓	✓
✗	174	blankhalf	2002	✓	✓	✓
✗	175	blankquarter	2005	✓	✓	✓
✗	1	exclamation1	2755	✓	✓	✓
✗	2	exclamation2	2757	✓	✓	✓
✗	3	question1	2754	✓	✓	✓
✗	4	question2	2753	✓	✓	✓
✗	26	plus	2795	✓	✓	✓
✗	27	minus	2796	✓	✓	✓
✗	55	multiply	2716	✓	[5] ✓	✓
✗	66	divide	2797	✓	✓	✓
✗	40	bigcircle1	2B55	✓	✓	✓
✗	62	cross2	274C	✓	✓	✓
✗	132	check2	2713	✓	[5] ✓	[6] ✓
✗	61	cross1	274E	✓	✓	✓
✗	73	checkmark1	2705	✓	✓	✓
Geometric shapes						
✗	117	roundarrow1	21AA	✓	[5] ✓	[6] ✓
✗	118	roundarrow2	21A9	✓	[5] ✓	[6] ✓
✗	29	uparrow1	21E7	✓	[5] ✓	[6] ✓

WAP	Openwave		ISO	WP	Android	iOS
Class – name	Nr	Name	Code	8.0	4.1 - 4.2	5.0 - 6.0
✗	30	downarrow1	21E9	✓	5 ✓	6 ✓
✗	63	rightarrow1	21E8	✓	5 ✓	6 ✓
✗	64	leftarrow1	21E6	✓	5 ✓	6 ✓
✗	33	uptri1	25B3	✓	5 ✓	6 ✓
✗	32	downtri1	25BD	✓	5 ✓	6 ✓
✗	6	righttri1	25BB	✓	✗	6 ✓
✗	5	lefttri1	25C1	✓	5 ✓	6 ✓
✗	7	lefttri2	25C0	✓	5 ✓	✓
✗	88	uptri3	1F53A	✓	✓	✓
✗	89	downtri3	1F53B	✓	✓	✓
✗	9	littlesquare1	25AB	✓	✓	6 ✓
✗	17	medsquare1	25FD	✓	✓	6 ✓
✗	21	bigsquare1	25FB	✓	✓	6 ✓
✗	38	biggestsquare1	2B1C	✓	✓	✓
✗	10	littlesquare2	25AA	✓	5 ✓	6 ✓
✗	18	medsquare2	25FE	✓	✓	6 ✓
✗	22	bigsquare2	25FC	✓	✓	6 ✓
✗	39	biggestsquare2	2B1B	✓	✓	✓
✗	19	littlediamond1	1F539	✓	✓	✓
✗	36	bigdiamond1	1F537	✓	✓	✓
✗	20	littlediamond2	1F538	✓	✓	✓
✗	37	bigdiamond2	1F536	✓	✓	✓
✗	23	littlecircle1	26AA	✓	✓	6 ✓

WAP	Openwave		ISO	WP	Android	iOS
Class – name	Nr	Name	Code	8.0	4.1 - 4.2	5.0 - 6.0
✗	40	bigcircle1	1F535	✓	✓	✓
✗	24	littlecircle2	26AB	✓	✓	[6] ✓
✗	41	bigcircle2	1F534	✓	✓	✓

11. DETECTION OF TERMINAL CAPABILITIES

While Device Description Repositories (DDR) include few attributes directly related to pictograms, an application server can nevertheless detect support for this capability with a reasonable level of confidence.

- **Openwave and WAP**.

  If the browser name and browser version are known, then one can readily determine whether the client software implements WAP or Openwave pictograms, and, implicitly, which catalogues of symbols are available.

  With WURFL, this is a matter of checking attribute *mobile_browser* against a series of browser names, and attribute *mobile_browser_version* against a range of versions. The compatibility of browsers with standard WAP and Openwave icon sets is detailed in the article mentioned in the introduction.

- **ISO**.

  Support for ISO pictographs can be derived from the operating system name and version, and the browser name and version. In WURFL, those additional attributes correspond to *device_os* and *device_os_version*.

  Data about the OS are required because ISO pictographs are characters defined by the system font of the handset; browser identification is necessary because different browsers deal with the UNICODE space differently. Thus, while the default stock browsers of Windows Phone, iOS and Android handle pictographs without problems, Opera Mobile 12.0 is unable to render every character outside the Basic Multilingual Plane.

  Regrettably, whereas ISO characters are all neatly organized in distinct UNICODE blocks, mobile operating systems may implement these only partially – as revealed by a quick look at the preceding tables. Configuring a back-end system to serve appropriate symbols for each device can therefore become a tedious task, as this cannot be reduced to a simple “character block is available/unavailable” binary logic.

- **Emoji**.

  One cannot rely upon common attributes to determine the availability of emojis: browser or operating system identifiers of phones commercialized in Japan are frequently unknown or ambiguous. Nippon operators classify

devices in generations (e.g. FOMA 900i, FOMA 902i, FOMA 903i, etc. by NTT DoCoMo), and duly document the corresponding browser capabilities and pictogram sets in their manuals and WWW sites. Unfortunately, well-known DDR developed in Western countries do not store this information; when they do, not with enough accuracy: WURFL, for instance, has a boolean attribute simply indicating whether emojis are supported or not.

In any case, Japanese mobile networks constitute such a peculiar market that special-purpose gateways and server utilities have been developed there to cope with the multiplicity of proprietary pictographic formats.

The utilization of ISO pictographs and Japanese emojis raises further issues related to character encodings, whose basics are explained in another article at http://areppim.com/b2evolution/usrblogs/technotes/?p=33.

12. REQUIREMENTS ON PICTOGRAPHIC RESOURCES

Pictograms must fulfil certain design criteria to ensure their usability in a mobile environment. Manufacturers publish detailed instructions regarding the technical characteristics (dimensions, colours, aspect, style) of icons embedded in native applications running on their devices; references can be found in the table below.

Vendor	OS	Reference for application iconography
Apple	iOS	http://developer.apple.com/library/ios/#documentation/userexperience/conceptual/mobilehig/IconsImages/IconsImages.html
Google	Android	http://developer.android.com/guide/practices/ui_guidelines/icon_design.html
Microsoft	Windows Phone	http://msdn.microsoft.com/en-us/library/windowsphone/develop/hh184843(v=vs.105).aspx
Nokia	Meego S40 Symbian	http://www.developer.nokia.com/Resources/Library/Design_and_UX/#!iconography-style-summary.html
RIM	Blackberry	Version 6 http://docs.blackberry.com/en/developers/deliverables/17965/Icons_and_indicators_2_0_514453_11.jsp http://docs.blackberry.com/en/smartphone_users/deliverables/21204/ Version 7 http://docs.blackberry.com/en/developers/deliverables/28627/Icons_and_indicators_2_0_514453_11.jsp Version 10 https://developer.blackberry.com/devzone/design/bb10/visual_style.html
Samsung	Bada	http://developer.bada.com/help/topic/com.osp.documentation.help/html/app_dev_process/setting_app_info.htm

Hereafter, we sketch some clearly non-exhaustive requirements that complement these vendor-specific apps-oriented guidelines, but are targeted at cross-platform Web development with non-proprietary technologies.

- **Formats**.

  A typeface represents a future-proof approach to deliver pictograms to mobile devices. When packaged as a Web font, all common formats (WOFF, TTF, SVG, OTF, EOT) must be generated because different device models recognize different subsets of this group of standards. An additional image pack caters for those numerous mobile phones incapable of processing Web fonts. Here, PNG is indispensable because of the deplorably inconsistent support for SVG images across mobile browsers.

- **Dimensions**.

  Even vector-based pictures may not retain their legibility when rescaled; icons must be delivered in several sizes, crafted to remain crisp in all their variations, as explained in http://www.pushing-pixels.org/2011/11/04/about-those-vector-icons.html. Rather than a single pictogram for “telephone”, there may be different images designed, for instance, to appear in large menus and titles, in the normal body of text, and as small adjuncts to form fields and status areas. When starting with recommended icon dimensions for native apps, one must adjust them to those Web-orientated use-cases.

- **Colours**.

  The mainstream style of the WWW is derived from printed documents: dark text on a light background. This presentation is adequate for all sorts of mobile phones, including those operated via LCD touch screens. Recently, “black themes”, i.e. light text on a dark background, have taken hold in order to cope with the starkly brightness-dependent power consumption of OLED displays (about an order of magnitude more for white than for sombre colours, and three times as much as LCD screens in the former case). Pictograms should be legible in both contexts, which, in the case of polychrome symbols, might entail designing two complementary icon sets.

- **Dictionaries**.

  The pictograms listed in this and the other referenced paper are well-established and are sufficient for a wide range of purposes. Any extension must comply with UNICODE (symbols, code points, names), as this norm progressively supersedes all other standards and is already the default in Windows Phone, iOS and Android. Unavoidably, some non-standard signs – especially logos for the plethora of Internet stores and social networks – may have to be added to the collection on a case-by-case basis.

Simple, legible symbols are preferable to the sometimes overly refined and colourful emojis favoured by Apple; however, the understandability of pictograms is a complex matter whose thorough discussion is way beyond the scope of the present article. As for the technical aspects of programming mobile Web applications with custom icon sets, they are enough to form the topic of a separate instalment.

REFERENCE

Eduardo Casais: *Domain-specific pictograms for mobile Web applications*, technical paper, areppim AG, Bern, Switzerland, 2013-01-25, 19 pages.

This paper can be downloaded in PDF format from areppim.com at

http://areppim.com/b2evolution/usrblogs/technotes/?p=38

ATTRIBUTION

The tables use icons from the fatcow collection at http://www.fatcow.com/free-icons.

ABOUT THE AUTHOR

Eduardo Casais has been working on mobile Web technologies since 1997. He led the development of content adaptation facilities in the Nokia WAP Gateway. He was also involved in projects dealing with transcoders for WWW on TV set-top-boxes. Eduardo Casais has been an invited expert to the Mobile Web Best Practices Working Group of the World-Wide-Web Consortium, where he participated in the elaboration of the Content Transformation Guidelines.

ABOUT AREPPIM AG

areppim AG develops Internet applications, with an emphasis on the display of quantitative information. The site http://www.areppim.com publishes data on a wide range of topics, presented as intuitive, content-rich charts and often accompanied by concise analyses. Naturally, data can also be accessed with mobile phones at http://mobile.areppim.com through a no-frills, mobile-optimized interface.

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